Fishery Management Report No. 19-24

Cook Inlet Area Groundfish Management Report, 2016–2018

by

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and

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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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ABSTRACT

The Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries, manages all commercial groundfish fisheries within the Cook Inlet Area (Registration Area H), defined as territorial waters from the shoreline to 3 nautical miles (nmi) offshore located west of Cape Fairfield and north of the latitude of Cape Douglas. The area is divided into the Cook Inlet and North Gulf districts. Additionally, ADF&G has management authority for lingcod *Ophiodon elongatus*, black rockfish *Sebastes melanops*, and dark rockfish *S. ciliatus* in waters of the exclusive economic zone (EEZ) located adjacent to the Cook Inlet Area from 3 nmi offshore. This report summarizes annual harvests and exvessel values for commercial groundfish fisheries during 1988–2018, management changes for 2016–2018, and recent regulatory changes. During 2018, Cook Inlet Area commercial groundfish harvests totaled 1.5 million lb and generated an estimated exvessel value of $924,473, the lowest harvest and value since the early 1990s. Pacific cod *Gadus macrocephalus* has contributed the greatest economic yield since 1990; however, in 2018, the Pacific cod population in the Gulf of Alaska took a major downturn leading to a 77% reduction in guideline harvest levels (GHLs) with reductions in harvest and revenue. Sablefish *Anoplopoma fimbria* has the second highest annual exvessel value since 2000 due to a high price per pound but 2018 was the lowest harvest since 1995 and the lowest exvessel value since 1998. Rockfish harvest in 2018 was half of the harvest in 2017, partly a result of lower target fishery Pacific cod GHLs. Lingcod harvest increased along with its value in 2017, and again in 2018 to nearly 50,000 lb and over $54,000 in 2018, which was the highest value in the history of the fishery. Walleye pollock *Theragra chalcogramma* harvest was less than 2,000 lb harvested as bycatch.

Key words: Cook Inlet, Area H, commercial fisheries, groundfish, harvest, management, exvessel value, lingcod, *Ophiodon elongates*, black rockfish, *Sebastes melanops*, dark rockfish, *Sebastes ciliatus*, Pacific cod, *Gadus macrocephalus*, sablefish, *Anoplopoma fimbria*, walleye pollock, *Theragra chalcogramma*, yelloweye rockfish *Sebastes ruberrimus*, state waters, parallel, Annual Management Report AMR

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) Division of Commercial Fisheries manages all commercial groundfish fisheries within the territorial waters of the Cook Inlet Area (Registration Area H), which are defined as those waters from the shoreline to 3 nautical miles (nmi) offshore (5 AAC 39.975). Under state regulation 5 AAC 39.975 *Definitions* (21), groundfish are defined as all marine finfish except halibut, osmerids, herring, and salmonids. For territorial waters, the Alaska Board of Fisheries (BOF) establishes management regulations and ADF&G uses its emergency order (EO) authority to make adjustments to fishing time and area. The BOF schedules regular meetings for area groundfish on a triennial basis. Except for lingcod *Ophiodon elongatus*, black rockfish *Sebastes melanops*, blue rockfish *S. mystinus*, and dark rockfish *S. ciliatus*, the National Marine Fisheries Service (NMFS) manages groundfish resources in waters of the exclusive economic zone (EEZ), located from 3 to 200 nmi offshore, under Fishery Management Plans (FMPs) developed by the North Pacific Fishery Management Council (NPFMC). Gulf of Alaska (GOA) waters under federal jurisdiction located adjacent to the Cook Inlet Area are within the Central Gulf of Alaska Regulatory Area (CGOA).

The Cook Inlet Area includes territorial waters west of Cape Fairfield (148°50.25′ W long) and north of the latitude of Cape Douglas (58°51.10′ N lat) and is divided into 2 districts: Cook Inlet and North Gulf (Figure 1). The Cook Inlet District includes waters of Cook Inlet north of a line from Cape Douglas to Point Adam (59°15.27′ N lat) and the North Gulf District comprises the remaining waters of the management area, primarily the waters along the outer Kenai Peninsula. Commercial harvests reported here are representative of the current area definition (since being redefined in 1996).

Within the Cook Inlet Area, directed fisheries occur for several commercially important groundfish, including sablefish *Anoplopoma fimbria*, Pacific cod *Gadus macrocephalus*, walleye pollock *Gadus chalcogrammus* (previously *Theragra chalcogramma*; Page et al. 2013), lingcod,

and pelagic shelf rockfish species (primarily black rockfish). Alaska groundfish regulations also accommodate incidental groundfish bycatch from other directed groundfish, halibut, and salmon and herring gillnet fisheries. Some additional species landed as bycatch to directed groundfish fisheries include Pacific spiny dogfish *Squalus suckleyi* (previously *Squalus acanthias*; Ebert et al. 2010), Pacific sleeper shark *Somniosus pacificus*, salmon shark *Lamna ditropis*, commander squid *Berryteuthis magister*, giant Pacific octopus *Octopus dofleini*, big skate *Raja binoculata*, longnose skate *Raja rhina*, other skates *Bathyraja* spp., shortspine thornyhead *Sebastolobus alascanus*, and numerous rockfishes *Sebastes* spp. Alaska regulations adopted in 1997 prohibited directed commercial fishing for sharks (5 AAC 28.084) and allowed skate fishing of the order *Rajiformes*, only under a commissioner's permit (5 AAC 28.083). However, effective in 2005, the BOF provided for directed spiny dogfish (shark) fishing under the terms of a commissioner's permit. Few flatfish landings have occurred but numerous species of flatfish make up a large portion of the groundfish biomass within Cook Inlet Area waters (Bechtol 2001; Gustafson and Bechtol 2001).

Commercial groundfish harvests are primarily monitored inseason through required reporting on ADF&G fish tickets (5 AAC 39.130); additional information was derived from dockside sampling of the commercial catch, fishermen interviews, and logbooks for some fisheries. Fish ticket information is collected both electronically through the eLandings systems, a multi-agency (ADF&G, NMFS, and International Pacific Halibut Commission) harvest accounting program, and through submission of conventional (paper) fish tickets. These records are reviewed and edited as needed by ADF&G staff, entered into the statewide fish ticket database, and archived.

Dockside sampling involves the collection of biological data such as species, size, sex, gonad condition, and groundfish age structures (e.g., otoliths, vertebrae, fin spines, fin rays). Fishermen interviews are used to verify information about harvest location and effort. Prior to 2001, dockside activities occurred opportunistically and were contingent upon ADF&G staff availability. Subsequently, through grant funding under the Alaska Fisheries Information Network (AKFIN), a regional groundfish sampling coordinator and a dedicated fisheries technician were hired, resulting in more consistent biological sampling of the commercial harvest. Statewide reporting requirements specify that all groundfish retained but not delivered for sale, such as harvest that is retained for personal use or used as bait at sea, must be reported on an ADF&G fish ticket. This has helped improve fisheries management through complete and accurate documentation of fisheries removals.

Legal gear types for groundfish fishing in the Cook Inlet Area are longline, pelagic trawl, mechanical jig, hand troll, and pot gear. In area fisheries, if more than 1 gear type is legal, only 1 gear type may be aboard a vessel at any time, with the exception of mechanical jig and hand troll gear, which may be fished at the same time as jig gear, but under separate Commercial Fisheries Entry Commission (CFEC) permit cards. Fishermen operating groundfish gear or groundfish tenders in Cook Inlet Area waters must have an area registration prior to fishing or tendering. Another area regulation establishes a 24-hour delivery requirement following the closure of a directed season. Some open groundfish seasons are established in regulation 5 AAC 28.310. For many species, season openings are specified in regulation as calendar dates while season closures and other adjustments are set by EO (Table 1). For Pacific cod, the parallel and state-waters seasons established in regulation 5 AAC 28.367 *Cook Inlet Pacific Cod Management Plan* are opened by EO contingent upon management actions for the Pacific cod fishery in the adjacent federal CGOA (Table 2). For a miscellaneous groundfish species that is not otherwise specified

in regulation, the fishing season is established as a provision of the miscellaneous groundfish commissioner's permit (5 AAC 28.379), a regulation first effective in 1999.

This report summarizes annual harvests, in pounds and exvessel values (Appendix A1), for commercial groundfish fisheries during 1988–2018; describes management changes for the period 2016–2018; and summarizes recent regulatory changes based upon BOF actions.

PACIFIC COD

MANAGEMENT AND REGULATIONS

Current elements of the Cook Inlet Area Pacific cod parallel season include:

- Seasons inside state waters open and close by EO to coincide with the federal seasons in the adjacent CGOA area;
    - Initial seasons for pot, jig, and longline open January 1 and close by gear type to coordinate with federal gear sector closures in CGOA for pot, jig, and hook-and-line (HAL; vessels less than 50 ft, vessels more than or equal to 50 ft) announced by NMFS;
    - Parallel seasons may open and close by EO with federal "B" seasons and also unscheduled openings and closures in the CGOA; parallel seasons typically open with regulatory "B" season: June 10 for jig and September 1 for pot and longline;
    - Harvest accrues to federal total allowable catch (TAC);
- Nonexclusive groundfish area vessel registration (gear-specific) required, a vessel may be registered to take Pacific cod in 1 or more nonexclusive registration areas;
- Adopt federal Vessel Monitoring System (VMS) requirements inside state waters (jig exempt).

Current elements of the Cook Inlet Area Pacific cod state-waters season include:

- Season opens by EO 24 hours following closure of the initial federal season in the CGOA area by NMFS;
- Exclusive area registration: vessel may not register for more than 1 exclusive Pacific cod registration area during a state-waters season;
- Guideline harvest level (GHL) calculated as 3.75% of the CGOA estimated total allowable harvest;
- GHL allocated 85% to pot gear and 15% to jig gear;
- Harvest cap of 25% of the GHL on vessels longer than 58 feet and fishing pot gear;
- Legal gear is no more than 60 pots per vessel with a buoy tag requirement, or up to 5 mechanical jigging machines with a maximum of 30 hooks per line;
- If the jig allocation is not achieved by September 1, the remainder of the allocation becomes available to all legal gear; and
- Gear limits and the exclusive area registration requirement may be relaxed after October 30, if ADF&G considers the action necessary to achieve the GHL.

REGULATION DEVELOPMENT

Historically, the Cook Inlet Area commercial Pacific cod fishery was managed by EO to coincide with seasons in the adjacent federal CGOA. First implemented in 1997, the *Cook Inlet Pacific Cod Management Plan* (5 AAC 28.367) defines 2 seasons, a "parallel" and a "state-waters" season. Similar to historical management, the parallel season was set by EO to coincide with the federal CGOA fishery for Pacific cod with respect to season dates and allowable gear types, provided those gear types were legal in state waters, and was further guided by statewide regulation 5 AAC 28.087 regarding Steller Sea Lion (SSL) protection measures and use of VMS. Harvest during the parallel season accounts towards the federal TAC. The state-waters season occurs after the initial parallel season and is managed for a separate GHL, which is a percentage of the estimated total allowable harvest for the federal CGOA by state regulation. Total allowable harvest is equivalent to acceptable biological catch (ABC) in NMFS documents; ABC is the term used herein. This management plan originally set the GHL at 2.25% of the ABC, with step-up provisions to 3% and then to a maximum of 3.75%. The plan also initially allocated 50% of the GHL each to pot and jig gear. Jig gear includes mechanical jig and hand troll gear. Statewide regulations for groundfish pots specify tunnel eye openings, perimeters of 36 inches or less (5 AAC 28.050 (e)), and a biodegradable escape mechanism, as described in 5 AAC 39.145.

Area regulations specify localized closures to groundfish pots in portions of Kachemak Bay and Kamishak Bay (5 AAC 28.350) to protect depressed king crab *Paralithodes platypus* stocks and rebuilding Tanner crab *Chionoecetes bairdi* stocks (Bechtol et al. 2002; Figure 2). The Kachemak Bay pot closure regulation, partially defined by a depth contour, was amended in 2002 and defined by latitude and longitude coordinates. In 2016, this area was reduced in size to provide more fishing opportunity for Pacific cod fishermen while still protecting crab habitat. Information from ADF&G surveys has better defined the Tanner crab habitat area; this information was used to delineate the updated closure area.

Since adoption in 1997, the state-waters Pacific cod season, which was designed to provide additional Pacific cod fishing opportunities to local vessels using pot and jig gear, has been modified numerous times. The management plan originally specified a state-waters season that opened 7 days following closure of the parallel season and closed each time the federal CGOA directed Pacific cod season, and concurrent parallel season, reopened.

During the state-waters season, there was a pot closure period of April 7 to June 15 that addressed an industry concern of reduced quality for post-spawn Pacific cod product. Although the product quality concerns meant to be addressed by the pot closure period were not realized, the closure period was retained, but reduced to May 1 through June 15 by BOF action in 1999. The closure was retained due to user interest to ensure a fishing season for Pacific cod in the fall, and it provided an additional 3 weeks of pot fishing time in April. In 2000, a 7-day closure between the parallel and state-waters seasons, intended to ensure separation of the fisheries and facilitate accurate seasonal catch accounting, was reduced to 24 hours and the management plan was further modified to enable the state-waters season to remain open despite subsequent federal CGOA openings, which would have normally resulted in additional parallel seasons. However, in the Cook Inlet Area, parallel seasons have typically continued to be coordinated with federal CGOA seasons, but the management plan modifications allow more flexibility, if needed.

In 2001, the BOF recognized NMFS fishing gear closures for Pacific cod in critical habitat around the haulouts and rookeries of endangered SSL by giving the commissioner EO authority

to adopt the federal closures surrounding these areas. As a result, fishing with longline or pot gear within 10 nmi of Sugarloaf Island (within the Barren Islands group) and Outer Pye Island has been closed annually since 2001 via EO (Figure 3).

Beginning in 2002, the BOF also adopted the federal VMS requirement for parallel Pacific cod fisheries. This action was adopted to provide more precise location information in support of fishery enforcement efforts and protection of essential fish habitat and areas of particular concern.

Due to attainment of the 2003 GHL, and consistent with the management plan, beginning in 2004, the state-waters Pacific cod allocation increased from 2.25% to 3.00% of the federal CGOA ABC. During the 2004 meeting cycle, the BOF adopted several regulatory changes to the Pacific cod state-waters season that became effective during 2005. These changes included increasing the percent calculation for the GHL from 3.00% to 3.75%, setting a harvest cap of 25% of the GHL for vessels greater than 58 feet in overall length, and establishing new gear allocations that changed from 50% each to 75% for pot and 25% for jig gear.

At a special 2011 Pacific cod BOF meeting, the BOF amended all of the area specific Pacific cod management plans in order to coordinate with new federal gear sector allocations implemented in 2012. These regulatory changes allowed staggered parallel and state-waters seasons by gear type in order to coordinate with the now staggered federal Pacific cod seasons. The BOF also adopted new allocations for the Cook Inlet Area GHL of 85% for pot gear and 15% for jig gear, with a step-up provision when the jig allocation would increase by 5% the following year, if 90% of the jig allocation was achieved in a given year, up to a maximum of 25%. Additionally, the BOF eliminated the May 1 to June 15 pot closure.

FISHERY OVERVIEW: 2016-2018, RECENT YEARS

Pacific cod abundance in the Gulf of Alaska and surrounding areas experienced a drastic decline in 2018, which resulted in a 77% reduction in GHLs. In the Cook Inlet Area, the state-waters GHL was reduced from over 3.6 million lb in 2017 to 671,141 lb in 2018 (Table 3). This reduction was attributed to an ocean condition called the “warm blob,” a marine heat wave that negatively affected some marine species, including Pacific cod. Pacific cod is an ectotherm, meaning that temperature directly affects its metabolism (Barbeaux 2017). These warmer water temperatures occurred between 2014 and 2016; this was an unusual event due to the magnitude of the temperature increase (Bond et al. 2015).

Research has shown that Pacific cod are very sensitive to water temperature, particularly during early stages of their development. Optimal egg development occurs in slim margins of temperature, salinity and oxygen levels (Barbeaux 2017). Larval production is also driven by water temperature because cold sea surface temperatures produce higher larval abundance and higher temperatures produce less larvae (Doyle and Mier 2016). Higher temperatures increase metabolic demands of Pacific cod and the “warm blob” also negatively affected primary production and reduced abundance of key zooplankton species, such as copepods and krill, which in turn deplete food sources for higher trophic levels and increased mortality (Barbeaux 2017).

The parallel Pacific cod fishery in Cook Inlet Area had been dominated by longline harvest following the 2012 federal gear sector splits; however, in 2016 and 2017, pot gear dominated the harvest before falling below longline gear in 2018. The decreased Pacific cod abundance, and

TAC, resulted in a reduction of harvest for all gear types, from nearly 2.2 million lb in 2016 to 744,128 lb in 2018, which was the lowest harvest since 2010. Longline harvest decreased from 990,491 lb in 2016 to 484,260 lb in 2018, and pot harvest decreased from 1.1 million lb in 2016 to 259,669 lb in 2018. In 2018, jig harvest was at an all-time low at 199 lb. Vessel participation from all gear types ranged from 70 in 2016 to 40 vessels in 2018. The 107 landings in 2018 were the lowest observed in 30 years (Table 4; Figure 4).

In the state-waters fishery, pot and jig seasons open 24 hours after the close of the parallel season for each respective gear type (Table 2). The state-waters Pacific cod fishery GHL is calculated as 3.75% of the federal CGOA ABC and decreased from nearly 4.1 million lb in 2016 to 671,141 lb in 2018 (Table 3). The highest GHL since the fishery was established was 5.1 million lb in 2015 (Table 3; Figure 5). The GHL is allocated 85% to vessels using pot gear and 15% to jig gear but vessels using jig gear have taken less than 2% of their allocation. Vessels using pot gear harvested 53% (2017) to 98% (2018) of the pot gear allocation. Pot vessels had a low fishery catch per unit effort (CPUE) in 2017 and harvested about half of their allocation. Although the GHL was relatively high, the below-average harvest was a direct indication that the Pacific cod population in the Gulf of Alaska was declining.

During the parallel season, Pacific cod harvest is more concentrated in statistical areas close to the ports of Homer and Seward (Figure 6). Longline gear comprised the majority of harvest delivered into Seward and pot gear dominated the harvest landed in Homer. Vessels that fish using pots dominate the state-waters harvest and these vessels deliver almost exclusively into Homer (Figure 7). Most of the larger vessel Pacific cod harvest occurs in the statistical areas around the Chugach Islands in the North Gulf District (NGD).

Since 2016, the state-waters pot season has opened in February (Tables 1 and 2). Vessels longer than 58 feet are limited to 25% of the total GHL, and the number of participants has been 3 vessels or less, which resulted in a variety of season lengths for this group of participants (Table 3). For the smaller vessel participants, which are those vessels less than or equal to 58 feet, between 2016 and 2018, the state-waters season ranged from 5 months to 6.5 months, and in 2018 the season was open until September 1 when the parallel "B" season opened.

From 2016 to 2018, management of the Pacific cod fishery was highly variable for vessels that fished using jig gear. In 2016, the parallel season opened January 1 and closed March 1, which triggered a state-waters opening. Then, the state-waters season closed, and the parallel season reopened on March 21, concurrent with the federal CGOA fishery, and remained open until December 31, the regulatory end of the season. In 2017, the parallel jig season was open all year, January 1 through December 31. In 2018, because the TAC was so small, the parallel jig season never opened, and the state-waters season was open all year, January 1 through December 31 (Table 2).

Longline is a legal gear type for the parallel Pacific cod fishery in the Cook Inlet Area. From 2016 to 2018, a majority of the harvest came from NGD; however, in 2016, vessels fishing in the Cook Inlet District (CID) harvested 961,639 lb, which was close to the 1.2 million lb harvested in the NGD (Table 5). During the state-waters season, the district with the highest harvest varied. The highest harvest in both the CID and NGD for this time period was in 2016 when 11 vessels harvested 1.8 million lb in CID and 11 vessels harvested 1.1 million lb in NGD (Table 6). The lowest harvest and effort was in 2018, when 6 vessels harvested 225,948 lb in CID and 4 vessels harvested 331,339 lb in NGD (Table 6).

FISHERY OVERVIEW: THE EARLY YEARS

Plan 5 AAC 28.367, implemented in 1997, first established the parallel season and the state-waters seasons. Prior to 1997, the Cook Inlet Area commercial Pacific cod fishery was managed via EO to coincide with federal seasons in the adjacent CGOA. Management of the Cook Inlet fishery was similar to the parallel season; however, for reporting purposes, this historical season was considered the parallel season. Parallel season harvests by all gear types were combined and accounted to a single federal CGOA TAC until federal gear sector splits were implemented in 2012. Parallel seasons historically spanned January 1 to approximately mid-March, and more recently have ranged between 1 and 2 months (Table 2). The state-waters fishery was apportioned a percentage of the federal CGOA ABC for the GHL when it was established in 1997.

Parallel season annual harvest and effort from 1988 to 1996 ranged from 36,846 lb from 21 landings by 9 vessels in 1989 to 5,441,421 lb from 868 landings by 190 vessels in 1992 (Table 4). The parallel season harvest first exceeded 1.0 million lb in 1991 and averaged 3.3 million lb annually between 1991 and 2000 (Table 4; Figure 4). Historically, the majority of the parallel harvest came from longline gear in the NGD. However, the 1990s expansion of the pot fishery shifted the largest component of parallel Pacific cod harvest to the CID in 2001 for the first time since 1990 and it accounted for the larger portion of the harvest from 2003 to 2006 and in 2011 (Table 5; Figure 4). Pot gear took the larger portion of the parallel season harvest in those years and also in 2010, and took the highest percentage, 93% of the parallel harvest, in 2004 (Table 4). However, longline gear overtook pot gear as the dominant gear from 2007 through 2009, taking the highest percentage of the parallel harvest, 84%, in 2009, before shifting back to pot gear as the dominant gear type in 2010 and 2011 (Table 4).

After federal gear sector splits were implemented in 2012, harvest shifted back to longline as the dominant gear type through 2015. After 2000, parallel fishery harvests through 2011 totaled less than 1.0 million lb annually, primarily due to a shift to the Kodiak Area by the local longline fleet. However, after sector splits were implemented, parallel harvests increased to an average of 1.5 million lb from 2012 through 2015. Harvest by vessels using jig gear has not played a major role in the parallel fishery, but jig harvest has been high some years in the state-waters fishery (Tables 3 and 4).

In 1997, the first year of the state-waters fishery, vessels using jig gear harvested 561,947 lb, the highest harvest to date, and made up 67% of the total harvest and 22% of the GHL. In 2003, jig gear harvested 429,684 lb, nearly 30% of both total harvest and the GHL. Although vessels using jig gear have performed well in some years during the state-waters season, harvests have often been relatively low, and jig gear has rarely achieved higher than 10% of the GHL in most years and has never achieved its allocation. However, the highest GHL for the period was over 4.4 million lb in 2011 and vessels using jig gear harvested nearly 0.5 million lb, or 11% of the GHL, which was the largest harvest since 1997 (Table 3).

From 1997 through 2015, annual harvest by vessels using pot gear during the state-waters fishery averaged 2.0 million lb .Vessels using pot gear typically achieved their allocation, but the Cook Inlet Area state-waters Pacific cod fishery GHL has only been achieved in 2003 (Figure 5). The highest pot harvest (4.0 million lb) and the highest GHL up to that point (4.7 million lb) occurred in 2012. However, GHLs remained high after 2012 and peaked in 2015 at 5.1 million lb, but harvest by pot vessels declined, and only 66% of the GHL was harvested in 2015. This poor

fishery performance may have been an early indication of the future decline of the Pacific cod fishery that was fully realized in 2018 (Table 3).

RESEARCH

ADF&G has limited data about spring Pacific cod distributions in the Cook Inlet Area (Bechtol 2001), but studies from other areas have suggested that Pacific cod undertake a seasonal migration, beginning in the fall, to aggregate in major spawning areas over winter, and then disperse to summer feeding grounds following spawning (Shimada and Kimura 1994). This was supported by observations during the commercial Pacific cod fishery in the Cook Inlet Area, when catch rates increased over winter and generally peaked during February and March, then tended to slow down by late April.

HARVEST MONITORING

Dockside sampling of Pacific cod and fishermen interviews were conducted during the Cook Inlet Area parallel and state-waters seasons. Information collected by dockside samplers included fishing location and effort as well as fish length, weight, sex, maturity stage, and age structures.

Pacific cod biological data have been collected since the state-waters season was implemented in 1997, but only length data was recorded the first year of sampling. Average weights of Pacific cod have ranged from 2.4 kg to 3.8 kg, average lengths ranged from 57 cm to 66 cm, and sex ratios ranged from 51% to 60% female (Table 7). Pacific cod size has been on a downward trend in recent years and fish sampled in 2016 were the smallest size on record for both length and weight (Table 7). During the most recent 3 years (2016–2018), Pacific cod average lengths were the shortest for the time series (Table 7). A total of 2,101 Pacific cod were sampled for length in the Cook Inlet Area in 2018, with 1,300 fish sampled from the CID and 801 fish from the NGD (Table 7). Historically, fish sampled from the NGD have consistently been larger than those in the CID, and that trend continued in 2018. CID fish averaged 58 cm in fork length and fish from the NGD averaged 63 cm in length (Table 7; Figure 8). Length information, by sex, gear type, month, year, and NMFS area, has been provided to NMFS annually since 2014 for the CGOA Pacific cod stock assessment, and has included all historical data back to 1997.

Otoliths were collected from approximately 25% of the fish sampled. Pacific cod age determination can be problematic and age accuracy has been unresolved in past years (Carlile 2005). Because Pacific cod in the GOA are managed by NMFS using a length, rather than age-structured model, a decision was made to reduce otolith sampling and archive otoliths for future age determination (Russ et al. 2013b). However, recent indications of greater site fidelity in Pacific cod than was previously assumed (Shi et al. 2007) suggested that further analysis and more focused assessment of state-waters Pacific cod may be warranted. Information about Pacific cod age, sex, size, and distribution was also collected during the trawl surveys in Kachemak and Kamishak bays; survey results were reported in separate reports (Bechtol 2001).

2019 SEASON SUMMARY AND OUTLOOK

The 2019 Cook Inlet Area parallel Pacific cod season opened to all gear types on January 1. The parallel longline season continued through 12:00 pm February 7 for vessels less than 50 feet and through 12:00 pm February 27 for vessels equal to or larger than 50 feet. The parallel season for vessels using pot gear closed 12:00 pm January 27 and jig gear in the parallel season closed

12:00 pm March 12. The parallel "B" season was expected to open to both pot and longline gear on September 1.

The state-water seasons for pot and jig gear opened 24 hours after the parallel season closures, per regulation. Vessels greater than 58 feet fished pot gear through 8:00 pm February 8 when the large vessel cap was reached, and remaining pot vessels (less than or equal to 58 ft) fished until 5:00 pm March 9 when pot gear allocations were achieved. The state-waters season is expected to remain open to jig gear for the remainder of the year, because only 3% of the allocation harvested through December 31.

During the 2019 parallel Pacific cod season as of July 31, 2019, longline was the dominant gear type, harvesting 298,434 lb and 71% of the total parallel harvest. Vessels using pot gear harvested 118,925 lb of Pacific cod during the parallel season, and no harvest by jig gear. Total harvest for the parallel fishery was 417,366 lb by 31 vessels from 68 landings (Table 4).

The total harvest for the 2019 state-waters Pacific cod season was 573,293 lb of the 633,857 lb GHL as of July 31, 2019. The state-waters Pacific cod fishery is dominated by vessels using pot gear; longline is not a legal gear type for this fishery. Pot vessels harvested 99% of the total harvest and 7 vessels made 54 landings. Jig vessels harvested 2,868 lb of Pacific cod and 3 vessels and made 4 landings (Table 3).

SABLEFISH

MANAGEMENT AND REGULATIONS

Current elements of the Cook Inlet Area state-waters sablefish fishery include the following:

- Season opens July 15 and closes December 31 unless closed earlier by EO;
- Sablefish may only be retained during an open directed sablefish fishery on board a vessel that is registered to participate in the Cook Inlet Area sablefish fishery;
- Registration required;
- GHL is annually adjusted by the percentage of change in the CGOA ABC calculated by NOAA/NMFS from stock assessment;
- Legal gear is longline, pot, or jig gear;
- Pot gear may be connected by a line in the sablefish fishery only, with no more than 15 groundfish pots attached to the same line;
- 6-hour prior notice of landing (PNOL) requirement;
- Mandatory log sheet requirement; and
- Trip limit of 3,000 lb (round weight) of sablefish in 2 consecutive days.

Federal regulations allow a federal sablefish Individual Fishing Quota(IFQ) holder to participate in the state-managed sablefish fishery, provided the vessel harvest does not exceed the allotted IFQ shares (state-managed sablefish harvest is deducted from IFQ) and the permit holders comply with both federal IFQ and state regulations, including registration.

REGULATION DEVELOPMENT

The Cook Inlet Area sablefish fishery historically opened and closed on dates concurrent with the sablefish season in adjacent federal waters (Bechtol 1995). Following implementation of the

federal sablefish IFQ program in 1995, the Cook Inlet Area sablefish fishery became one of only 2 open-access sablefish fisheries in the state (Sigler et al. 2003). Beginning in 1995, the Cook Inlet Area fishery opened concurrently with the IFQ sablefish fishery on March 15, and closed by EO based upon harvest and catch rates. In 1997, the GHL was set at the recent 5-year average sablefish harvest of 104,000 lb from the NGD using the pre-1996 district boundaries. The fishery GHL was subsequently adjusted each year in proportion to the percentage annual change in sablefish ABC set by NPFMC for federal waters of the CGOA. The ABC was based on biomass estimates generated from annual surveys conducted by NMFS in the Gulf of Alaska. Because sablefish in the Cook Inlet Area were considered to be part of the Gulf of Alaska stock, adjusting the state GHL proportional to changes in the CGOA ABC was a conservative approach to managing this historical nearshore fishery.

In response to public complaints of harvest being misreported from adjacent federal waters, and testimony suggesting improved sablefish catch rates in nearshore waters later in the year, a public proposal to change the sablefish season opening date to July 15 was considered by the BOF in 1998. Harvest information from 1988 to 1998 indicated the majority of harvest occurred during May and June, supporting the increased catch rate claims discussed at the November 1998 BOF meeting. The BOF adopted the proposal, which was first implemented in 2000.

Although ADF&G adjusted season duration in response to catch rate increases, managing for the annual harvest targets remained problematic. GHLs were exceeded annually from 2000 to 2003 by 35% to 50% (Table 8; Figure 9). In 2004, ADF&G submitted a proposal for an equal quota share that would divide the GHL equally among all registered participants. However, the proposal was amended to limit harvest per vessel to no more than 3,000 pounds of sablefish within 2 consecutive days. This vessel trip limit approach was adopted by the BOF as part of the *Cook Inlet Sablefish Management Plan* (5 AAC 28.360) which also included sablefish fishery-specific registration and a logbook requirement. First implemented in 2005, the trip limit resulted in increased season duration and improved management precision for harvest targets.

Longline is the primary gear type used in this fishery; however, due to increasing whale depredation statewide, use of pot gear has increased. The BOF adopted a regulation in 2016 allowing groundfish pots used in the Cook Inlet Area sablefish fishery to be attached to a line, with the stipulation that there may be no more than 15 pots on each line and a buoy is required to be attached to each end of the line to mark the location of the gear.

Two other regulations were implemented in 2016: one clarified the requirements of log sheets in the fishery and the other added a 6-hour PNOL for vessels delivering sablefish from Cook Inlet Area. Both of these new regulations aid management of the fishery. Log sheets allow ADF&G to track the effort throughout the fishery and the PNOL allows ADF&G enough time to deploy staff to collect biological information from sablefish deliveries as well as aid in enforcement.

FISHERY OVERVIEW: THE LAST 6 YEARS

Over the last 6 years (2013–2018), there has been consistently reduced harvest and participation in the Cook Inlet area sablefish fishery compared to pre-2013 levels. The average annual harvest during this 6-year period was just below 40,000 lb and an average of 6 vessels participated, which was less than half the average of approximately 85,000 lb and 14 vessels from 2000 to 2012 (Table 8 and Figure 9).

NMFS Gulf of Alaska sablefish biomass estimates have varied and affected the corresponding Cook Inlet Area sablefish GHLs .The biomass estimates and corresponding ABCs for the CGOA declined annually from 1994 to 1999 (Sigler et al. 2003), then increased from 2000 to 2004, and once again declined from 2004 to 2010, and finally showed a slight increase in 2011. The lowest GHL since it was first set in 1997 was 48,000 lb in 2016, which marked the only year the GHL was achieved since 2012. The lowest harvest since GHL implementation occurred in 2018 at 24,779 lb, and only 40% of the GHL was attained (Table 8).

The average number of annual landings during this 6-year period was 33, which was similar to the average of 37 landings between 2000 and 2012 (Table 8). This may have been due in part to combined commercial halibut and sablefish fishing trips. However, the low CPUE has also contributed; average pounds per landing over the last 6 years averaged 1,210 lb compared to ~3,000 lb per landing from 2000 to 2012 (Table 8).

Fishery season length has varied over the past 6 seasons, ranging from 117 days to 166 days. In 2016, the season closed on November 8 (Table 1).

Despite declining harvests, the sablefish fishery still generates the second highest economic contribution from Cook Inlet Area commercial groundfish fisheries due to a high dockside price per pound. However, the estimated exvessel value for 2018 of nearly $104,815 was the lowest since 1998 (Appendix A1).

FISHERY OVERVIEW: THE EARLY YEARS

Between 2000 and 2007, the harvest and average pounds per landing were at high levels. The harvest ranged from 76,889 lb to 133,435 lb and average per landing ranged from 2,136 lb to 8,721 lb. Participation during this same period was between 10 and 23 vessels, and landings averaged between 14 and 41. Pre-2000, effort and landings peaked in 1992 at 103 landings by 79 vessels (Table 8; Figure 9).

Cook Inlet Area sablefish harvests since 1988 have ranged from 2,996 lb in 1989 to 136,260 lb in 1988; effort has ranged from 4 vessels in 1989 and 2015 to 79 vessels in 1992 (Table 8). The NGD yielded the majority of sablefish harvested whereas annual harvests from the CID rarely exceeded 2,000 lb. In the NGD, waters of Resurrection Bay, Aialik Bay, and in some years Day Harbor were the primary fishing areas. No sablefish were landed from the CID since 1995.

From 1996 to 2004, as catch rates increased, season duration steadily declined. The 1996 season lasted 169 days and following the season opening date change to July 15 in 2000, season duration declined further from 11 days in 2000 to the fishery low of 1 day in 2004 (Russ et al. 2013a).

Despite declines in NMFS biomass estimates and corresponding decreases in Cook Inlet fishery GHLs from the mid-1990s to early 2000s, catch rates increased from 1995 to 2004, peaking in 2003, until the 3,000 lb trip limit was implemented in 2005 (Table 8).

RESEARCH

Sablefish have traditionally been thought to form 2 populations based on differences in growth rate, size at maturity, and tagging studies (McDevitt 1990; Saunders et al. 1996; Kimura et al. 1998). The northern population inhabits Alaska and northern British Columbia waters and the southern population inhabits southern British Columbia, Washington, Oregon, and California waters, with mixing of the 2 populations occurring off southwest Vancouver Island and

northwest Washington (Hanselman et al. 2018). Substantial stock structure among the federal Alaska population is unlikely given extremely high movement rates throughout their lives (Hanselman et al. 2015; Heifetz and Fujioka 1991; Maloney and Heifetz 1997; Kimura et al. 1998). Mixing between federal stock and Cook Inlet Area sablefish is assumed, which is why the GHL is adjusted with the ABC in the CGOA.

HARVEST MONITORING

Logbook data has been collected from the sablefish fishery since 2005. Beginning in 2016, comprehensive efforts were made to error-check and standardize this data. Logbook information has been combined with fish ticket harvest data to produce CPUE (pounds per hook) from 2005 to 2018. CPUE has ranged from 0.12 lb/hook in 2009 to 0.48 lb/hook in 2016, and there are no obvious continuing trends. The total hooks varied widely from 96,276 hooks in 2016 (which also had highest CPUE) to 429,315 hooks in 2009 (the lowest CPUE). In 2018, the CPUE was the second lowest for the time series, at 0.15 lb/hook. Logbook information used for CPUE analysis excludes incomplete or missing data and includes total hooks for all trips combined and corresponding sablefish harvest (excluding unusable trips) (Table 9).

Sablefish biological sampling began consistently in 2000. Between 2000 and 2018, dockside sampling yielded average sablefish lengths ranging from 55 cm to 63 cm and average weights ranging from 1.9 kg to 2.7 kg; the largest sablefish documented was in 2005.Sablefish were the smallest on record in 2016 and 2017 having the shortest average length of 55 cm in 2016 and the lowest average weight of 1.9 kg in both 2016 and 2017. Sablefish increased in size in 2018 with a length of 60 cm and a weight of 2.4 kg, closer to average for the time series. The percentage of females in the harvest was the lowest on record in 2016 at 45%, but has increased over the past 3 years, and the highest percentage on record of 69% was in 2018. The previous high percentage of females of 68% occurred in 2002, the first-year sex ratio data was available, and the average for all years was 63% female (Table 10).

OUTLOOK

NOAA/NMFS research and stock assessment of the sablefish stocks in the CGOA and the GOA shows that 2014 produced a large year class, which was 2 times higher than any other year class observed from 1977 to 2014 (Hanselman et al, 2018). Although this is a positive sign, there is also concern about the lack of older fish and spawning biomass and uncertainty surrounding survival of the 2014-year class, especially because there have been signs of higher mortality. These concerns and uncertainty caused ABC stock assessment authors to recommend harvest levels that were conservative. These recommendations were approved by the Groundfish Plan Team and the NPFMC. The CGOA sablefish ABCs increased steadily from 2016 through 2019 from 4,023 metric tons (mt) in 2016 to 8,178 mt in 2019; this resulted in a 2016 GHL of 48,000 lb, the lowest since the GHL was first set in 1997, and then increasing to 62,000 lb in 2019 (Table 8).

ROCKFISH

AGGREGATION DEFINITIONS

There are 3 rockfish assemblages: pelagic shelf rockfish (PSR), demersal shelf rockfish (DSR), and slope rockfish. The pelagic shelf rockfish assemblage includes the following: black rockfish *Sebastes melanops,* dusky rockfish *S. variabilis*, dark rockfish *S. ciliates*, yellowtail rockfish

S. flavidus, widow rockfish *S. entomelas*, and blue rockfish *S. mystimus*. Demersal rockfish assemblage includes the following: canary rockfish *S. pinniger*, china rockfish *S. nebulosus*, copper rockfish *S. caurinus*, quillback rockfish *S. maliger*, rosethorn rockfish *S. helvomaculatus*, tiger rockfish *S. nigrocinctus*, and yelloweye rockfish *S. ruberrimus*. Slope rockfish describes any species of the genus *Sebastes* not specified in either demersal shelf rockfish or pelagic shelf rockfish; thornyhead rockfish *Sebastolobus* spp. are included with the slope rockfish aggregate for harvest accounting in Cook Inlet Area.

MANAGEMENT AND REGULATIONS

Current elements of the *Cook Inlet Rockfish Management Plan* (5 AAC 28.365) include:

- GHL of 150,000 lb for all rockfish species, bycatch and directed harvest combined;
- Mandatory retention of all rockfish;
- 5-day trip limits of 4,000 lb for the North Gulf District and 1,000 lb for the Cook Inlet Districts;
- Rockfish bycatch limits are established by regulation under 5 AAC 28.365 for other groundfish and halibut fisheries and referenced in annual emergency order; and
- Cook Inlet Area directed rockfish fishery for PSR:
    - Season opens on July 1 and closes December 31 unless closed earlier by emergency order;
    - Legal gear is mechanical jigging machines and hand troll;
    - Other requirements:
        - Log sheets;
        - Registration; and
        - 6-hour prior notice of landing (PNOL).

REGULATION DEVELOPMENT

The *Cook Inlet Rockfish Management Plan* (5 AAC 28.365) was first implemented in 1993, and established the 150,000 lb GHL. From 1993 to 1996, rockfish opened to directed fishing January 1, closed when the 150,000 lb GHL was attained, and remained open as a bycatch-only fishery for the duration of the year. In 1996, due to bycatch harvest levels that exceeded directed fishery removals in some years, and a lack of stock abundance information, the BOF adopted a more conservative approach by adopting the 150,000 lb GHL as a harvest cap rather than a "trigger" for opening the bycatch fishery. Management under the harvest cap approach, which began in 1997, proved problematic, because it required ADF&G to anticipate the amount of rockfish bycatch needed for other directed fisheries, such as halibut and Pacific cod.

In 1998, the NPFMC amended the pelagic rockfish assemblage, as defined in the federal GOA FMP, by removing black and blue rockfishes (DiCosimo et al. 1997). This action, requested by the state to address misreporting problems associated with the fishery, effectively transferred management authority for these species in federal waters to the State of Alaska (5 AAC 28.010). Although blue rockfish has not been reported in the Cook Inlet Area, black rockfish is a pelagic species commonly found in federal waters of the NGD.

In addition, in 1998, the BOF established a July 1 directed rockfish season opening date and restricted gear for targeting rockfish to mechanical jig or hand troll gear (jig gear). These measures were adopted to align the directed rockfish season with the lingcod season due to similarities in gear and habitat requirements and to focus the directed fishery on black rockfish,

rather than yelloweye rockfish, which are more susceptible to overfishing. However, once these changes became effective, individual jig landings were dominated by yelloweye rockfish and harvest increased in the directed rockfish jig fishery.

By 2001, yelloweye rockfish harvest by jig gear surpassed the harvest by longline gear as bycatch to other directed groundfish fisheries. In addition, changes in the species composition of the commercial harvest heightened concern about stock sustainability because DSR, such as yelloweye rockfish, require a much longer rebuilding period than PSR if overfishing occurs. In response to the increased DSR harvest from jig gear, ADF&G submitted a proposal in 2004 that was subsequently adopted by the BOF to restrict the directed fishery to PSR species and require logbooks. The effect of these regulatory changes focused the jig fishery on PSR species and has provided better resolution about harvest location. Also adopted by the BOF in 2004 and effective in 2005, was mandatory retention of rockfish in the Cook Inlet Area. Mandatory retention improved accounting of fishery removals because rockfish caught in deep water suffer barotrauma, which is caused by rapid decompression and expansion of gases in the swim bladder, and therefore experience a high rate of mortality.

Prior to 2004, 2 varieties of dusky rockfish were identified under the name *Sebastes ciliatus*; a dark colored variety that inhabited inshore, shallow waters, and a lighter colored variety that inhabited deeper water offshore. In 2004, these 2 varieties of dusky rockfish were designated as distinct species. The dark colored variety is now recognized as dark rockfish, *Sebastes ciliatus*, and the light-colored variety is now recognized as dusky rockfish, *Sebastes variabilis* (Orr and Blackburn 2004). In 2008, dark rockfish were removed from the GOA FMP and management authority of that species in federal waters was delegated to the State of Alaska.

In 2010, ADF&G submitted a proposal to adjust and standardize rockfish bycatch allowances to halibut and directed groundfish species and also to define DSR bycatch allowances in the directed PSR jig fishery. This proposal was adopted by the BOF and implemented in 2011. The rockfish bycatch allowances for the Cook Inlet Area are 10% to halibut and directed groundfish fisheries, except that the bycatch allowance of DSR is 20% in the directed PSR jig fishery. Prior to 2011, rockfish bycatch allowances in the Cook Inlet Area ranged from 5% to 20% depending on the target species.

In 2017, ADF&G submitted 2 proposals that were adopted to aid in the management of the directed PSR fishery in the Cook Inlet Area. One of the new regulations clarified the procedures for obtaining and submitting log sheets and the other added a 6-hour PNOL requirement for the fishery.

FISHERY OVERVIEW: THE LAST 9 YEARS

Since 2010, the harvest of the PSR assemblage has dominated the harvest in all years except 2012, due to more participation in the directed PSR jig fishery (Table 11 and Figure 10). In the years between 2011 and 2018, the PSR harvest has ranged from 11,677 lb in 2012 to 83,147 lb in 2016 in this fishery (Table 12). During the same period, DSR harvest ranged from 18,730 lb in 2014 to 54,052 lb in 2015 (Table 11). Slope rockfish harvest has ranged from 2,854 lb in 2014 to 6,413 lb in 2013 and remains the lowest percentage assemblage of the total rockfish harvest (<10% annually since 2011) (Table 11). The total rockfish harvest climbed above 100,000 lb in 2015, 2016, and 2017; rockfish harvest dropped back down to 59,097 lb in 2018 when effort decreased in the PSR jig fishery (Tables 11 and 12).

Jig and longline gear harvest the majority of the commercial rockfish in the Cook Inlet Area (Table 13 and Figure 11). Since 2011, the percentage of the total harvest has been dominated by jig gear, ranging from 56% to 75%, with the exception of 2012 when only 28% of the total harvest was taken by jig gear. Total participation averaged 55 vessels during this time period, which was fairly stable (Table 13). Participation, number of landings, and total harvest peaked in 2016 for this period, when 74 vessels made 225 landings for a total harvest of 144,368 lb, the highest harvest since 2000 (Tables 11 and 13).

Jig rockfish harvest reached higher levels in 2015, 2016, 2017, averaging about 85,000 lb, which is above the overall average of 68,539 lb beginning in 1988 (Table 13). Since 2011, longline harvest has ranged from 14,746 lb in 2018 to 59,265 lb in 2015 (Table 13). Longline rockfish harvest is bycatch only and these varying levels are driven by the harvest levels of the species that these vessels are targeting. The Cook Inlet Area Pacific cod GHL reached an all-time high in 2015 and plummeted to the lowest level in the history of the state-waters fishery in 2018 which affected the bycatch levels of rockfish in the longline fishery (Tables 3 and 13).

Historically, the majority of all rockfish harvest, including that from the directed PSR jig fishery, has occurred in the NGD (Figure 1 and 12). However, 2,200 lb of rockfish was harvested in the CID in 2018. In federal waters, the state has managed black rockfish since 1998 and dark rockfish since 2008. Federal waters harvest has been consistently higher during the last 4 years with an average of about 1,300 lb compared to the historical average since 1998 of about 1,000 lb. Rockfish harvest from federal waters since 2010 peaked in 2013 at 3,978 lb, which was the highest harvest since 2000 (Table 14).

In the directed PSR fishery, average pounds per trip has ranged from 854 lb in 2018 to 3,176 lb in 2005; the average from 2005 through 2018 was about 1,500 lb per trip (Table 12).

Since 2010, the most prevalent harvested species from the PSR assemblage has been black rockfish, in both the directed fishery and overall (including bycatch), ranging from 84% to 98% of the total PSR harvest (Tables 11 and 12); dusky and dark rockfish levels were far lower, averaging approximately 1,100 lb (2%) and 2,300 lb (5%) annually, respectively, in the directed PSR fishery since 2010 (Table 12). Black rockfish harvest has ranged from 11,498 lb to 70,311 lb in the directed PSR jig fishery since 2010 and averaged about 42,000 lb annually (Table 12). Total black rockfish harvest has averaged 43,592 lb for the same time period in all fisheries and peaked at approximately 75,000 lb in 2015 and 2016, coincident with those years of high harvest in the directed fishery (70,000 lb; Tables 11 and 12).

For the DSR assemblage, yelloweye rockfish generally dominates the harvest, but not as consistently, ranging from 48% to 98% of the total DSR harvest since 2010 (Table 11). Higher harvests of DSR retained as bycatch have tracked with large Pacific cod quotas, and this was the trend from 2010 through 2017, and the highest DSR harvest of 54,052 lb occurred in 2015, the same year as the highest Pacific cod GHL. This was due to more DSR bycatch harvested during the Pacific cod fishery because bycatch allowances are a percentage of target species (Table 11). Interestingly, 2015 also marked only the second time that yelloweye rockfish did not comprise the majority of DSR harvest, when the quillback rockfish harvest of 27,492 lb was more than the yelloweye rockfish harvest of 25,678 lb (Table 11). Conversely, the 2018 harvest of yelloweye rockfish, as well as all DSR species, was down to its second lowest level since 2010 at 16,887 lb, which corresponded with the lowest Pacific cod GHL and harvest for the time period (Tables 3 and 11).

Since 2010, rockfish harvest has generated the third highest contribution from Cook Inlet Area commercial groundfish fisheries, after Pacific cod and sablefish. Estimated exvessel value from all rockfish harvest in 2016 of $99,614 was the highest in this time period, corresponding to the high harvest in that year (Appendix A1).

FISHERY OVERVIEW: THE EARLY YEARS

PSR, particularly black rockfish taken primarily by jig gear, accounted for over 66% of the total harvest in most years through 2005, and harvest exceeded 200,000 lb in 1995. A decline in PSR harvest began in 2006, with a historical low of 3,154 lb harvested in 2009 due to low jig effort in the directed PSR fishery (Table 11; Figure 10).

DSR, which are predominantly yelloweye rockfish, and historically harvested primarily by longline gear, was the second most dominant assemblage and averaged 37% of the annual harvest from 1996 to 2009 (Table 11). From 2001 to 2003, yelloweye rockfish harvest by jig gear exceeded that harvested by longline gear, and 33,063 lb were harvested by jig gear in 2003 (Rumble et al. 2016). However, after 2003, jig harvest of DSR species declined substantially, due primarily to the directed fishery being restricted to target PSR since 2005.

Within the Cook Inlet Area, the NGD has historically yielded greater than 95% of the commercial rockfish harvest during any given year (Table 14) and also supports active sport fisheries. The rocky, high-relief habitat typical of the NGD is more suitable to nearshore rockfish than the glacial-mud substrate of the CID (Rumble et al. 2016).

INTERDIVISIONAL ROCKFISH WORKING GROUP

Currently, ADF&G has no overarching statewide management strategies for black rockfish or yelloweye rockfish across the Gulf of Alaska. The Division of Commercial Fisheries has developed GHLs in different regions, but these are based on historical harvest levels. The Division of Sport Fish has taken management actions (e.g., reduced daily bag limits), but has no documented management strategies for rockfish.

In 2017, ADF&G began a statewide effort to develop both short and long-term management strategies for black and yelloweye rockfish in the Gulf of Alaska. ADF&G efforts from 2017 to present have been focused on the creation of statewide standards for black and yelloweye rockfish management, and the development of structures that will support long-term adaptive management.

Mission Statement

ADF&G recognizes the unique life history characteristics of rockfish species that make them particularly vulnerable to overfishing including the current lack of stock status information for many black and yelloweye rockfish stocks, increasing fishing effort on black and yelloweye rockfishes throughout Alaska, and multiple user groups harvesting the same stocks of these species. ADF&G intends to maintain sustainable black and yelloweye rockfish fisheries throughout the state by following, to the extent practicable, the standards developed through this effort to achieve these management priorities:

1. Manage all fisheries under an appropriate harvest level or harvest rate.
2. Maintain optimum spawning populations.

3. Maintain and sustain fishing opportunity through collaborative management between fishery divisions.

Work continues with funding for several rockfish projects to continue filling data gaps. Several focused committees exist and will continue to meet to ensure that projects are completed, and analyses are updated to better understand black and yelloweye rockfish populations in Alaska. Two large meetings have been planned for fall 2019 and spring 2020 to continue this important interdivisional work.

RESEARCH

Between 2001 and 2005, ADF&G conducted a series of research projects to assess black rockfish populations within the NGD[1] (Byerly and Bechtol 2005). One goal of these studies was to develop a standardized approach to index the abundance of black rockfish and associated species in nearshore waters. Initial surveys attempted to estimate local abundances of black rockfish in areas that may serve as long-term survey locations to monitor population trends. Mark–recapture and underwater scuba transects were used to estimate local abundances. Low recapture success and biases detected during scuba transects made these methods unusable. A follow-up study evaluated the use of hydroacoustic counts and mechanical jigging CPUE as low-cost methods to index black rockfish population abundance on a management district scale. Mechanical jigging CPUE was found to not be a predictable index of abundance but hydroacoustic counts showed some promise and continued evaluation of this method may prove to be effective.

In 2005, research was conducted to develop lingcod and DSR estimates using a remotely operated vehicle (ROV; Byerly et al. 2015). The purpose of this survey was to estimate, for the first time, the abundance of lingcod within a section of the NGD in the Cook Inlet Area. Chiswell Ridge was selected for this 2005 survey because it was a historically important recreational and commercial harvest area. Lingcod were the focus of this survey, but abundance estimates for DSR were also made because both species occupy similar habitats. A closed population was assumed because the Chiswell Ridge was surrounded by relatively deep waters, extending to the lower limit of typical lingcod depth distribution. A neighboring area was also surveyed to compare and investigate variation in density estimates. Strip transects were conducted with a ROV to estimate lingcod and DSR abundance within rocky habitats delineated from multi-beam and side-scan sonar data. Substantial differences in lingcod density were detected between study areas. Chiswell Ridge abundance estimates were relatively precise for all species; the coefficient of variation for lingcod was 20%, adult yelloweye rockfish was 15%, and quillback rockfish was 18%.

A hydroacoustic survey of the NGC is planned for August 2019 to attempt to assess black rockfish.

[1] Byerly, M. M., and C. Worton. *Unpublished* (2007). Development of a black rockfish population index [*In*] Nearshore Marine Research in Alaska (V): Final Comprehensive Progress Report, NOAA Cooperative Agreement NA03NMF4370202. Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

HARVEST MONITORING

Dockside sampling of PSR harvests began consistently in 1998, and in 2015 the largest number of PSR were sampled due to increased commercial fishing effort in the directed jig fishery which led to more sampling opportunities. Sampling goals were met in both 2017 and 2018 because effort in the fishery remained at consistently high levels (Tables 15 and 16). In 2018, there was still a relatively high number of vessels participating, but the CPUE was 854 lb per trip, which was the lowest on record and similar to the 2007 CPUE when harvest in the PSR fishery was at its lowest point (Table 12).

There was a decreasing trend in the percentage of black rockfish in PSR samples during the past 5 years; 70% in 2015 versus an average of 92% from 1998 to 2013. Nearly 100% of the PSR samples in 2005 and 2006 were black rockfish, and the lowest level of 67% was in 2011. From 2016 through 2018, the percentage of black rockfish sampled generally increased, and peaked at 94% in 2016, due to a concerted effort to achieve black rockfish sampling goals. The high black rockfish percentages in some years may have been partly due to limited time to collect other PSR species samples, because black rockfish were the sampling priority, and therefore, other PSR catch composition sampling may not be indicative of actual abundance (Table 15).

Species composition reported on fish tickets differed somewhat from dockside sampling indices suggesting a systematic underreporting of dusky and dark rockfish in landings of PSR; however, due to efforts by ADF&G staff in recent years, accurate species reporting is improving. PSR samples are collected primarily from directed jig landings, which tend to have a higher percentage of other species besides black rockfish. This may be contributing to the discrepancy in species composition between reported versus sampled harvest. The highest percentages of dark rockfish (12%) and dusky rockfish (14%) samples occurred in 2015 (Table 15).

From 1998 to 2018, average weight of black rockfish ranged from 2.0 to 2.6 kg, average length ranged from 46 to 53 cm, and average age ranged from 12 to 21 years. In 2018, black rockfish were 46 cm in length and 2.0 kg, the smallest fish in the time series; however, the percent female was 63%, well above the average of 50%, and followed 3 consecutive years of the lowest female percentages on record (Table 16; Figures 13 and 14).

Harvests of non-pelagic rockfish since 2016 were predominately bycatch to longline fisheries for halibut, sablefish and Pacific cod, with some harvest occurring in the directed rockfish and lingcod jig fisheries (Table 11). Notable is that quillback rockfish, which had peaked in 2015 for proportion sampled at 42%, surpassing the proportion of yelloweye sampled for the first time, has steadily decreased, and in 2018 had returned to average levels (Table 17). In 2018, yelloweye rockfish had the highest proportion sampled (64%) and was followed by quillback and rougheye (15% each), with other rockfish species combined making up 24% of the sampled harvest (Table 17).

From 1999 to 2018, the average weight of yelloweye rockfish ranged from 2.6 to 5.0 kg and average length ranged from 52 to 62 cm. Average ages through 2015 ranged from 29 to 38 years. In 2018, yelloweye rockfish were 4.3 kg and 59 cm, and the female ratio was 53%, all of which were close to average for the time series (Table 18).

LINGCOD

MANAGEMENT AND REGULATIONS

Current regulations for commercial lingcod in the Cook Inlet Area include the following:

- Lingcod may only be retained July 1 through December 31;
- Registration required for directed lingcod fishery;
- GHL is 52,500 lb;
- Directed fishing for lingcod is restricted to jig gear (mechanical or hand troll); no more than 5 lines and 30 hooks per line;
- Lingcod may be retained as bycatch during other directed fisheries at a 20% level;
- Minimum size limit of 35 inches from the tip of the snout to the tip of the tail; and
- ADF&G has EO authority to close and immediately reopen the fishery with a requirement that all lingcod be delivered with head on and with the vent and external area 1 inch forward of the vent unmutilated so that gender may be determined during dockside sampling.

REGULATION DEVELOPMENT

In the Central Region, the State of Alaska first exercised its management authority for lingcod in the EEZ in 1995. It is unknown whether subsequent changes in harvest distribution indicated shifts in relative abundance, harvest areas, or harvest reporting.

In 1993, the BOF adopted regulatory lingcod season dates of July 1 to December 31 and a minimum size requirement of 35 inches overall or 28 inches measured from the front of the dorsal fin to the tip of the tail. The season dates closed lingcod fishing during the first half of the year to protect spawning and nest-guarding lingcod at a time when they are particularly vulnerable to capture (Vincent-Lang and Bechtol 1992). The minimum legal size was intended to allow sexually mature lingcod to spawn in at least 2 successive years prior to being subjected to harvest removal. From 1997 until 2002, the commercial lingcod fishery was managed for a 35,000 lb GHL that was established in 1997 as 50% of the recent 5-year harvest. ADF&G adopted this conservative approach due to a lack of lingcod abundance and biomass information, and evidence of localized recruitment failures, particularly in Resurrection Bay, during the early 1990s (Vincent-Lang and Bechtol 1992). Since 1993, Resurrection Bay has been closed to lingcod fishing, initially by EO and later by regulation (5 AAC 28.50 (c)), to protect depressed lingcod stocks. The most recent surveys indicated little recruitment had occurred in this area (Bethe and Meyer 2002). Directed fishing for lingcod was restricted to jig gear (mechanical or hand troll) beginning in 1999. Lingcod may be retained as bycatch to other directed fisheries at a 20% level during the open season.

In 2002, ADF&G increased the allowable harvest to 52,500 lb, or 75% of the average harvest during the period 1992 through 1996. This increase in the GHL was consistent with the approach applied by NPFMC groundfish plan teams for groundfish stocks in federal waters. Under Amendment 56 adopted by the NPFMC for the *Bering Sea/Aleutian Groundfish Fishery Management Plan*, a fishery is classified as a Tier 6 fishery if the only reliable assessment data are catch history. For a Tier 6 fishery, ABC is defined as 75% of the historical annual average harvest.

During the 2004 meeting on Cook Inlet Area groundfish, the BOF adopted a regulation giving ADF&G EO authority to require, if necessary, that lingcod be landed with the head on and the vent intact to allow biological sampling of the catch. This change became effective in 2005 but has not been implemented by EO. Very few lingcod are landed with the head removed and most fishermen are aware of the need to leave the vent intact for sampling purposes.

FISHERY OVERVIEW: THE LAST 10 YEARS

In the Cook Inlet Area, lingcod may be retained commercially after July 1 as bycatch to other groundfish fisheries or by directed jig fishing. Harvest levels are closely monitored to stay within the GHL (Table 19). Since the current GHL was developed, it had only been achieved once in 2006 (80% of the harvest that year was bycatch to gear other than jig) until harvest increased in 2017 and the GHL was achieved in 2018. In 2017, 24 vessels made 55 landings to harvest 48,740 lb and, in 2018, 27 vessels made 59 landings to harvest 49,479 lb (Table 19 and Figure 15). The lingcod season closed on November 11 in 2018 when harvest projections indicated the GHL would be achieved (Table 1); weather and other factors resulted in a lower harvest than projected. There has been increased directed rockfish and lingcod effort with combined trips. The 2017 and 2018 lingcod harvest and effort were well above the 10-year average of 30 vessels and 50 landings harvesting 21,042 lb of lingcod (Table 19). During the recent 10 years (2009 to 2018), there were 3 years, 2011, 2012, and 2015, that had lingcod harvest less than 10,000 lb (Table 19). The majority of lingcod harvest since 2010 was taken in state waters, ranging from 52% to 95%, with 76% taken in state waters in 2018, about average for the time series (Table 19). The NGD, which supports active commercial and recreational lingcod fisheries, has historically accounted for virtually all of the harvest; lingcod harvest from the CID continues to be low.

Corresponding to higher harvests in 2017 and 2018, estimated exvessel values for lingcod harvest increased and were the highest in the historical time series at $42,452 and $54,427, respectively (Appendix A1).

FISHERY OVERVIEW: EARLY YEARS

Since 1988, the commercial harvest of lingcod has ranged from 2,894 lb in 1989 by 10 vessels with 20 landings to a high of 87,370 lb in 1993 by 18 vessels with 64 landings (Table 19). Between 1988 and 2005, there were only 5 years when the majority of the fish were not harvested with jig gear (Figure 15). The highest percentages of jig harvest occurred in 1993 and 1994, when 99% of the lingcod harvested each year were taken with jig gear (Table 19). Historically, effort has been sporadic and, in some years, prior to adoption of the July 1 season opening date, the fishery was open the entire year.

Jig gear has persisted as the dominant gear type since 1988, accounting for over 60% of the total harvest, with the combined longline, pot, and trawl gears accounting for the remainder (Table 19). Due to confidentiality requirements, these data cannot be presented separately. However, the differences in gear types were attributable to greatly increased harvest by pot gear in certain years but the majority of historical harvest other than jig gear has been by longline gear.

RESEARCH

Please refer to the rockfish research section in this report for ROV information, which includes lingcod.

HARVEST MONITORING

Dockside sampling of lingcod began in 1998, although no samples were collected in 1999. Information collected by dockside samplers included fishing location and effort as well as fish length, sex, maturity stage, and otoliths or fin rays for age determination. Sampling information indicated some variability in weight, length, age, and sex ratio. Average weight of sampled lingcod for all years ranged from 11.8 to 17.3 kg, average length ranged from 101 to 119 cm, and average age for years when data are available ranged from 13 to 20 years (Table 20). In 2018, lingcod were the smallest on record with an average weight of 11.8 kg and average length was 101 cm (Table 20). Through 2015, female lingcod made up the majority of the harvest with an average of 74%; however, in 2016, female lingcod dropped to 39% of sampled fish and after rebounding to 54% in 2017, decreased to a record low of 28% in 2018 (Table 20). This relates to the smaller size trends, because mature female lingcod are substantially larger than male lingcod. External determination of sex was possible for many of the fish sampled. However, most lingcod were delivered gutted and some with the vent area removed, prohibiting collection of sex and maturity data on some fish, which resulted in reduced sample sizes for those variables in some years. Sample sizes have increased during the past 3 years along with more targeted effort; the sampling goal was achieved in 2017 for the first time. An experiment comparing ages estimated from otoliths and fin ray sections was conducted in 2001 through 2005 and analysis produced results that were comparable (Russ et al. 2013a). Therefore, the decision was made to switch to collecting otoliths as the preferred age structure for all commercial lingcod age determination in the Central Region beginning in 2006, because substantially less labor was required to process otoliths versus fin rays.

POLLOCK

MANAGEMENT AND REGULATIONS

Walleye pollock may be retained as bycatch under 5 AAC 28.070. *Groundfish Possession and Landing Requirements*. In Cook Inlet Area, an EO is issued annually to set groundfish bycatch limits. Since 2014, this EO allowed permit holders participating in a halibut or directed groundfish fishery, or taken incidentally by drift or set gillnet gear fishing for salmon or herring, to retain 20% pollock round weight as a percentage of the target species harvested, which is the maximum bycatch level allowed under 5 AAC 28.070.

Since mid-1999, directed fishing for pollock has required a commissioner's permit under 5 AAC 28.379 *Permit for Miscellaneous Groundfish*.

REGULATION DEVELOPMENT

Temporal and geographical fishing restrictions associated with SSL protective measures complicated pollock harvesting opportunities beginning in 2000 and effectively closed all of the NGD to pollock trawl fishing. Due to lack of interest, no commissioner's permits were issued through 2003. A single commissioner's permit was issued in 2004 to allow the pelagic trawl harvest of pollock in state waters for 24 hours between 149° and 150° longitude, except within 3 nmi of SSL haulouts, while the season was open in the federal CGOA area. That vessel, in combination with deliveries of incidentally caught pollock by other vessels, resulted in a total 2004 pollock harvest of 342,305 lb. The BOF generated a proposal in 2004 to consider reestablishing the Cook Inlet pollock trawl fishery in the Resurrection Bay area, which was

tabled until October 2006 pending comment from NMFS in regard to SSL protections. The proposal ultimately failed.

Limited deliveries of pollock also occurred under 5 AAC 28.070(e), requiring vessels fishing groundfish to retain all pollock when a pollock fishery was open, and up to the maximum retainable bycatch levels when closed. Under 5 AAC 28.075, processors are required to accept and utilize at least 15% of fish retained under 5 AAC 28.070(e). These regulations were intended to encourage improved retention and utilization of pollock and Pacific cod although regulatory compliance was believed to be poor. A proposal to clarify 5 AAC 28.070(e), because the language was confusing and often misinterpreted to allow retention of pollock during an open Pacific cod fishery, was adopted during the 2015/16 BOF cycle.

FISHERY OVERVIEW: RECENT YEARS

There has been no directed walleye pollock fishing since the commissioner's permit fishery was last prosecuted in 2016. Total harvest in 2017 and 2018 from bycatch was 8,227 lb and 1,771 lb, respectively (Table 21).

FISHERY OVERVIEW: COMMISSIONER'S PERMIT EXPERIMENTAL FISHERY

The walleye pollock seine commissioner's permit experimental fishery opened in the Cook Inlet Area on December 1, 2014. The first permit period was from December 1, 2014 through February 28, 2015. The allowable harvest level was set at 220,000 lb through December 31, 2014 and an additional 220,000 lb was made available from January 1 through February 28, 2015. A trip limit of 10,000 lb, mandatory observers, logbooks, and some closed areas were also part of the permit requirements (Rumble et al. 2016, Table 22).

During this initial 2014 and 2015 fishing period, a total of 32,318 lb of walleye pollock were harvested. In this fishery, 2 vessels participated (confidentiality was waived by participants) and made 11 trips with a combined total of 53 purse seine sets. There were 45 Chinook salmon caught with 2 mortalities and the remaining salmon were released alive. The pollock average weight was 0.7 kg (1.4 lb; Table 23). ADF&G Homer groundfish staff observed fishing on all trips (Table 22).

Another commissioner's permit fishery opened October 1 through December 31, 2015, and allowed up to 210,000 lb of walleye pollock to be harvested. The trip limits were eliminated and observers were required to be accommodated upon request, although observers were not deployed on every trip. The same 2 vessels participated between October 7 through December 4, 2015, and the total pollock harvest was 8,469 lb, with an average weight of 0.6 kg (1.3 lb; Table 23). Nine trips were made with 6 trips observed by ADF&G Homer groundfish staff. Bycatch included 61 adult Chinook salmon with 2 mortalities; most of these fish were 3 lb or less. During this fishing period, 35 Chinook salmon smolt and 1 adult coho salmon were also caught and all were mortalities (Table 22).

Another commissioner's permit fishery opened January 1, 2016, and the same 2 vessels participated. In 2016, the fishing period was changed to run the calendar year with a split season from January 1 to March 31 and from October 1 to December 31; the allowable pollock harvest level was set at 220,000 lb (Table 22). Effort was low in 2016 and only 206 lb of pollock was harvested from 2 trips and 3 purse seine sets with no participation in the fall season (Table 22). There was no salmon bycatch. Pollock average weight was larger in 2016 at 1.2 kg (2.6 lb)

compared to 0.7 kg (1.5 lb) in 2014 and 0.6 kg (1.3 lb) in 2015 (Table 23); however, sample size was small.

The majority of bycatch was jellyfish, totaling as much as 10,000 lb per set. The next most common bycatch species was herring. Herring bycatch ranged from 0 to 800 herring in a set (data on file with ADF&G, Division of Commercial Fisheries, Homer). Other bycatch included: Pacific cod, Pacific tomcod, Pacific sandfish, saffron cod, rainbow smelt, flathead sole, rock sole, butter sole, starry flounder, Alaska plaice, sturgeon poacher, smooth lumpsucker, sculpin (yellow Irish Lord, Pacific staghorn), snailfish, ronquil, greenling, prowfish, sand lance, sablefish (juvenile), and longnose skate.

Herring seine nets fishing at depths of approximately 3 and 6 fathoms were originally used; during the fall 2015 fishing period, both vessels acquired new deeper seine nets that fished at about 8 fathoms. However, these nets had limited success, and 1 vessel redeployed their original shallower net.

All of the pollock were sold for food or bait. Originally the participants were hoping for a niche market, but the product did not fit the specifications of that market. Total value of pollock sold in the Cook Inlet Area, based on price per lb reported on fish tickets, was $3,621 in 2014 and $3,788 in 2015 (Appendix A1).

There have been no Commissioner's Permits issued for pollock since 2016.

FISHERY OVERVIEW: THE EARLY YEARS

Walleye pollock seasons in the Cook Inlet Area were historically managed via EO as parallel fisheries with state seasons set to coincide with NMFS actions in the adjacent waters of the federal EEZ. The cumulative reported pollock harvest from area state waters between 1988 and 1995 was 473,201 lb (Table 21; 1989 confidential data omitted). Directed pollock fishing with pelagic trawls occurred in the NGD between 1996 and 1999. Annual pollock harvest during these years ranged from approximately 1.9 million lb in 1996 to 9.7 million lb in 1998, with pelagic trawls yielding over 99% of the harvest.

There was minimal harvest after 1999 until a commissioner's permit was issued in 2004 to allow pelagic trawl harvest (Table 21). Since 2004, there has been very low harvest, except for some increased jig effort as part of the Pacific cod fishery in 2013, until the commissioner's permit seine fishery was implemented in 2014.

HARVEST MONITORING

Biological sampling of walleye pollock resumed between 2013 and 2016, after a hiatus from 2005 to 2012, in response to increased jig effort in 2013 and implementation of the commissioner's permit seine pollock fishery in 2014 (Table 23). However, no samples were collected in 2017 and 2018 because there was no jig effort and no commissioner's permits issued. Information collected by dockside samplers included fishing location and effort as well as fish length, weight, sex, maturity stage and otoliths for age determination.

Between 2013 and 2016, a total of 750 pollock samples were collected with an average length of 46 cm, average weight of 0.85 kg, and an average age of 5 years old (Table 23). Sex ratio averaged 58% female. The largest pollock in recent years occurred in 2016 with an average weight (1.2 kg) twice the 2015 sampled fish (0.6 kg).

In years of directed pelagic trawl harvest (1997–1999 and 2004), samples showed average length ranged from 44 cm to 56 cm and average weight ranged from 0.9 kg to 2.3 kg (Table 23). Sex ratio averaged 47% female.

OUTLOOK

ADF&G will continue to issue commissioner's permits in the future as requested and monitor the harvest.

OTHER GROUNDFISH

HISTORICAL BACKGROUND

Assorted species of skates, flatfish, sharks, and other groundfish have been harvested in both directed and bycatch fisheries in the Cook Inlet Area (Table 24). Historically, for any groundfish species that lacked specific regulatory management measures, state waters fishing seasons were set by EO to coincide with NMFS fishing seasons in adjacent federal waters. However, due to the potential for rapidly expanding and uncontrolled fisheries on species for which there was little biological data, the BOF adopted a variety of regulatory measures allowing ADF&G and the BOF to take a precautionary approach toward new or rapidly developing fisheries.

In the Cook Inlet Area, an EO has been issued annually since 2014 to set groundfish bycatch limits to other directed groundfish fisheries per 5 AAC 28.070, which provides for a maximum bycatch level of up to 20%, by weight, of the directed groundfish species onboard the vessel.

Among the more pertinent measures adopted by the BOF were:

- 5AAC 28.070 – *Groundfish Possession and Landing Requirements*
- 5 AAC 28.089 – *Guiding Principles for Groundfish Fishery Regulations*
- 5 AAC 39.210 – *Management Plan for High Impact Emerging Fisheries*
- 5 AAC 28.083 – *Permit Requirements for Skates and Rays*
- 5 AAC 28.084 – *Fishing Seasons, Landing Requirements, and Utilization for Sharks*
- 5 AAC 28.379 – *Permit for Miscellaneous Groundfish*

SKATES

Currently, skates in Alaska are managed as bycatch and there is no directed fishery. Most harvest comes from longline gear, much of it as bycatch to other directed groundfish and halibut fisheries and primarily during the months of February to April.

Historically, skates were open to directed fishing with little regulatory oversight beyond general reporting requirements. Effective in May 1998, statewide regulation 5 AAC 28.083 established a commissioner's permit requirement for directed skate fishing, which may restrict or specify conditions such as depth of fishing, season dates, fishing areas, minimum size limits, gear, and logbooks, as well as other conditions the commissioner finds "necessary for conservation and management purposes."

Since 2012, the harvest of skates has been historically high because of a developing market (Table 24). A peak harvest of 164,085 lb occurred in 2015 but has decreased steadily to 11,742 lb in 2018 (Appendix A1). Price per pound for skates has exceeded some of the target harvest

and the 2015 exvessel value was the highest on record. Federal Pacific cod gear sector splits implemented in 2012 was a substantial factor in the increased harvest of skates because more longline vessels participated in the parallel fishery and the highest bycatch harvest of skates occurred during that fishery.

The first applications for permits to target skates in the Cook Inlet Area were received in 2004. ADF&G issued 9 permits and the harvest totaled 18,728 lb. Permits were valid for 90 days; restricted gear to longline or jig; and required logbooks, 2-hour PNOL, and agreement to carry an ADF&G observer upon request. Catch reporting by species was required and in 2004 ADF&G's fish ticket reporting system was amended to provide species codes to facilitate reporting of the 2 most commonly harvested skate species, longnose *Raja rhina* and big *Raja binoculata*. Big skates made up approximately 97% of the total harvest (Rumble et al. 2016).

Due to concern of overfishing and lack of adequate stock assessment, NMFS moved skates to bycatch-only status in federal fisheries. Because of this action, no commissioner's permits for skates have been issued since 2004. In addition, in recent years, there has been concern over skate abundance levels derived from NMFS stock assessment surveys. This resulted in a reduction of the maximum retainable amounts (MRA) from 20% to 5% for skates in federal directed groundfish fisheries in 2016. There were concerns about the skate population stock assessment information and of vessels "topping off" their harvest with maximum allowed bycatch. Additionally, the TAC was achieved for big skate in 2013 through 2015, and big skate was closed to retention in federal waters of the adjacent CGOA. ADF&G closed big skate in state waters of the Cook Inlet Area to mirror this action because there was no GHL set for skate species. The Cook Inlet Area allowable bycatch level of skate species in aggregate had already been reduced from 20% to 15% in 2014 due to conservation concerns. Following suit after the recent federal action, ADF&G reduced bycatch levels in the Cook Inlet Area from 15% to 5% in 2016 and bycatch allowances remain at this level.

Stock assessment is conducted by NOAA/NMFS each year and separate ABCs are generated for big skate, longnose skate, and "other" skates. All GOA skates are managed under Tier 5, which base ABC and overfishing levels (OFL) on survey biomass estimates and mortality rate. The gulfwide ABC for big skate decreased from 3,814 mt in 2017 to 2,848 mt in 2018. Most of the decrease was in recommendations in the Western and Eastern Gulf of Alaska, where the ABCs decreased by half. The longnose ABC recommendations were similar for 2017 and 2018, 3,206 mt and 3,572 mt, respectively.

SHARKS

Annual shark harvests from the Cook Inlet Area have ranged from no reported landings to 6,594 lb in 1999 (Table 24). In 1997, the BOF closed directed shark fishing and permitted retention of shark bycatch. Little new biological information has become available since the 1997 BOF actions. Data that might be used to develop a state management plan, such as stock structure, biomass and abundance levels, existing fishing mortality, and ecological linkages, are still lacking. High annual variability of sharks in ADF&G surveys is consistent with current literature, which confirms most shark species are highly migratory (Weng et al. 2008; McFarlane and King 2003). Effective in 2005, after adoption by the BOF in 2004, a new regulation allowed a directed spiny dogfish fishery via commissioner's permit. Since the regulation took effect, only 1 commissioner's permit has been issued, which happened in 2006. There has been no reported harvest of sharks in 10 of the last 12 years, but the reported harvest in 2006 was close to harvest

levels that occurred in 1999. Because retention of sharks has been minimal, as allowed under current commercial regulations, interest in shark fisheries in 2006 does not appear to be related to increased market demand, but instead to reducing hook competition with other, more valuable, target species.

There has been no harvest of sharks reported since 2006; however, incidental captures of shark species may approach nuisance levels, particularly spiny dogfish. Discarded catch rates are poorly documented, but anecdotal information suggests rates may be high, at least in some areas and at some times. Cook Inlet Area shark bycatch, composed primarily of spiny dogfish, as evidenced by reported at-sea discards on fish tickets, was comparatively high between 2000 and 2010, averaging about 21,000 lb annually (Table 25). In contrast, shark bycatch levels reported between 2011 and 2014 averaged about 3,500 lb per year. However, there was a large increase in reported at-sea discards of sharks in 2015 of 32,393 lb, the highest level since 2004 (Table 25).

Similar to skates, allowable bycatch level of shark species in aggregate was reduced from 20% to 15% by EO in 2014 due to lack of stock assessment information.

2016–2018 Season Summary

In 2018, the majority of other groundfish harvested as bycatch was made up almost entirely of skates, and since 2004, more than 90% of the total harvest was composed of skates. Skate harvest has been trending downward since the 2015 record-high harvest of 164,085 lb (Table 24), which can be attributed to the decrease in directed groundfish abundance, the reduction in the bycatch limit from 15% to 5% of the directed harvest, and less market demand. In 2018, skate harvest was 11,742 lb, the lowest level since 2010.

Since the spiny dogfish commissioner's permit fishery ended in 2006, up through year 2017, there was 0 shark harvest reported, and in 2018, only 10 lb of shark were harvested (Table 24).

Harvest Monitoring

There is currently no sampling effort on skates harvested during commercial fisheries in the Cook Inlet Area. The most recent dockside sampling of Cook Inlet skates in occurred in 2004, the last year that there was directed effort. Information collected by dockside samplers included fish length, sex, weight, and vertebrae for age determination. Age structures were shipped to the NMFS age lab in Seattle, but to date final age estimates have not been received. Preliminary analysis indicated commercially harvested skates from the Cook Inlet Area ranged from 8 to 22 years in age (Gburski et al. 2007). Species composition of the directed skate harvest sample was 93% big skate and 7% longnose skate. Female skates made up 73% of the sampled harvest. Big and longnose skates averaged 144 cm (n = 115) and 115 cm (n = 9) total length, respectively.

Samples of spiny dogfish were collected in 2005 and 2006, in response to BOF actions to allow a commissioner's permit fishery. Length, weight, sex, and age structures were collected from spiny dogfish in those years. Spiny dogfish averaged 4.3 kg (n = 65) with an average age of 22 years (n = 41) in 2005 (sampled fish caught as bycatch in salmon set gillnets), and in 2006 had an average weight of 4.1 kg (n = 247) and average age of 25 years (n = 243) (Rumble et al. 2016).

AT-SEA DISCARDS

At-sea discards reported by vessels fishing in Cook Inlet Area waters ranged from 18 lb in 1989 to 138,793 lb in 1996 (Table 25). Between 1988 and 2018, sharks made up the largest

component (32%) of at-sea discards, with skates (24%) and flatfish (21%) making up the next largest components (Table 25). Most reported discards come from NMFS and International Pacific Halibut Commission survey cruises, with a smaller proportion coming from vessels carrying observers. Reporting of at-sea discards is somewhat dependent upon factors such as location and timing of fishery, changes to fishing technology, market conditions, and requirements of vessel operators. However, based on relative catch abundances observed in ADF&G surveys, actual discard rates are much higher than reported (Bechtol 2001; Gustafson and Bechtol 2001).

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TABLES AND FIGURES

Table 1.–Emergency orders issued for commercial groundfish fisheries in the Cook Inlet Area, 2016–2018.

Emergency order number	Effective date	Explanation
2-GF-H-01-18	1/1/2018	Set Cook Inlet Area groundfish bycatch limits.
2-GF-H-02-18	1/1/2018	Opened parallel Pacific cod season to pot and longline gear.
2-GF-H-03-18	1/1/2018	Opened state-waters Pacific cod season to jig gear.
2-GF-H-04-18	2/14/2018	Closed parallel Pacific cod season and opened state-waters season (24 hours after parallel closure) to pot gear.
2-GF-H-05-18	2/18/2018	Closed state-waters Pacific cod season to pot gear for vessels greater than 58 feet.
2-GF-H-06-18	3/2/2018	Closed parallel Pacific cod season to longline gear for vessels less than 50 feet.
2-GF-H-07-18	3/14/2018	Closed parallel Pacific cod season to longline gear for vessels greater than or equal to 50 feet.
2-GF-H-08-18	9/1/2018	Closed state-waters Pacific cod season to pot gear and opened parallel season to pot and longline gear.
2-GF-H-09-18	11/11/2018	Closed lingcod season.
2-GF-H-10-18	12/1/2018	Closed parallel Pacific cod season to longline gear.
2-GF-H-01-17	1/1/2017	Set Cook Inlet Area groundfish bycatch limits
2-GF-H-02-17	1/1/2017	Opened parallel Pacific cod season to pot, jig, and longline gear.
2-GF-H-03-17	2/23/2017	Closed parallel Pacific cod season and opened state-waters season (24 hours after parallel closure) to pot gear.
2-GF-H-04-17	3/25/2017	Closed state-waters Pacific cod season to pot gear for vessels greater than 58 feet.
2-GF-H-05-17	4/6/2017	Closed state-waters Pacific cod season and reopened parallel season to pot gear.
2-GF-H-06-17	6/10/2017	Closed parallel Pacific cod season to pot and longline gear and reopened state-waters season to pot gear.
2-GF-H-07-17	7/15/2017	Opened sablefish season at 12:00 noon.
2-GF-H-08-17	9/1/2017	Closed state-waters Pacific cod season to pot gear and opened parallel season to pot and longline gear.
2-GF-H-09-17	12/15/2017	Closed lingcod season.
2-GF-H-01-16	1/1/2016	Set Cook Inlet Area groundfish bycatch limits
2-GF-H-02-16	1/1/2016	Opened parallel Pacific cod season to pot, jig, and longline gear.
2-GF-H-03-16	2/1/2016	Closed parallel Pacific cod season and opened state-waters season (24 hours after parallel closure) to pot gear.
2-GF-H-04-16	3/1/2016	Closed parallel Pacific cod season and opened state-waters season (24 hours after parallel closure) to jig gear.
2-GF-H-05-13	3/11/2016	Closed parallel Pacific cod season to longline gear.
2-GF-H-06-16	3/12/2016	Closed state-waters Pacific cod season and reopened parallel season to pot gear.
2-GF-H-07-16	3/21/2016	Closed the state-waters Pacific cod season and reopened parallel season to jig gear.
2-GF-H-08-16	3/31/2016	Closed parallel Pacific cod season and reopened state-waters season to pot gear.
2-GF-H-09-16	7/15/2016	Opened sablefish season at 12:00 noon.
2-GF-H-10-16	9/1/2016	Closed state-waters Pacific cod season and opened parallel season to pot gear.
2-GF-H-11-16	9/29/2016	Prohibited retention of big skate.
2-GF-H-12-16	11/8/2016	Closed sablefish season.
2-GF-H-13-16	11/25/2016	Closed directed rockfish season.
2-GF-H-14-16	12/7/2016	Amended groundfish pot closure area in Kachemak Bay per BOF.

Table 2.–Cook Inlet Area Pacific cod parallel and state-waters season dates by gear type, 2016–2018.

Year	Dates and times [a]	Season and gear
2018	1/1/18–3/2/18; 9/1/18–12/1/18	Parallel season, longline <50′
	1/1/18–3/14/18	Parallel season, longline ≥50′
	1/1/18–2/14/18; 9/1/18–12/31/18	Parallel season, pots
	Closed	Parallel season, jig
	2/15/18–9/1/18	State-waters season pot vessels ≤58′
	2/15/18–2/18/18	State-waters season pot vessels >58′
	1/1/18–12/31/18	State-waters season jig
2017	1/1/17–6/10/17; 9/1/17–12/31/17	Parallel season, longline <50′
	1/1/17–6/10/17; 9/1/17–12/31/17	Parallel season, longline ≥50′
	1/1/17–2/23/17; 4/6/17–6/10/17; 9/1/17–12/31/17	Parallel season, pots
	1/1/17–12/31/17	Parallel season, jig
	2/24/17–4/6/17; 6/10/17–9/1/17	State-waters season pot vessels ≤58′
	2/24/17–4/6/17; 6/10/17–9/1/17	State-waters season pot vessels >58′
	Closed	State-waters season jig
2016	1/1/16–3/11/16	Parallel season, longline
	1/1/16–2/1/16; 3/12/16–3/31/16; 9/1/16–12/31/16	Parallel season, pots
	1/1/16–3/1/16; 3/21/16–12/31/16	Parallel season, jig
	2/2/16– 3/12/16; 3/31/16–9/1/2016	State-waters season pot vessels ≤58′
	2/2/16–3/12/16; 3/31/16–9/1/16	State-waters season pot vessels >58′
	3/2/16–3/21/16	State-waters season jig

[a] Opening and closure times occurred at 12:00 pm, except openings on January 1 occurred at 12:01 am and closures on December 31 occurred at 11:59 pm.

Table 3.–Annual harvest and effort by gear type from the commercial Pacific cod state-waters season in the Cook Inlet Area, 1997–2019.

	Jig gear[a]			Pot gear[b]			Total		% of GHL
Year	Vessels	Landings	Harvest	Vessels	Landings	Harvest	harvest[c]	GHL	Harvested
1997	46	233	561,947	10	136	276,966	838,913	2,549,646	33%
1998	29	123	188,209	13	183	542,260	730,469	2,434,565	30%
1999	14	51	127,229	24	278	1,390,678	1,517,907	2,637,445	58%
2000	5	12	13,885	17	219	1,135,903	1,149,788	2,160,255	53%
2001	5	13	19,428	9	196	875,923	895,351	1,917,195	47%
2002	6	15	18,163	9	306	1,310,684	1,328,847	1,571,455	85%
2003	15	160	429,684	10	140	1,023,854	1,453,538	1,438,516	101%
2004	18	120	326,298	12	170	1,785,386	2,111,684	2,367,765	89%
2005	8	28	90,734	10	205	2,227,417	2,318,151	2,737,893	85%
2006	[d]	[d]	[d]	11	148	1,476,115	1,476,115	3,131,088	47%
2007	4	7	5,545	13	145	1,436,804	1,442,349	3,131,088	46%
2008	3	7	14,456	13	227	2,379,085	2,393,541	3,133,403	76%
2009	9	41	138,960	13	181	2,393,574	2,532,535	2,606,393	97%
2010	6	20	48,754	9	128	3,074,871	3,123,626	4,054,466	77%
2011	31	203	498,185	11	156	3,902,154	4,400,339	4,449,911	99%
2012	27	137	192,847	13	155	4,043,548	4,236,395	4,707,420	90%
2013	0	0	0	13	154	2,754,265	2,754,265	4,074,804	68%
2014	0	0	0	8	121	3,018,318	3,018,318	4,389,955	69%
2015	7	31	70,639	11	134	3,256,063	3,326,701	5,069,530	66%
2016	7	19	55,673	14	126	2,869,969	2,925,642	4,076,788	72%
2017	0	0	0	13	96	1,636,865	1,636,865	3,652,504	45%
2018	[d]	[d]	[d]	8	46	558,828	558,828	671,141	83%
2019[e]	3	4	2,868	7	54	570,424	573,293	633,857	90%

[a] Includes mechanical jig and hand troll gear.

[b] Harvest reported in round pounds.

[c] Total harvest does not include confidential data.

[d] Confidential data due to limited number of participants.

[e] Information through July 31, 2019.

Table 4.–Annual harvest and effort by gear type of commercial Pacific cod parallel fisheries in the Cook Inlet Area, 1988–2019.

			Harvest (lb)[a]				
Year	Vessels	Landings	Longline	Pot	Jig[b]	Other[c]	Total
1988	59	213	482,365	[d]	[d]	[d]	517,497
1989	9	21	35,978	[d]	[d]		36,846
1990	52	127	250,888	20,244	[d]	107,505	378,637[e]
1991	122	489	1,347,759	525,774	17,284	25,819	1,916,636
1992	190	868	3,553,709	1,873,717	13,995		5,441,421
1993	109	427	2,316,492	1,336,799		8,454	3,661,744
1994	74	386	1,386,775	1,290,860	5,487	[d]	2,685,562
1995	140	669	2,250,472	1,721,079	3,572	433,528	4,408,651
1996	106	567	2,219,948	987,626	25,645	1,411,726	4,644,945
1997	137	576	2,049,394	1,114,131	37,362	72,354	3,273,240
1998	116	519	1,900,375	529,355	42,453	211,406	2,683,589
1999	112	457	2,171,877	981,674	21,331	8,296	3,183,178
2000	101	417	815,742	770,298	[d]		1,586,041[e]
2001	86	243	301,654	314,098			615,752
2002	65	222	582,635	307,937	[d]		890,573[e]
2003	45	142	126,168	294,630			420,798
2004	62	133	27,026	360,637	[d]		387,662[e]
2005	44	118	25,720	167,320	[d]		193,040[e]
2006	51	171	70,507	520,613			591,121
2007	47	202	364,427	328,878			693,305
2008	52	161	267,991	145,473			413,464
2009	57	172	452,796	88,657			541,453
2010	50	124	197,795	228,429	[d]		426,223[e]
2011	49	144	199,613	579,007	237		778,857
2012	51	216	1,018,217	957,217	[d]		1,975,434[e]
2013	61	220	1,039,822	367,635	4,817		1,412,274
2014	50	156	678,901	348,900	32,260	18	1,060,078
2015	57	205	1,716,574	407,494	87	252	2,124,408
2016	70	266	990,491	1,123,120	48,379	40	2,162,030
2017	60	252	667,553	1,034,841	6,161		1,708,555
2018	40	107	484,260	259,669	199		744,128
2019[f]	31	68	298,434	118,925			417,366

Note: Harvest combines directed parallel seasons and Pacific cod bycatch from other fisheries.

[a] Harvest is reported in round pounds.

[b] Includes mechanical jig and hand troll gear.

[c] "Other" includes trawl, gillnet, and seine gear.

[d] Confidential data due to limited number of participants.

[e] Total harvest does not include confidential data.

[f] Information through July 31, 2019.

Table 5.–Annual harvest and effort by district in the commercial Pacific cod parallel season in the North Gulf and Cook Inlet Districts, 1988–2018.

	North Gulf District			Cook Inlet District			Pooled Districts		
Year	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)	Vessels[a]	Landings	Harvest (lb)[b,c]
1988	28	79	303,778	38	135	213,719	74	386	2,685,562
1989	7	18	29,256	4	4	7,590	140	669	4,408,651
1990	19	26	158,654	34	101	220,145	106	567	4,644,945
1991	79	158	980,179	77	331	936,458	137	576	3,273,240
1992	155	611	4,656,230	50	257	785,191	116	519	2,683,589
1993	89	265	2,752,451	29	162	909,294	112	457	3,183,178
1994	52	160	1,482,618	30	226	1,202,944	101	417	1,587,390
1995	112	255	3,014,296	50	415	1,394,355	86	243	615,752
1996	94	300	3,807,762	24	271	837,183	66	222	891,970
1997	109	290	2,050,031	39	286	1,223,209	45	142	420,798
1998	93	295	2,122,576	27	224	561,013	62	133	387,902
1999	88	255	2,103,345	33	202	1,079,834	43	118	193,075
2000	80	224	1,057,657	31	195	529,732	51	171	591,121
2001	68	120	269,982	27	125	345,769	47	202	693,305
2002	49	96	577,725	19	126	314,244	52	161	413,464
2003	29	42	162,757	19	101	258,041	57	172	541,453
2004	39	56	112,899	31	77	275,003	50	124	426,241
2005	31	62	67,194	15	57	125,881	49	144	778,857
2006	42	90	258,569	11	83	332,552	51	216	1,982,207
2007	36	107	394,640	16	96	298,665	61	220	1,412,274
2008	40	87	266,486	16	74	146,978	50	156	1,060,078
2009	38	98	438,766	24	74	102,687	57	204	2,124,094
2010	36	65	222,248	17	61	203,993	70	266	2,162,030
2011	31	68	219,804	23	79	559,053	60	252	1,708,555
2012	38	112	1,103,198	16	105	879,009	40	107	744,128
2013	43	123	1,039,694	20	98	372,580	74	386	2,685,562
2014	31	81	772,160	22	77	287,918	140	669	4,408,651
2015	38	136	1,752,360	20	69	371,733	106	567	4,644,945
2016	49	137	1,200,391	29	131	961,639	137	576	3,273,240
2017	44	132	1,146,495	26	122	562,060	116	519	2,683,589
2018	27	52	537,156	21	57	206,972	112	457	3,183,178

Note: Harvest combines directed parallel Pacific cod harvest and Pacific cod bycatch from other fisheries.

[a] Pooled vessel count is discrete vessels.

[b] All harvest totals include reported at-sea discards.

[c] Sum discrepancies are due to rounding.

Table 6.–Annual harvest and effort by district from commercial Pacific cod state-waters fisheries in the North Gulf and Cook Inlet Districts, 1997–2018.

	North Gulf District			Cook Inlet District			Pooled Districts		
Year	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)	Vessels[a]	Landings	Harvest (lb)[b,c]
1997	29	81	291,565	35	288	547,349	55	367	838,913
1998	28	92	164,540	20	214	565,929	42	306	730,469
1999	20	56	359,511	23	274	1,158,396	38	329	1,517,907
2000	7	11	19,817	19	320	1,129,971	21	331	1,149,788
2001	5	15	60,310	9	194	835,042	14	209	895,351
2002	5	7	170,239	12	315	1,158,608	15	321	1,328,847
2003	15	41	616,306	14	260	837,232	19	300	1,453,538
2004	15	63	938,541	19	228	1,173,144	25	290	2,111,685
2005	7	25	798,623	15	208	1,519,528	17	233	2,318,151
2006	4	19	567,290	9	131	910,231	12	149	1,477,521
2007	8	31	809,949	11	122	632,400	17	152	1,442,349
2008	4	28	1,088,694	13	206	1,304,847	16	234	2,393,541
2009	9	35	1,142,965	15	189	1,389,570	18	222	2,532,535
2010	4	23	1,701,278	13	125	1,422,348	15	148	3,123,626
2011	16	90	2,126,614	30	271	2,273,725	40	359	4,400,339
2012	16	59	2,119,552	32	243	2,116,843	39	292	4,236,395
2013	6	36	1,473,670	9	122	1,280,595	13	154	2,754,265
2014	4	22	1,690,431	5	99	1,327,887	9	121	3,018,318
2015	5	42	1,866,104	14	125	1,460,598	18	165	3,326,701
2016	11	38	1,074,315	11	108	1,851,328	21	145	2,925,643
2017	4	21	987,363	10	82	649,501	13	96	1,636,864
2018	4	10	331,339	6	38	225,948	9	47	557,288

[a] Pooled vessel count is discrete vessels.

[b] All harvest totals include reported at-sea discards.

[c] Sum discrepancies are due to rounding.

Table 7.–Average weight, average length, and percent female of commercially harvested Pacific cod in the Cook Inlet Area, 1997–2018.

Year	Avg weight (kg)	*n*	Avg length (cm)	*n*	% female	*n*
1997	NA		61	2,480	NA	
1998	3.3	92	66	1,186	NA	
1999	2.9	519	64	3,522	53	2,261
2000	3.5	1,957	65	2,825	56	2,403
2001	3.1	716	61	1,318	58	817
2002	3.1	1,024	62	2,939	57	1,397
2003	3.4	590	64	1,714	51	624
2004	3.2	745	61	2,772	59	766
2005	3.3	545	61	1,642	57	650
2006	3.3	535	62	1,143	59	540
2007	3.7	632	65	2,833	59	623
2008	3.8	648	65	2,237	58	649
2009	3.3	776	63	1,595	60	776
2010	3.4	872	63	1,800	60	873
2011	3.0	2,812	63	2,811	56	1,419
2012	3.1	1,436	63	2,819	53	1,446
2013	3.3	1,033	63	2,032	55	1,032
2014	3.2	1,223	63	2,399	52	1,223
2015	2.9	2,320	61	4,466	51	2,269
2016	2.4	1,713	57	3,276	51	1,641
2017	2.9	3,040	60	3,099	59	1,562
2018	3.0	1,052	60	2,101	59	1,050

Note: *n* = sample size.

Table 8.–Harvest and effort from the Cook Inlet Area commercial sablefish fishery, 1988–2018.

			Round weight (lb)			
Year	Vessels	Landings	Commercial harvest[a]	Total harvest[a,c]	GHL[b]	Average per landing[d]
1988	37	86	136,260	136,260		1,566
1989	4	5	2,996	2,996		599
1990	22	24	8,480	8,480		339
1991	25	33	103,597	103,597		3,139
1992	79	103	126,852	126,852		1,208
1993	36	52	95,016	95,016		1,827
1994	39	56	45,008	45,008		790
1995	33	45	22,551	22,551		501
1996	25	79	81,067	81,067		1,013
1997	39	97	125,349	125,349	72,000	1,279
1998	29	57	69,689	69,689	72,000	1,223
1999[c]	23	40	73,695	76,741	63,400	1,842
2000[c]	16	31	102,639	103,662	67,000	3,207
2001	21	32	133,435	133,435	67,000	4,170
2002[c]	23	26	108,117	108,966	67,000	4,158
2003	14	14	122,098	122,098	75,000	8,721
2004	17	17	82,836	82,836	87,000	4,873
2005[d]	10	37	84,023	84,023	86,000	2,271
2006	16	41	88,695	88,695	76,000	2,163
2007	10	36	76,889	76,889	74,000	2,136
2008	12	43	68,852	68,852	66,000	1,636
2009	13	66	55,263	55,263	59,880	837
2010	9	44	55,899	55,899	53,733	1,270
2011	10	39	57,350	57,350	56,473	1,471
2012	12	49	67,452	67,452	69,000	1,377
2013	8	44	42,287	42,287	66,000	961
2014	5	29	50,703	50,703	56,000	1,748
2015	4	34	31,780	31,780	55,500	935
2016	6	35	47,241	47,241	48,000	1,350
2017	8	36	37,068	37,068	54,000	1,030
2018	7	20	24,779	24,779	62,000	1,239

[a] Does not include reported at-sea discards.

[b] Prior to implementation of the federal IFQ program, sablefish seasons were set to coincide with federal sablefish seasons and an annual state-water GHL was not established.

[c] Difference in total harvest attributed to sablefish caught during the longline assessment survey and sold to defray survey costs.

[d] Vessel trip limits implemented, 3,000 lb within 2 days.

Table 9.–Average catch per unit effort (CPUE) in pounds per hook for sablefish harvest using longline gear, from analysis of logbook and fish ticket data, 2005–2018.

Year	Total hooks	Sablefish harvest	CPUE (lb per hook)
2005	179,800	83,035	0.46
2006	220,417	71,675	0.33
2007	289,738	76,379	0.26
2008	232,174	60,546	0.26
2009	429,315	51,323	0.12
2010	224,191	50,462	0.23
2011	304,218	57,350	0.19
2012	261,963	52,675	0.20
2013	202,092	37,349	0.18
2014	199,125	49,061	0.25
2015	165,365	28,416	0.17
2016	96,276	46,673	0.48
2017	129,600	31,409	0.24
2018	166,680	24,749	0.15

Note: Harvest and hook data for incomplete logbook data is omitted.

Table 10.–Average weight, average length, and sex ratio of commercially harvested sablefish in the Cook Inlet Area, 1999–2018.

Year	Average weight (kg)	*n*	Average length (cm)	*n*	Average age (years)	*n*	% female	*n*
1999	[a]	9	[a]	9	–	0	[a]	9
2000	2.7	199	62	199	[b]	199	[c]	
2001	2.3	100	57	180	[b]	178	[c]	
2002	2.6	47	60	398	[b]	397	68	397
2003	2.1	367	58	439	4	388	62	439
2004	2.3	460	60	500	6	496	63	498
2005	2.7	400	63	400	10	393	66	400
2006	2.6	358	62	360	8	359	64	360
2007	2.2	560	60	560	7	530	67	540
2008	2.4	441	60	441	9	437	66	441
2009	2.5	511	61	511	8	510	58	511
2010	2.5	409	61	409	9	408	54	408
2011	2.1	614	58	613	7	596	66	613
2012	2.0	561	58	561	6	561	58	559
2013	2.4	590	60	590	6	588	54	587
2014	2.6	534	61	534	6	532	56	531
2015	2.0	550	57	550	[b]	550	59	543
2016	1.9	599	55	600	[b]	599	45	599
2017	1.9	551	56	551	[b]	551	62	546
2018	2.4	419	60	419	[b]	418	69	416

Note: *n* = sample size.

[a] Select samples and small sample sizes in 1999 provide insufficient data to evaluate biological variables.

[b] Age structures were submitted to the Age Determination Unit laboratory in Juneau, AK; data has not yet been analyzed.

[c] Insufficient gender data to evaluate sex ratio for 2000 and 2001 samples; in 2000, 100%, and in 2001, 44% were recorded as sex unknown.

Table 11.–Commercial harvest of rockfish in Cook Inlet Area, by assemblage with percent total harvest, and harvest of yelloweye rockfish and black rockfish, 1988–2018.

	Demersal shelf rockfish (DSR)			Pelagic shelf rockfish (PSR)[a]			Slope[b]		
Year	Yelloweye rockfish harvest (lb)	DSR harvest (lb)	DSR percent of total	Black rockfish harvest (lb)	PSR harvest (lb)	PSR percent of total	Harvest (lb)	Percent of total	Total harvest (lb)
1988	5,536	5,536	4	86,113	86,113	57	59,436	39	151,086
1989	9,582	10,376	46	10,406	10,747	47	1,639	7	22,762
1990	1,124	1,252	4	217	21,379	71	7,577	25	30,209
1991	4,170	7,217	3	120,956	189,656	85	26,392	12	223,265
1992	52,921	126,726	37	55,904	193,680	59	14,772	4	335,178
1993	22,969	27,802	36	30,207	37,201	57	5,814	7	70,817
1994	28,733	35,074	16	137,881	157,783	79	12,704	6	205,561
1995	35,337	37,812	13	202,124	226,737	84	9,992	3	274,541
1996	29,090	38,999	31	71,251	75,100	63	7,376	6	121,476
1997	45,347	49,809	27	115,509	118,806	65	14,417	8	183,032
1998	22,828	24,268	30	44,095	45,361	56	10,692	13	80,321
1999	40,238	46,129	53	31,229	32,298	37	9,225	11	87,652
2000	22,526	24,229	15	126,440	127,021	80	8,159	5	159,409
2001	25,760	26,894	23	82,467	83,608	72	5,821	5	116,323
2002	35,252	36,140	32	71,832	72,439	65	2,929	3	111,508
2003	44,434	44,808	31	95,194	96,367	68	1,554	1	142,729
2004	32,494	32,817	28	84,663	84,883	72	389	<1	118,089
2005	16,237	16,454	25	46,522	46,741	72	1,950	3	65,145
2006	13,143	13,298	48	12,950	12,972	46	1,664	6	27,935
2007	14,872	15,264	60	5,573	5,695	22	4,434	17	25,394
2008	17,378	17,817	59	6,135	6,209	21	5,943	20	29,968
2009	17,272	18,607	60	3,064	3,154	10	9,434	30	31,195
2010	23,937	24,406	46	22,367	22,843	43	5,365	10	52,615
2011	19,388	20,164	29	43,890	45,366	67	3,000	4	68,530
2012	21,154	29,585	63	12,190	12,788	27	4,414	9	46,787
2013	20,733	25,472	36	36,463	38,875	55	6,413	9	70,759
2014	15,381	18,730	31	36,725	39,254	65	2,854	5	60,839
2015	25,678	54,052	38	75,089	82,401	59	4,366	3	140,819
2016	31,964	48,367	34	75,083	89,913	62	6,088	4	144,368
2017	35,057	46,645	40	58,505	64,319	55	5,786	5	116,750
2018	16,887	20,114	34	32,017	35,589	60	3,394	6	59,097

[a] Includes black rockfish from state waters 1988–1997, state and federal waters black rockfish 1998-2018, and dark rockfish from federal waters beginning in 2008.

[b] Includes thornyhead rockfish.

Table 12.–Effort and harvest by species in the Cook Inlet Area directed pelagic shelf rockfish (PSR) fishery, including black and dark rockfish from federal waters, 2005–2018.

			Rockfish harvest by species						
Year	Vessels	Landings	Black[a]	Yellowtail	Dusky	Dark[b]	Dusky/Dark[c]	Total harvest	Avg lb/trip
2005	4	14	44,327	133				44,460	3,176
2006	3	7	12,136				10	12,146	1,735
2007	3	6	5,090				37	5,127	855
2008	3	6	5,909					5,909	985
2009	[d]	[d]	[d]		[d]	[d]		[d]	[d]
2010	10	16	21,712	14	141	262		22,129	1,383
2011	11	25	43,148	42	100	876		44,166	1,767
2012	5	11	11,498	19	85	75		11,677	1,062
2013	7	20	34,976	195	505	1,242		36,918	1,846
2014	12	22	36,349	152	310	1,817		38,628	1,756
2015	13	40	70,311	421	2,004	3,826		76,562	1,914
2016	19	54	69,881	146	4,855	8,265		83,147	1,540
2017	9	41	55,231	164	918	3,349		59,662	1,455
2018	13	39	31,178	19	789	1,317		33,303	854

[a] At-sea discards and test fishery catch included in harvest.

[b] Harvest includes black rockfish from federal waters.

[c] Dark rockfish from federal waters included in harvest beginning in 2008.

[d] Confidential data.

Table 13.–Annual effort and harvest (lb) of commercial rockfish by jig and longline gear in the Cook Inlet Area, 1988–2018.

Year	Vessels	Landings	Jig harvest[a]	Longline harvest[a]
1988	42	95	54,845	96,241
1989	11	29	4,870	17,891
1990	29	37	18,605	11,452
1991	59	154	206,695	16,154
1992	117	368	101,558	232,975
1993	74	198	36,164	34,420
1994	69	199	134,055	71,506
1995	106	292	225,032	48,465
1996	114	291	61,804	47,644
1997	120	336	112,730	69,953
1998[b]	105	302	41,756	34,012
1999	91	278	30,321	57,097
2000	94	243	130,150	29,259
2001	76	166	98,469	17,854
2002	67	161	93,471	18,031
2003	63	136	128,744	13,954
2004	59	13	99,236	18,813
2005	50	125	47,012	18,133
2006	56	112	13,268	14,666
2007	45	119	7,029	18,365
2008[c]	49	114	9,667	20,302
2009	57	136	4,471	26,723
2010	52	112	23,889	28,725
2011	48	119	46,793	21,687
2012	51	144	13,076	33,711
2013	57	171	39,479	31,280
2014	55	127	42,104	18,709
2015	54	208	81,337	59,265
2016	74	225	98,590	45,751
2017	54	176	75,144	41,590
2018	48	105	44,346	14,746
Average	66	171	68,539	39,657

Note: Discards at sea and test fishery catch included in harvest. Other gear not included due to confidential harvest in some years.

[a] Rockfish from state waters 1988–1997.

[b] Black rockfish from federal waters included in harvest beginning in 1998.

[c] Dark rockfish from federal waters included in harvest beginning in 2008.

Table 14.–Harvest and effort by district of Cook Inlet Area commercial rockfish, including black and dark rockfish from federal waters, 1988–2018.

			Round weight (lb)			
Year	Vessels	Landings	Cook Inlet District	North Gulf District	Federal waters	Total harvest [a, b]
1988	41	94	2,859	148,227		151,086
1989	11	29	0	22,762		22,762
1990	31	40	401	29,807		30,209
1991	62	158	272	222,993		223,265
1992	120	377	1,029	334,149		335,178
1993	76	201	2,641	68,177		70,817
1994	69	199	110	205,451		205,561
1995	110	302	4,190	270,351		274,541
1996	118	301	700	120,777		121,476
1997	122	340	3,269	179,763		183,032
1998[d]	110	311	[c]	72,887	[c]	80,321
1999	95	285	0	86,007	1,645	87,652
2000	94	243	0	133,431	25,978	159,409
2001	76	166	[c]	109,175	[c]	116,323
2002	68	162	[c]	106,638	[c]	111,508
2003	64	137	[c]	142,207	[c]	142,729
2004	60	114	246	117,843	0	118,089
2005	50	125	[c]	64,950	[c]	65,145
2006	56	112	556	27,379	0	27,935
2007	45	119	105	24,950	338	25,394
2008[e]	49	114	86	29,785	97	29,968
2009	57	136	317	30,842	36	31,195
2010	52	112	52	52,057	506	52,615
2011	50	121	1,148	67,340	42	68,530
2012	50	143	169	46,570	48	46,787
2013	57	171	200	66,581	3,978	70,759
2014	56	130	271	60,503	65	60,839
2015	55	213	239	139,119	1,461	140,819
2016	75	228	436	142,747	1,185	144,368
2017	57	179	984	114,578	1,189	116,750
2018	49	107	2,200	55,422	1,474	59,097
2009-18 Average	56	154	602	77,576	998	79,176

[a] Includes reported at-sea discards. Data combined from ADF&G Neptune and Venus fish ticket software applications.

[b] Rockfish from state waters 1988–1997. Differences in harvest totals are due to rounding.

[c] Confidential data.

[d] Black rockfish from federal waters included in harvest beginning in 1998.

[e] Dark rockfish from federal waters included in harvest beginning in 2008.

Table 15.–Species composition of pelagic shelf rockfish sampled in the Cook Inlet Area, 1998–2018.

	Black		Dusky[a]		Dark		Yellowtail/Widow[b]		Total
Year	*n*	%	*n*	%	*n*	%	*n*	%	sampled
1998	361	92	32	8			1	0	394
1999	311	93	25	7			0		336
2000	723	96	30	4			0		753
2001	440	92	35	7			1	0	476
2002	441	95	25	5			0		466
2003	481	94	28	6			4	<1	513
2004	532	92	48	8			0		580
2005	259	100	1	0			0		260
2006	248	100	1	0			0		249
2007[c,d]	73	91	4	5	3	4	0		80
2008[d]	0		0		0		0		0
2009[d]	62	94	3	5	1	2	0		66
2010	320	88	11	3	34	9	0		365
2011	351	67	25	5	132	25	14	3	522
2012	227	92	11	5	6	2	2	<1	246
2013	274	94	15	5	4	1	0		293
2014	513	78	44	7	103	16	1	0	661
2015	799	70	163	14	142	12	40	4	1,144
2016	641	94	37	5	1	0	2	<1	681
2017	555	79	33	5	117	17	1	0	706
2018	434	87	39	8	27	5	0	0	500

Note: *n* = sample size.

[a] Dusky rockfish includes light dusky and dark dusky specimens 1998–2006, *Sebastes ciliatus*.

[b] The only incidence of widow rockfish was 1 specimen in 2003; all other specimens are yellowtail rockfish.

[c] In 2004, light dusky and dark dusky rockfish were split into dusky rockfish *Sebastes variabilis* (name resurrected) and dark rockfish *Sebastes ciliatus*. However, the new nomenclature was not adopted into ADF&G regulation until 2007.

[d] Reduced effort in directed jig fishery resulted in lower incidence of rockfish sampling opportunities.

Table 16.–Average length, average weight, average age, sex ratio, and corresponding sample sizes of commercially harvested black rockfish in the Cook Inlet Area, 1998–2018.

Year	Average length (cm)	*n*	Average weight (kg)	*n*	Average age (years)	*n*	Percent female	*n*
1998	52	361	2.3	111	21	113	n/a	
1999	48	311	2.3	67	18	58	49	59
2000	47	723	2.0	510	12	157	53	590
2001	49	440	2.1	229	13	429	47	390
2002	50	441	2.4	180	14	347	60	331
2003	49	481	2.3	369	13	387	62	447
2004	50	532	2.5	468	14	531	66	469
2005	51	259	2.5	130	15	184	62	236
2006	51	248	2.6	60	16	248	61	99
2007[a]	52	73	2.6	73	14	70	59	61
2008[a]		0		0		0		0
2009[a]	53	62	2.6	1	19	62	47	62
2010	50	320	2.4	320	15	296	47	318
2011	49	351	2.1	351	16	351	40	351
2012	51	227	2.4	227	17	267	40	226
2013	49	274	2.3	274	15	274	45	274
2014	49	513	2.2	513	15	513	48	513
2015	50	799	2.2	799	18	799	32	798
2016	49	541	2.1	641	18	641	34	640
2017	50	555	2.3	555	17	555	39	553
2018	46	434	2.0	434	[b]	433	63	424

Note: *n* = sample size.

[a] Reduced effort in directed jig fishery resulted in lower incidence of rockfish sampling opportunities.

[b] Age determination not yet complete.

Table 17.–Species composition of commercially harvested non-pelagic rockfish, including number sampled and proportion, in the Cook Inlet Area, 1998–2018.

	Yelloweye		Quillback		Rougheye		Shortraker		Silvergray		Thornyhead		Other[a]		Total
Year	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Samples
1998	0		1	6	13	72	0		0		0		4	22	18
1999	77	22	58	16	86	24	32	9	16	4	23	6	65	18	357
2000	49	56	21	24	7	8	2	2	4	5	0		4	5	87
2001	80	38	6	3	95	45	6	3	8	4	17	8	0		212
2002	136	74	0		15	8	0		1	1	0		32	17	184
2003	204	88	0		15	6	0		12	5	0		1	<1	232
2004	141	95	7	5	0		0		0		0		0		148
2005	81	86	12	13	0		0		0		0		1	1	94
2006	306	82	15	4	46	12	1	<1	2	<1	0		5	1	375
2007	417	93	14	3	5	1	0		10	2	0		2	<1	448
2008	322	97	0		0		0		0		0		11	3	333
2009	523	71	53	7	135	18	10	1	0		3	<1	8	1	732
2010	492	81	30	5	29	5	10	2	2	<1	1	<1	44	7	605
2011	356	58	6	1	211	34	2	<1	27	4	5	1	13	1	616
2012	706	59	314	26	81	7	7	<1	34	3	14	1	48	4	1,204
2013	364	55	214	32	59	9	3	<1	10	2	1	<1	11	2	662
2014	390	51	221	29	82	11	2	<1	20	3	1	<1	51	7	767
2015	372	34	469	42	164	15	8	1	34	3	13	1	46	4	1,106
2016	561	50	346	31	110	10	33	3	24	2	9	1	28	3	1,111
2017	579	55	305	29	134	13	6	1	3	<1	1	<1	17	2	1,045
2018	426	64	97	15	98	15	19	3	3	<1	0	0	24	4	667

Note: *n* = sample size.

[a] Other non-pelagic rockfish (demersal and slope species): redstripe, Pacific ocean perch, northern, bocaccio, canary, copper, tiger, China, rosethorn, redbanded, and unspecified Sebastes.

Table 18.–Average length, average weight, average age, sex ratio, and corresponding sample sizes of commercially harvested yelloweye rockfish in the Cook Inlet Area, 1998–2018.

Year	Average length (cm)	*n*	Average weight (kg)	*n*	Average age (years)	*n*	Percent female	*n*
1998	65	13	4.0	6	NA	6		
1999	52	76	2.6	67	6	9	56	34
2000	56	49	3.4	49	38	36	57	37
2001	62	80	5.0	78	33	80	52	77
2002	60	136	4.5	98	33	121	52	114
2003	60	204	4.6	204	33	152	51	49
2004	60	141	4.2	70	32	141	29	35
2005	59	81	4.4	80	30	79	43	81
2006	61	306	4.7	211	34	306	38	214
2007	61	417	4.6	416	35	417	55	416
2008	62	322	4.6	298	37	322	54	322
2009	60	523	4.2	523	32	520	47	523
2010	62	492	5.0	467	33	492	43	486
2011	61	356	4.5	283	36	353	47	350
2012	56	706	3.8	697	32	706	60	703
2013	58	364	4.2	365	34	365	52	361
2014	58	390	4.3	351	33	388	54	388
2015	54	371	3.5	371	29	371	58	371
2016	58	561	4.2	545	[a]	464	56	547
2017	60	579	4.5	578	[a]	579	56	579
2018	59	426	4.3	426	[a]	422	53	424

Note: *n* = sample size.

[a] Age determination not yet complete.

Table 19.–Commercial lingcod harvest and effort by gear type from the combined Cook Inlet Area, with harvest from state and federal waters, 1988–2018.

			Round weight (lb)				
Year	Vessels	Landings	Jig/troll	Other gear[a]	State waters harvest	Federal waters harvest	Total harvest[b, c]
1988	16	37	6,512	18,436	18,362	6,586	24,948
1989	10	20	399	2,495	1,833	1,060	2,894
1990	22	22	1,306	5,463	2,496	4,272	6,769
1991	31	96	57,691	4,492	59,196	2,987	62,183
1992	84	192	6,998	35,220	24,660	17,558	42,218
1993	18	64	86,724	646	7,627	79,743	87,370
1994	14	30	56,505	331	21,782	35,054	56,836
1995	43	72	72,489	4,687	44,314	32,862	77,176
1996	39	58	47,986	11,310	29,461	29,835	59,296
1997	34	49	17,572	14,575	30,948	1,199	32,147
1998	23	41	27,284	13,955	39,781	1,458	41,239
1999	41	66	10,741	17,421	19,841	8,320	28,162
2000	41	72	29,488	4,029	26,524	6,992	33,517
2001	33	73	29,472	11,321	30,184	10,609	40,793
2002	33	64	16,383	3,794	18,664	1,513	20,177
2003	29	64	23,124	4,030	24,864	2,290	27,154
2004	30	63	31,009	5,635	35,632	1,012	36,644
2005	28	55	13,328	7,465	18,075	2,718	20,793
2006	28	55	11,679	45,899	19,495	38,083	57,578
2007	50	90	22,536	24,556	32,695	14,385	47,080
2008	33	66	26,966	17,066	36,781	7,251	44,032
2009	37	70	5,571	13,609	13,116	6,064	19,180
2010	31	53	13,298	8,669	17,312	4,655	21,966
2011	30	46	2,283	6,912	7,306	3,136	9,195
2012	31	44	1,609	7,886	5,617	3,878	9,494
2013	37	22	8,790	3,220	9,868	2,142	12,010
2014	27	37	7,535	2,686	8,833	1,388	10,221
2015	26	51	2,747	3,995	3,494	3,248	6,742
2016	31	63	19,605	3,787	20,776	2,616	23,393
2017	24	55	44,933	3,808	46,381	2,359	48,740
2018	27	59	43,326	6,153	37,724	11,755	49,479

[a] Other gear includes longline, pot, trawl, or salmon gillnet.

[b] Does not include reported at-sea discards.

[c] Sum discrepancies are due to rounding.

Table 20.–Average weight, average length, average age, sex ratio, and corresponding sample sizes of commercially harvested lingcod in the Cook Inlet Area, 1998–2018.

	Weight		Length		Age		Sex ratio	
Year	(kg)	*n*	(cm)	*n*	(Years)	*n*	% female	*n*
1998	14.1	304	110	304	13	80	66	157
1999[a]	NA		NA		NA		NA	
2000	13.2	26	108	26	15	26	NA	
2001	13.5	179	109	179	14	113	52	67
2002	14.3	152	111	152	16	149	50	28
2003	14.8	83	113	83	17	69	66	56
2004	15.5	155	115	155	18	143	77	108
2005	17.3	108	119	108	20	12	79	108
2006	15.5	139	115	139	18	129	79	134
2007	13.6	275	110	275	15	157	81	274
2008	16.2	103	117	103	18	80	87	103
2009	14.1	177	111	177	15	127	88	176
2010	13.8	194	110	194	16	191	71	163
2011	15.0	95	114	95	18	95	72	39
2012	14.1	87	111	87	16	87	84	74
2013	14.0	84	111	84	16	84	80	82
2014	15.3	93	114	93	[b]	93	77	91
2015	13.9	41	110	41	[b]	41	68	31
2016	13.1	257	104	258	[b]	249	39	208
2017	15.2	542	112	543	[b]	539	54	515
2018	11.8	343	101	343	[b]	339	28	331

[a] Sample size in 1999 insufficient for biological data analysis ($n = 2$).

[b] Age analysis not yet completed.

Table 21.–Commercial pollock fishing harvest and effort in the Cook Inlet Area, 1988–2018.

Year	Vessels	Landings	Harvest (lb) [a]	CPUE [b]
1988	6	14	2,380	170
1989	[c]	[c]	[c]	[c]
1990	18	35	61,817	1,766
1991	3	3	9,528	3,176
1992	34	43	3,875	90
1993	33	47	154,345	3,284
1994	24	39	238,261	6,109
1995	22	33	2,995	91
1996	16	33	1,943,659	58,899
1997	25	59	3,895,099	66,019
1998	18	74	9,693,429	130,992
1999	12	24	2,983,371	124,307
2000	4	4	615	154
2001	7	12	3,129	261
2002	7	9	1,381	153
2003	[c]	[c]	[c]	[c]
2004	4	7	342,305	48,901
2005	[c]	[c]	[c]	[c]
2006	[c]	[c]	[c]	[c]
2007	4	6	1,694	282
2008	[c]	[c]	[c]	[c]
2009	16	26	5,269	203
2010	[c]	[c]	[c]	[c]
2011	10	32	5,751	180
2012	13	18	4,301	239
2013	20	59	47,315	802
2014	13	24	12,931	539
2015	21	59	42,094	713
2016	29	72	39,169	544
2017	12	36	8,227	229
2018	10	15	1,771	118

[a] Includes reported at-sea discards and test fishery catch.

[b] CPUE is catch per unit effort in pounds per landing.

[c] Confidential data due to limited number of participants.

Table 22.–Cook Inlet Area Commissioner's Permit commercial pollock seine fishery harvest and salmon bycatch information 2014–2016.

Season dates	Vessels[a]	Trips	GHL (lb)	Pollock harvest (lb)	Trip limit (lb)	Salmon bycatch
12/1/2014–2/28/2015	2	11	440,000	32,318	10,000	45 Chinook salmon,
10/1/2015–12/31/2015	2	9	210,000	8,469	none	61 adult Chinook, 35 juvenile Chinook, 1 coho salmon
1/1/2016–3/31/2016; 10/1/2016–12/31/2016	2	2	220,000	206	none	0

[a] Confidentiality waived by participants.

Table 23.–Average weight, average length, and % female of commercially harvested walleye pollock in the Cook Inlet Area, 1997–2018.

Year	Average weight (kg)	*n*	Average length (cm)	*n*	Average age	*n*	% female	*n*
1997	1.5	600	56	598	8	600	45	598
1998	2.3	108	56	435	8	118	54	418
1999	1.0	124	50	1,226	6	167	47	1,218
2000-2003	NA		NA		NA		NA	
2004	0.9	200	44	199	4	200	43	199
2005-2012	NA		NA				NA	
2013[a]	0.9	200	47	200	6	200	64	200
2014[b]	0.7	200	43	200	5	174	46	175
2015[b]	0.6	324	42	549	5	323	53	324
2016	1.2	26	50	51	NA	26	69	26
2017-2018	NA		NA		NA		NA	

[a] Jig gear, Pacific cod fishery samples, pollock retained as bycatch.

[b] Seine gear, commissioner's permit fishery samples.

Table 24.–Commercial harvest and effort of other groundfish species, from the Cook Inlet Area, 1988–2018.

			Round weight (lb)				
Year	Vessels	Landings	Flatfish [a]	Sharks [b]	Skates	Other [c]	Total
1988	6	6	2,418	101	275	24	2,819
1989	3	3	0	234	0	0	234
1990	15	23	1,353	20	0	936	2,309
1991	10	12	31,866	0	2,321	40	34,227
1992	26	37	1,056	1,009	6,004	30	8,099
1993	21	57	4,560	0	2,967	501	8,028
1994	19	80	4,471	112	68	0	4,651
1995	14	47	283	100	180	6	569
1996	48	129	149,926	408	48,405	31	198,770
1997	42	190	51,929	394	22,006	715	75,044
1998	46	187	47,874	268	62,381	48	110,571
1999	22	129	86,410	6,594	2,679	532	96,215
2000	16	138	274	0	66	14	354
2001	10	106	31	0	0	193	224
2002	11	166	416	0	0	0	416
2003	13	138	333	0	270	3	606
2004	20	143	248	110	18,728	0	19,086
2005	11	108	0	25	3,951	0	3,976
2006	9	109	88	6,214	0	0	6,302
2007	14	84	0	0	252	0	252
2008	15	141	0	0	11,177	0	11,177
2009	18	113	50	0	2,442	147	2,639
2010	16	113	0	0	7,044	4	7,048
2011	30	145	207	0	12,241	8	12,456
2012	18	48	8	0	126,576	154	126,738
2013	27	77	263	0	113,288	14	113,565
2014	18	45	55	0	53,742	185	53,988
2015	29	121	11	0	164,085	706	164,811
2016	44	236	0	0	46,607	649	47,256
2017	22	137	249	0	27,628	583	28,460
2018	20	106	156	10	11,742	23	11,931

Note: Discards at sea not included.

[a] Flatfish includes general flatfish, flounders, sole, and turbot.

[b] Sharks include spiny dogfish, salmon, Pacific sleeper, and unspecified sharks.

[c] Other includes general groundfish, miscellaneous finfish, and unidentified fish.

Table 25.–Cook Inlet Area groundfish fisheries reported at-sea discards in whole pounds, 1989–2018.

Year	Sablefish	Rockfish	Lingcod	Pacific cod	Pollock	Flatfish	Sharks	Skates	Other	Octopus	Squid	Total
1989	0	18	0	0	0	0	0	0	0	0	0	18
1990	10	0	1,500	0	0	2,899	0	0	0	0	0	4,409
1991	0	27	1,528	200	3,830	60	0	400	1,610	0	0	7,655
1992	57	1,251	4,235	5,489	2,926	19,125	7,948	64,997	570	27	0	106,625
1993	13	0	1,180	6,906	4,470	13,396	10,704	43,607	1,900	329	2	82,507
1994	54	76	1,835	173	832	4,284	1,825	34,850	205	0	0	44,134
1995	1,000	356	2,950	5,007	1,550	4,387	19,531	34,486	0	0	0	69,267
1996	8,010	5,490	1	14,203	3,153	88,357	0	12,369	4,316	2,894	0	138,793
1997	0	0	0	0	25,000	0	500	300	0	10	0	25,810
1998	4,895	3,672	0	396	10,451	89,224	4,994	6,090	4,374	0	1,828	125,924
1999	0	0	68	0	137	241	864	959	1,188	0	690	4,147
2000	2,448	836	4,746	17,194	167	1,701	17,700	5,453	90	0	0	50,335
2001	1,510	0	7,549	1,253	1	734	23,651	2,709	111	113	0	37,631
2002	2,147	5	5,688	457	4	428	9,095	1,875	12	4	0	19,715
2003	3,445	30	3,277	645	0	206	23,206	2,892	47	1,400	0	35,148
2004	1,674	60	434	1,008	3	439	49,568	1,898	26	0	0	55,110
2005	833	9	1,643	1,002	0	620	14,915	3,862	37	0	0	22,920
2006	1,060	0	1,954	1,526	14	90	14,747	980	110	2	0	20,484
2007	1,139	0	2,086	742	9	192	27,707	4,730	373	15	0	36,994
2008	262	0	4,780	809	22	449	13,823	1,717	27	7	0	21,896
2009	1,183	0	1,531	1,332	16	767	20,895	6,401	30	407	0	32,563
2010	560	0	803	770	6	705	18,356	7,233	48	48	0	28,528
2011	853	0	453	1,175	10	259	3,147	1,977	13	42	0	7,929
2012	551	3	842	495	0	170	3,672	4,937	27	17	0	10,713
2013	763	11	117	1,585	22	218	4,754	3,834	115	132	0	11,549
2014	1,383	95	2,077	1,477	1	147	2,447	3,014	80	31	0	10,752
2015	171	0	589	314	0	112	32,393	5,987	160	0	0	39,727
2016	59	0	662	190	0	31	9,175	1,423	28	0	0	11,568
2017	40	117	1,395	43	0	46	5,046	1,202	28	2,000	0	9,917
2018	301	173	69	417	0	53	10,179	2,253	257	21	0	13,723
Total	34,421	12,229	53,992	64,808	52,624	229,340	350,842	262,435	15,782	7,499	2,520	1,086,492
Average	1,147	408	1,800	2,160	1,754	7,645	11,695	8,748	526	250	84	36,216

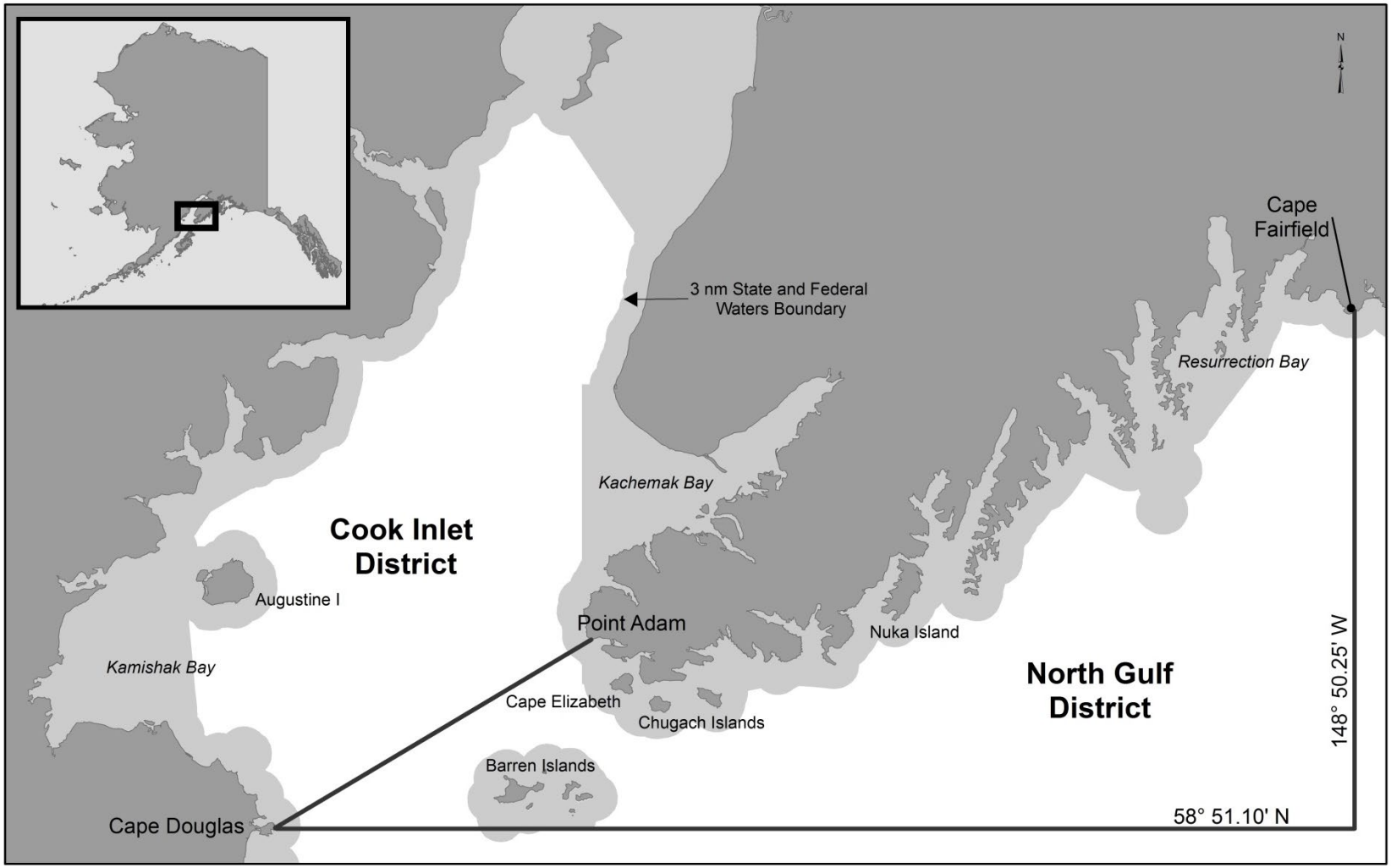

Figure 1.–Cook Inlet Area commercial groundfish area and district boundaries, 1997 to present.

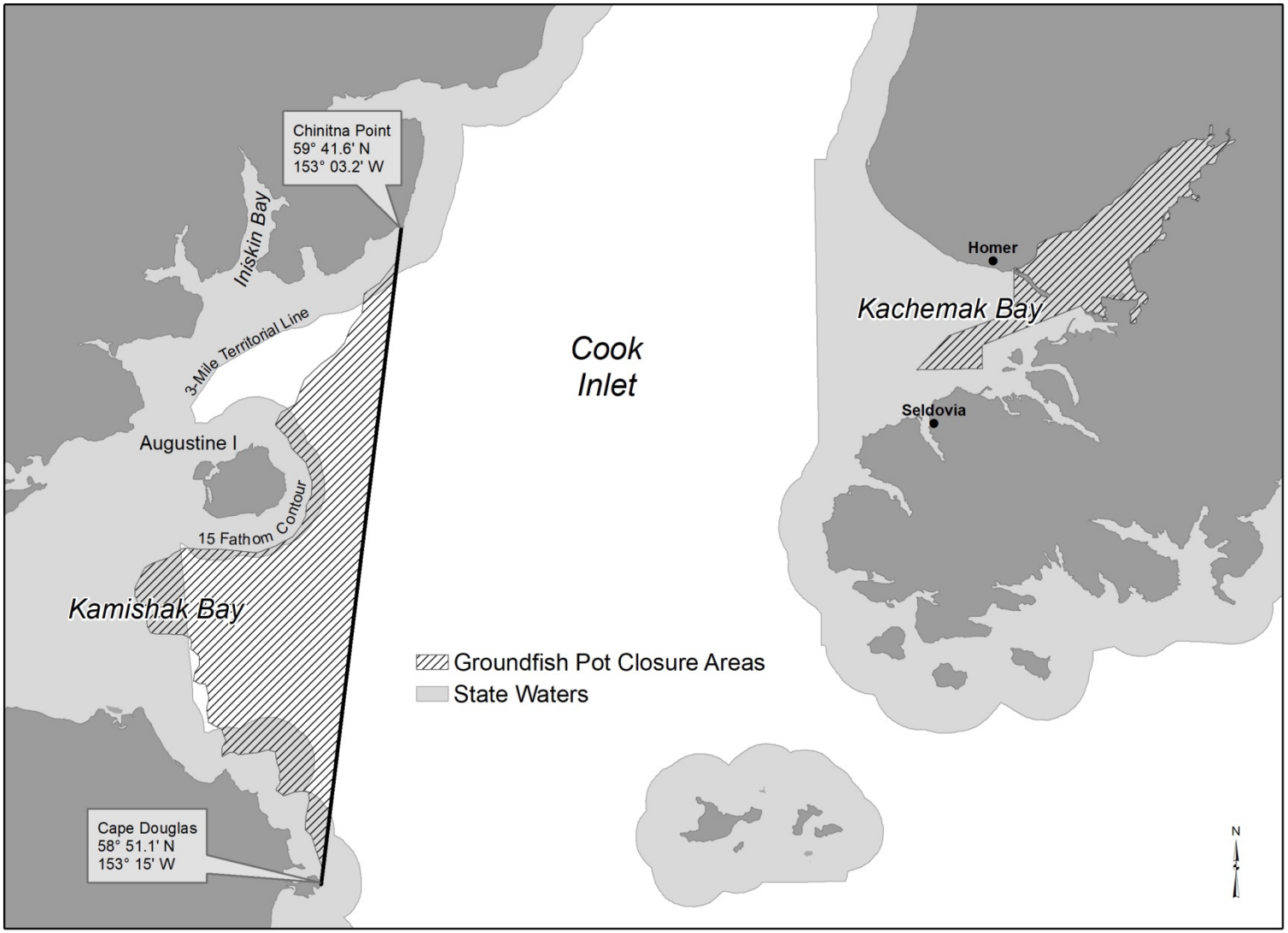

Figure 2.–Kachemak Bay and Kamishak Bay groundfish pot closure areas, amended 2016.

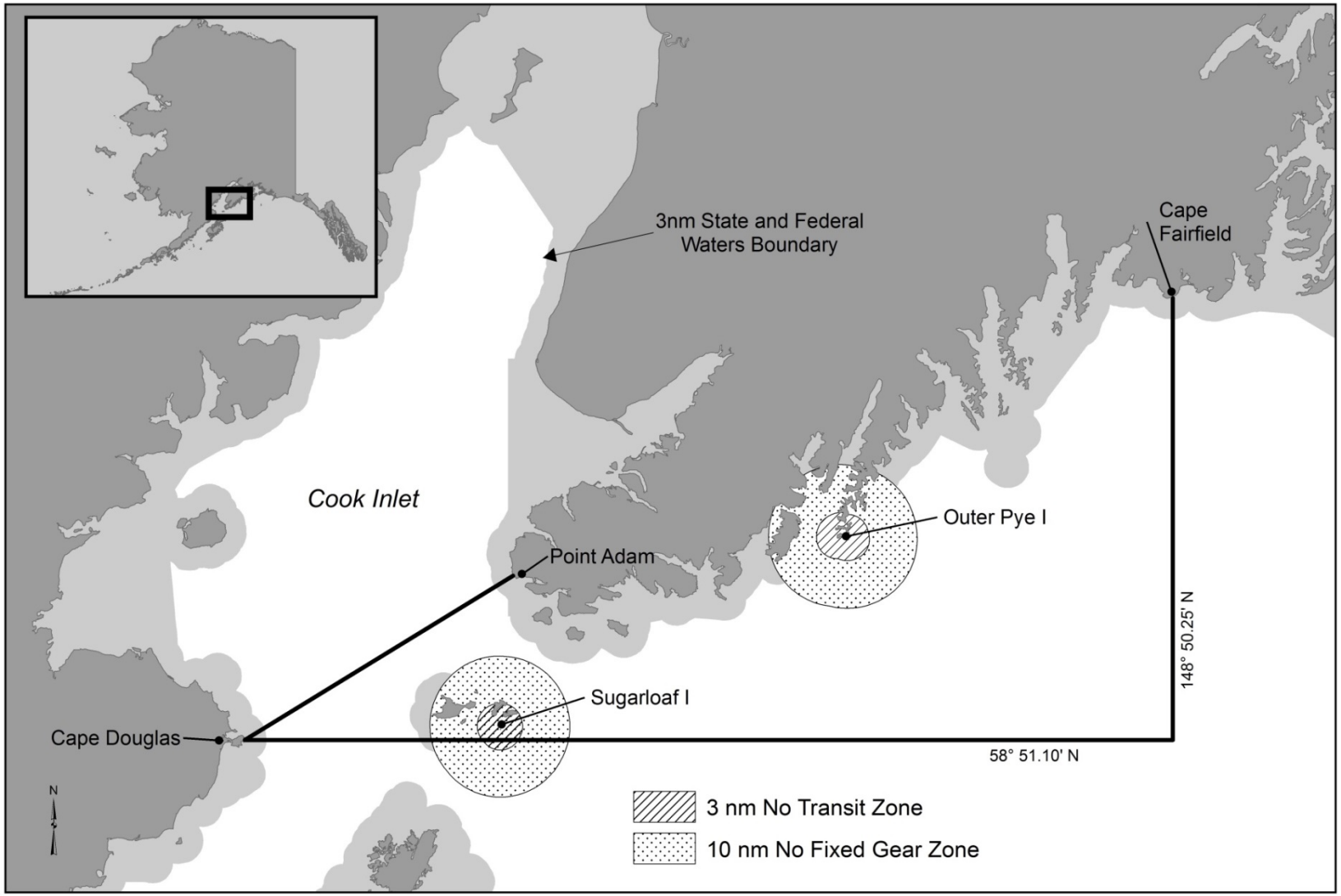

Figure 3.–Vessel no-transit and fixed gear Pacific cod fishing closure zones around Steller sea lion rookeries within the Cook Inlet Area.

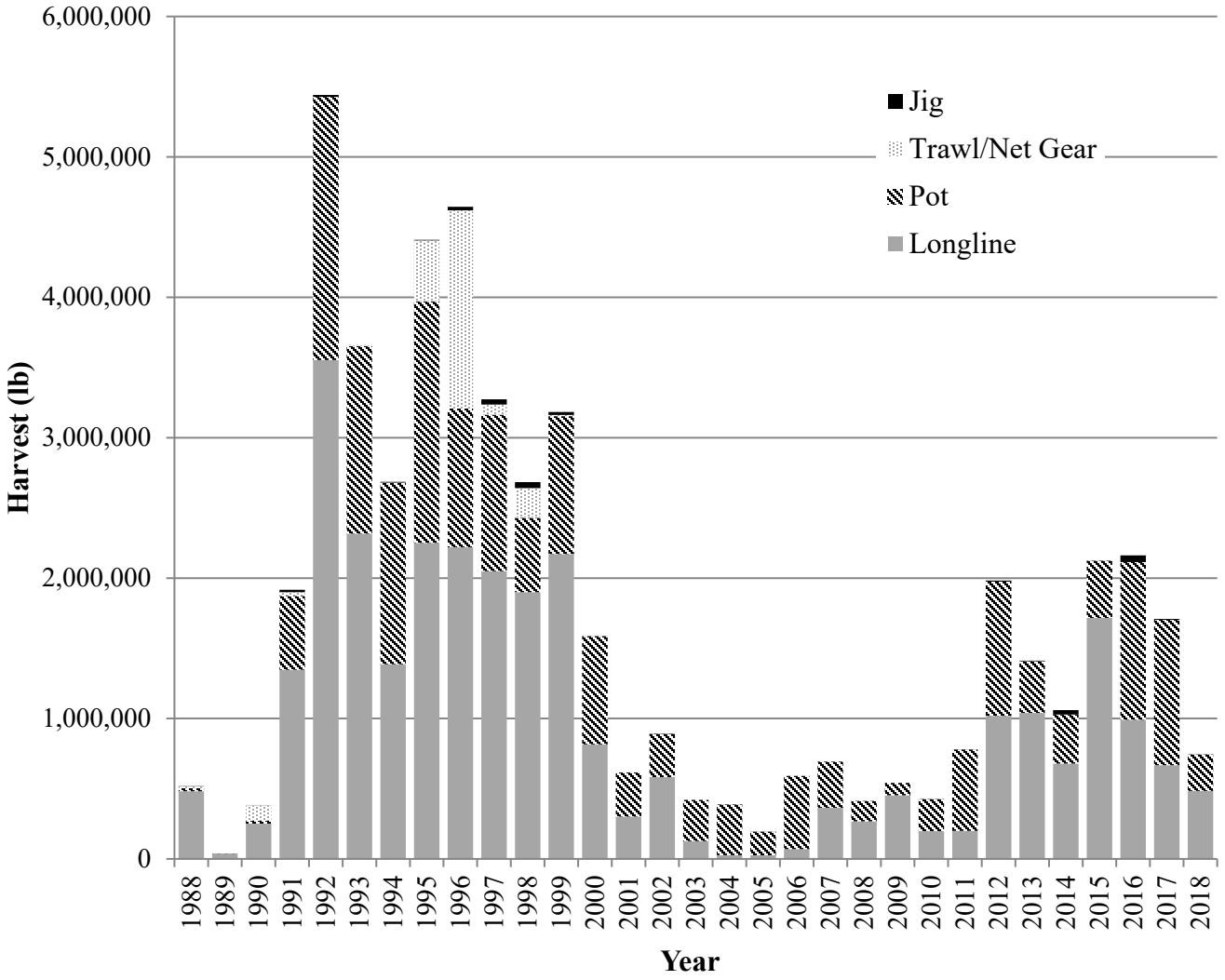

Figure 4.–Annual harvest (lb) by gear type in the commercial parallel Pacific cod fishery from the Cook Inlet Area, 1988–2018.

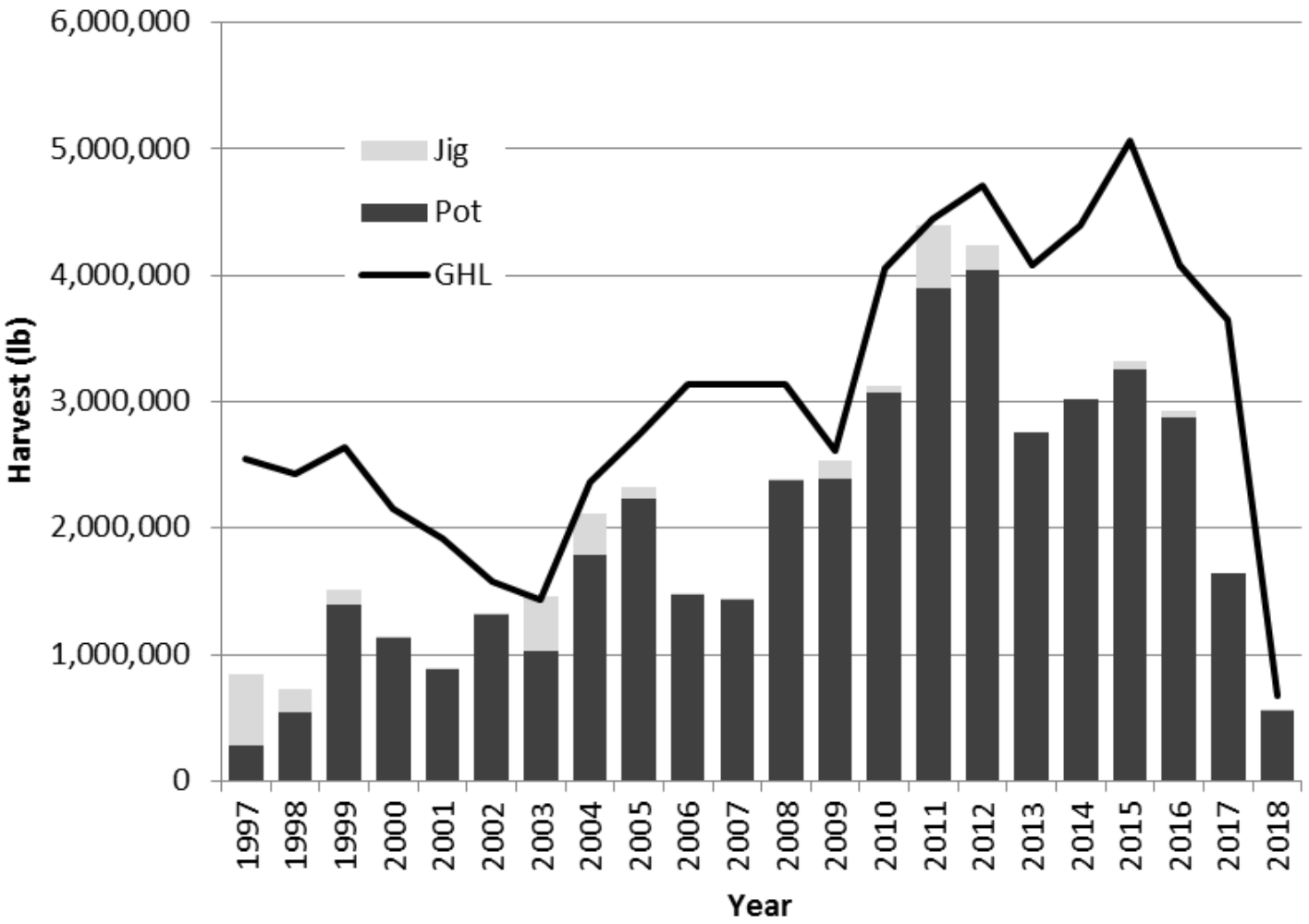

Figure 5.–Annual harvest (lb) by gear type in the commercial state-waters Pacific cod fishery from the Cook Inlet Area, 1997–2018.

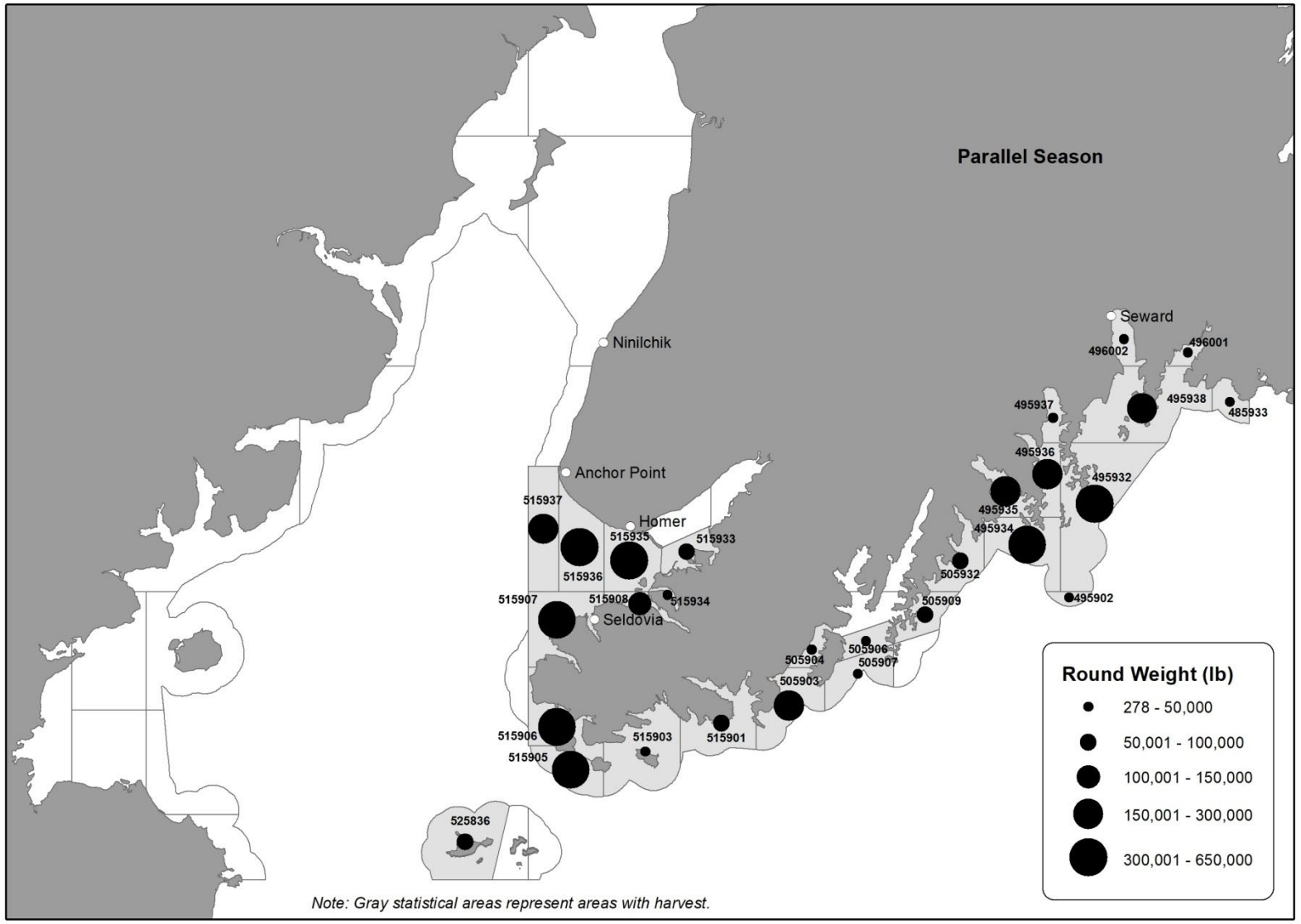

Figure 6.–Cook Inlet Area commercial Pacific cod harvest from the parallel season by statistical area, 2016–2018 combined.

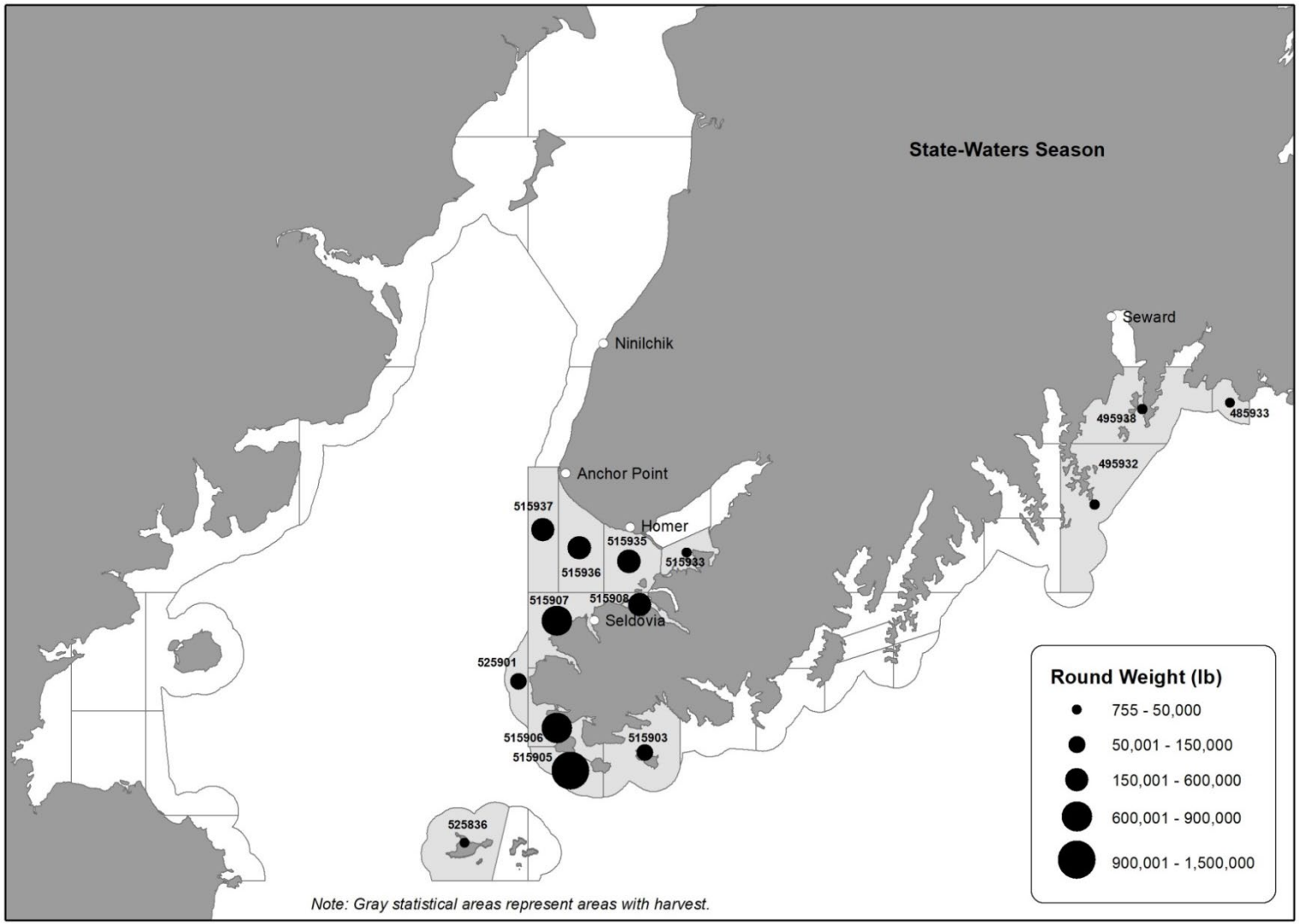

Figure 7.–Cook Inlet Area commercial Pacific cod harvest from the state-waters season by statistical area, 2016–2018 combined.

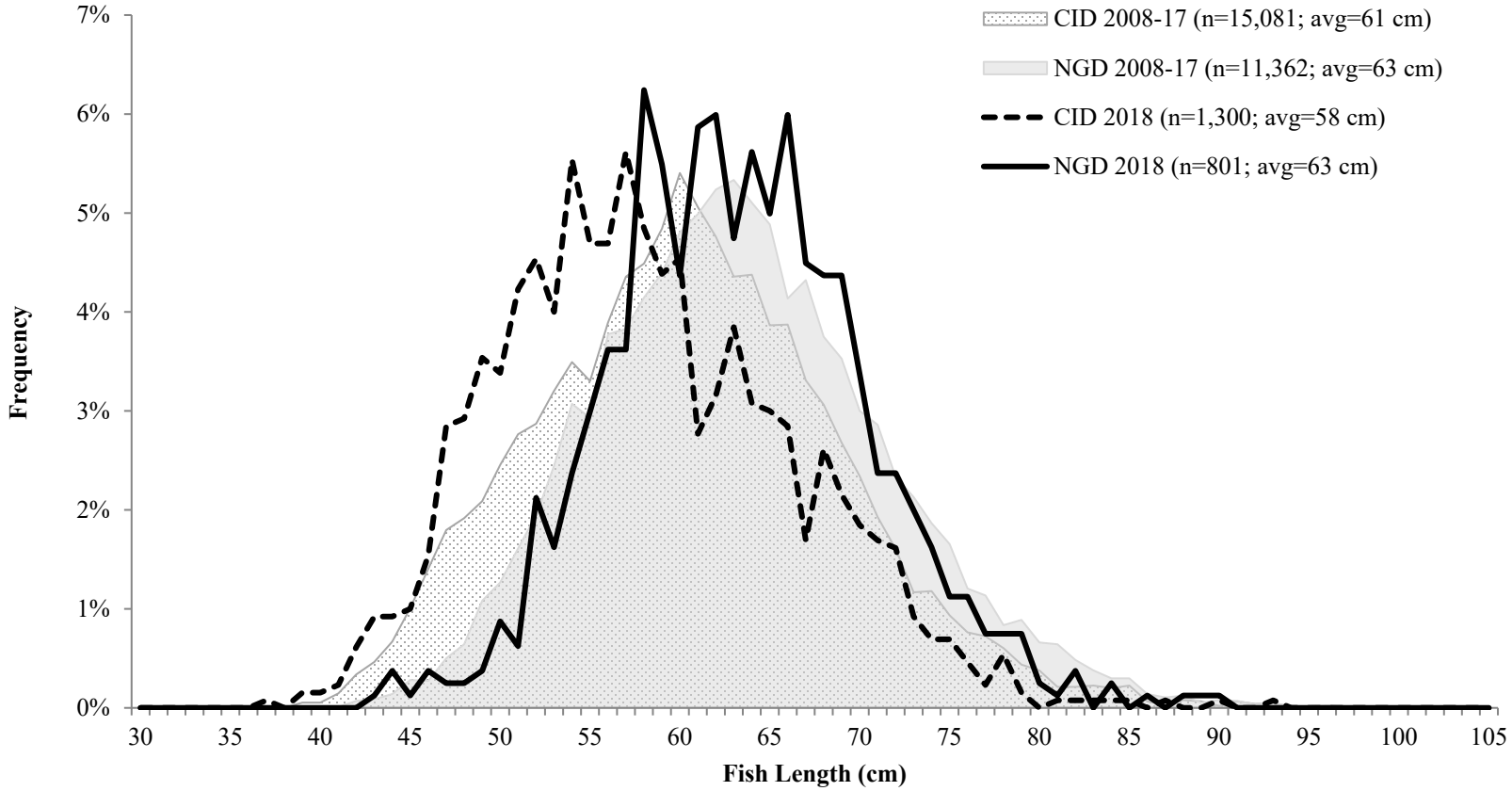

Figure 8.–Pacific cod length frequency distributions for Cook Inlet District (CID) and North Gulf District (NGD), 2008–2017 and 2018, including number of samples (*n*) and average length.

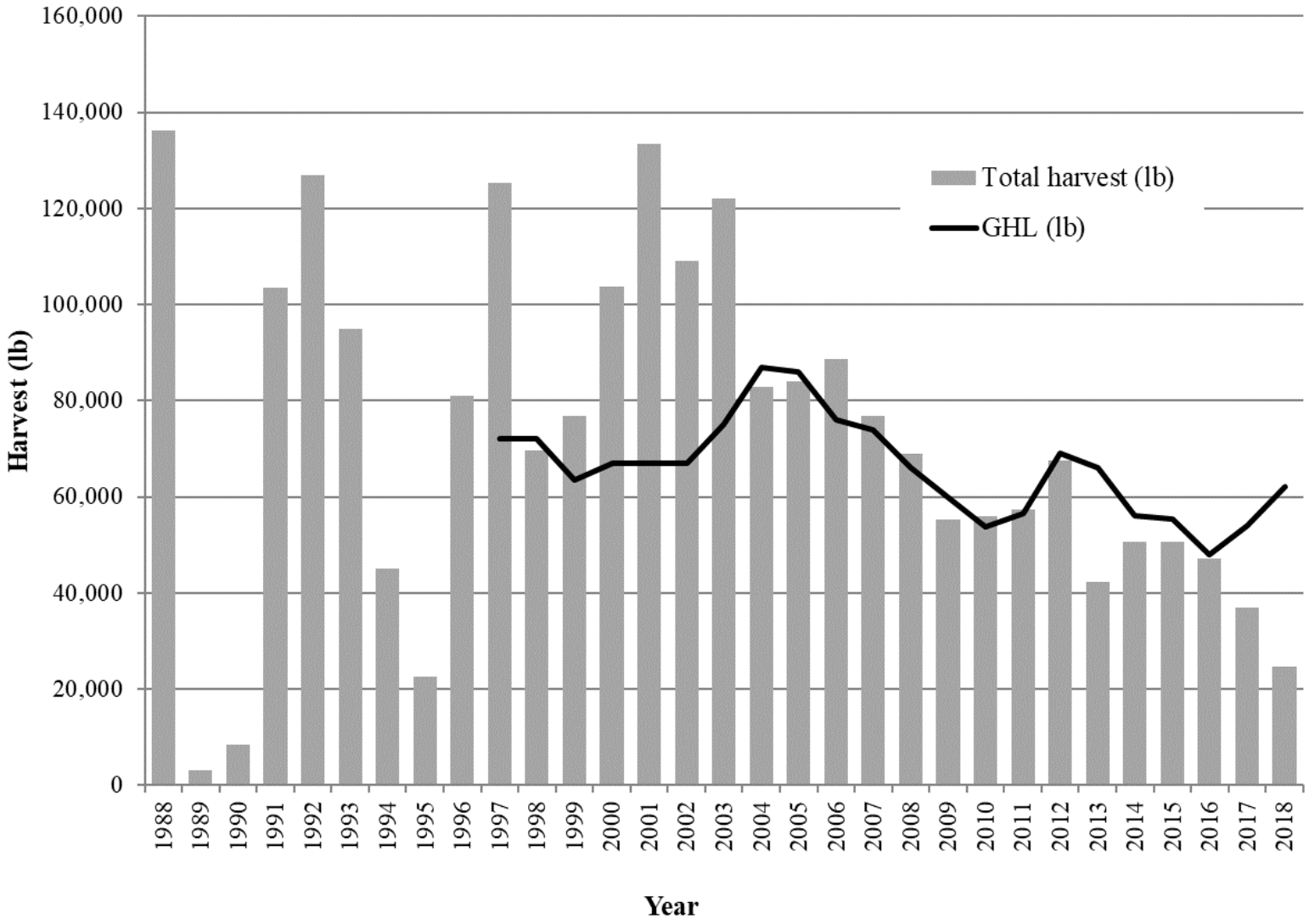

Figure 9.–Cook Inlet Area commercial sablefish harvest and guideline harvest level (GHL), 1988–2018.

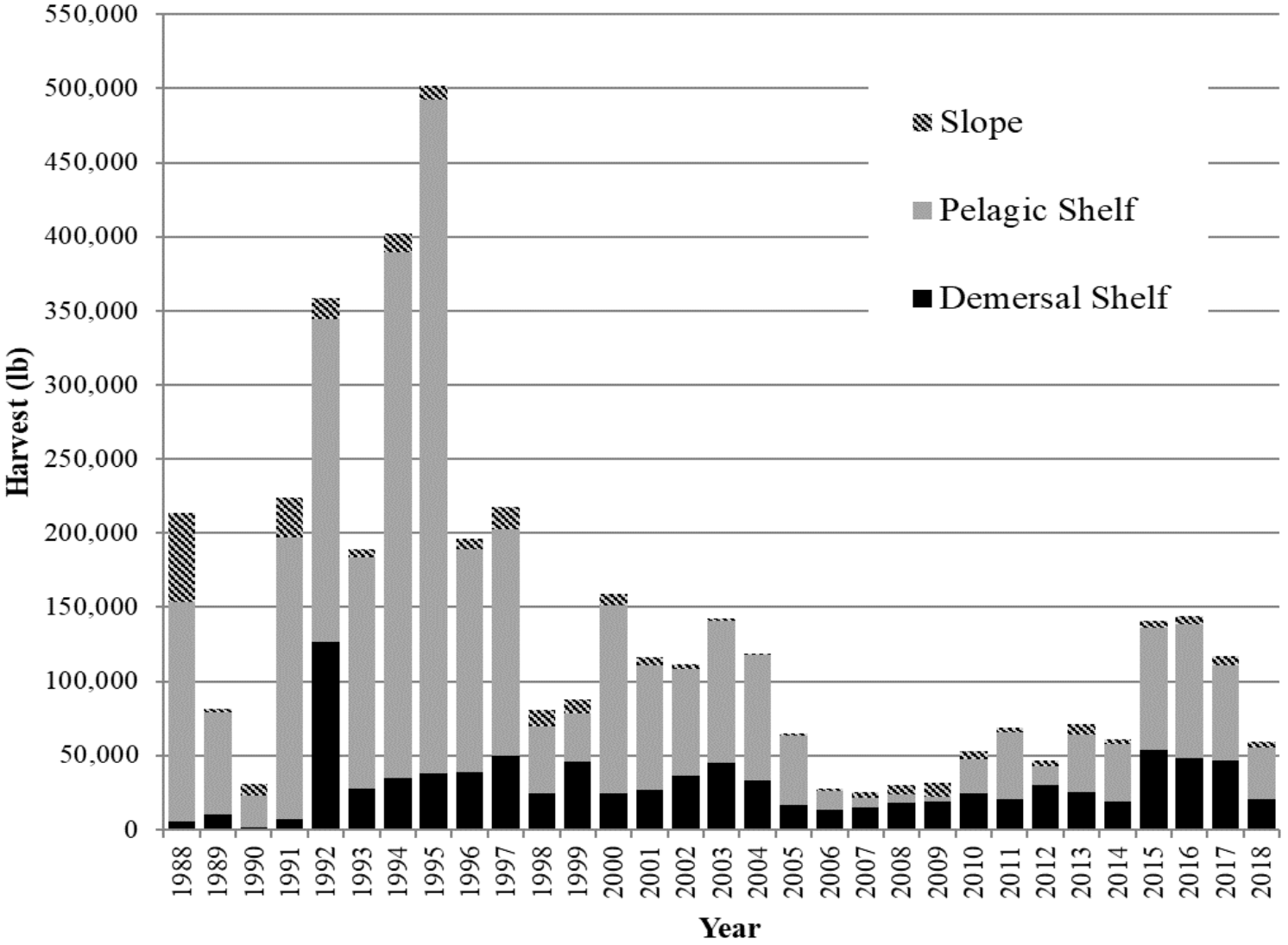

Figure 10.–Cook Inlet Area commercial rockfish harvest contribution by rockfish species assemblage, 1988–2018.

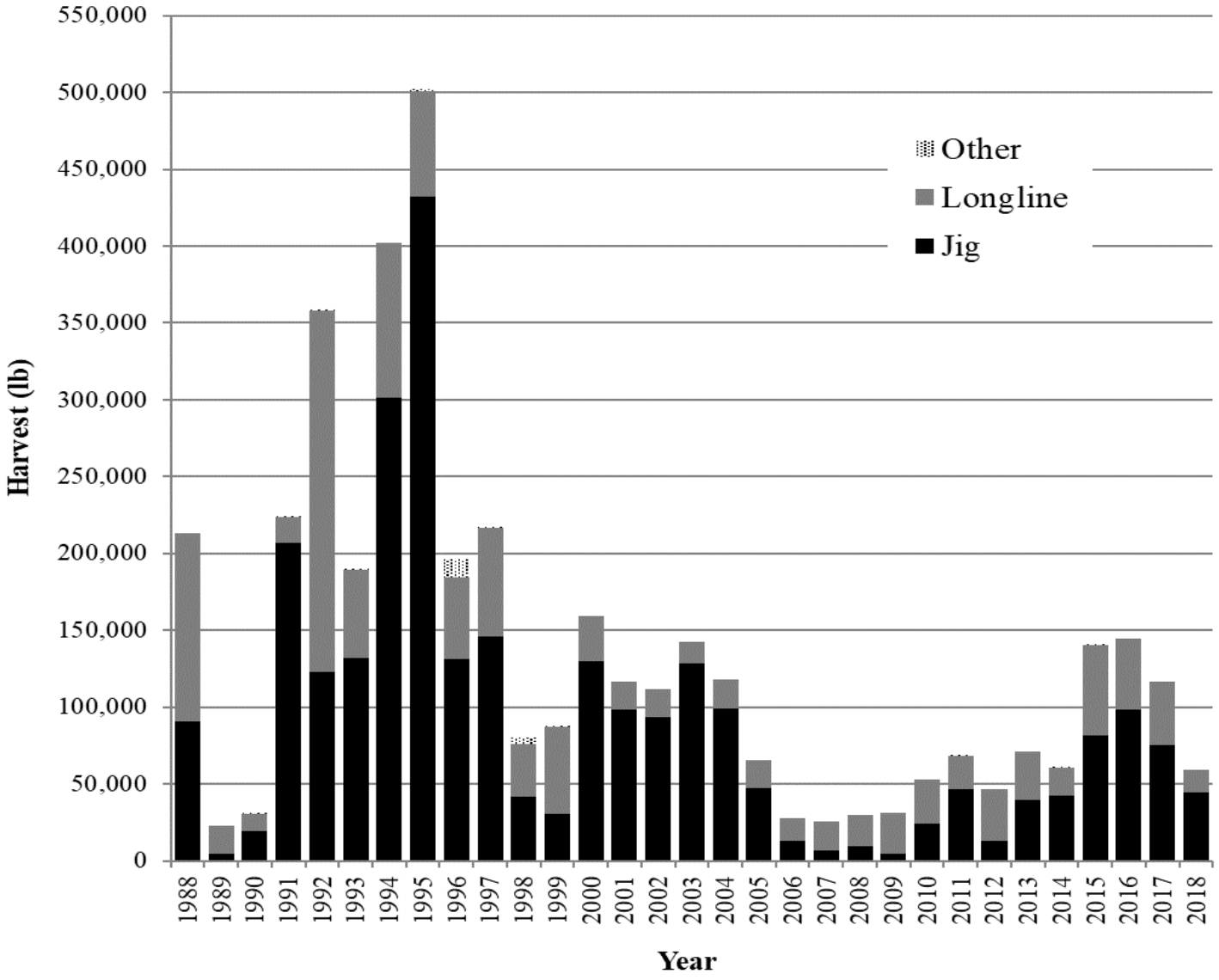

Figure 11.–Cook Inlet Area commercial rockfish harvest contribution by gear type, 1988–2018.

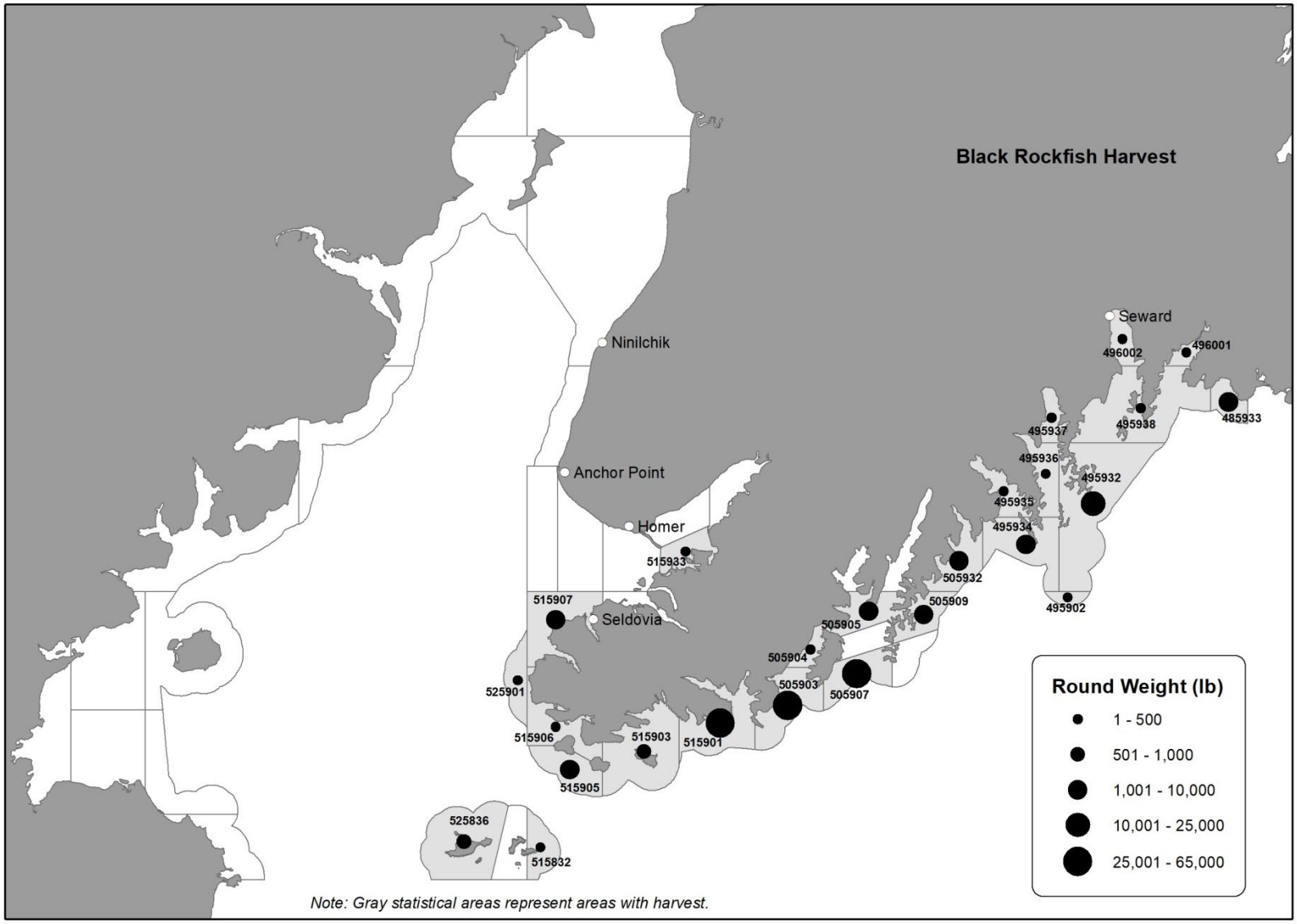

Figure 12.–Cook Inlet Area commercial directed black rockfish harvest by statistical area, 2016–2018 combined.

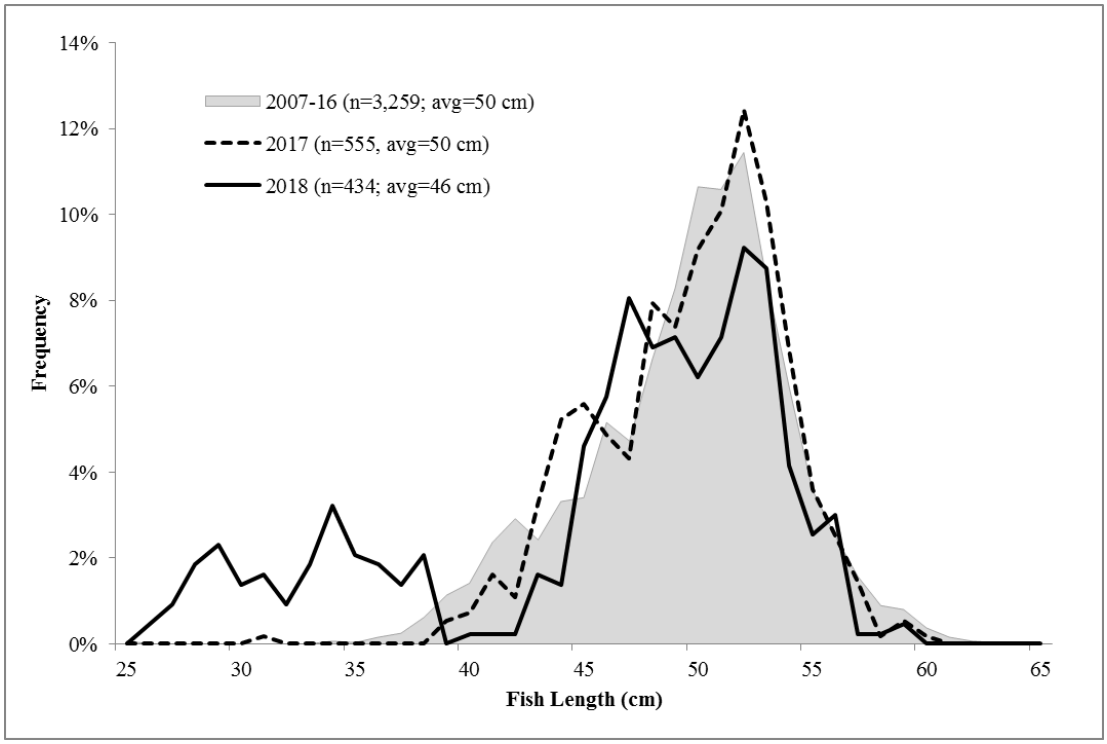

Figure 13.–Cook Inlet Area black rockfish length frequency distributions, 2007–2016, 2017, and 2018, including number of samples (*n*) and average length.

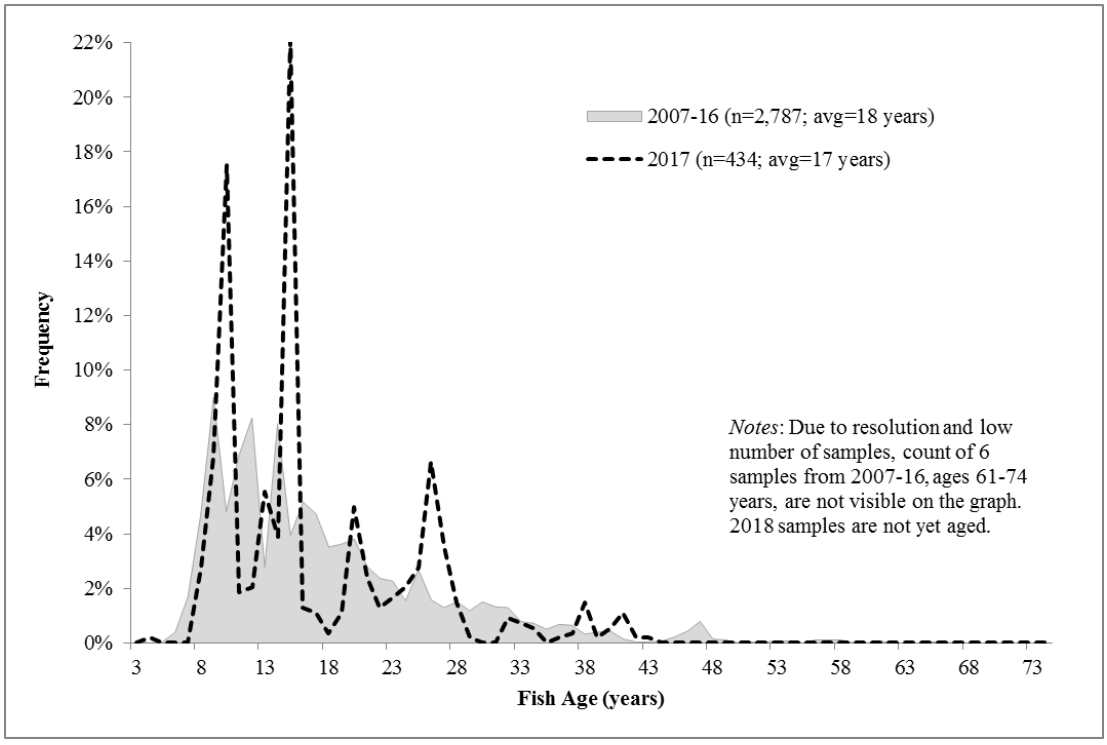

Figure 14.–Cook Inlet Area black rockfish age composition 2007–2016 and 2017, including number of samples (*n*) and average age.

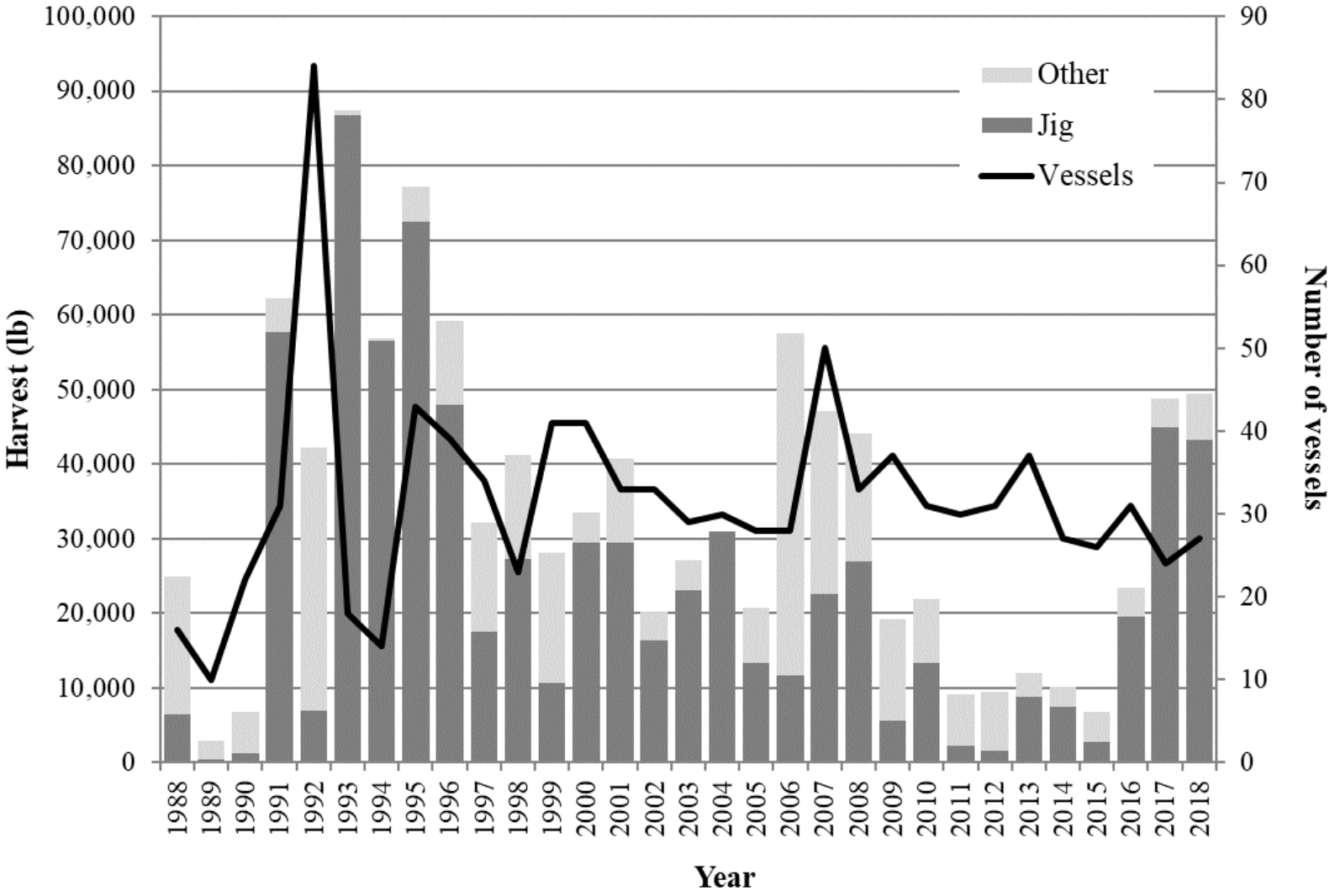

Figure 15.–Harvest by gear type and effort for the commercial lingcod fishery in Cook Inlet Area state and federal waters, 1988–2018.

APPENDIX A

Appendix A1.–Estimated exvessel values of Cook Inlet Area groundfish harvests, 1988–2018.

Year	Lingcod	Pacific Cod	Pollock	Rockfish	Sablefish	Skates	Other[a]	Total
2018 Harvest								
Round Weight (lb)	49,479	1,303,005	1,771	59,097	24,779	11,742	35,566	1,485,439
Price ($/lb)	$1.10	$0.53	$0.00	$0.70	$4.23	$0.38	$0.81	
Value	$54,427	$690,593	$0	$41,368	$104,815	$4,462	$28,808	$924,473
2017 Harvest								
Round Weight (lb)	41,620	3,278,094	8,085	114,176	37,020	27,628	684	3,507,306
Price ($/lb)	$1.02	$0.42	$0.04	$0.55	$4.11	$0.40	$0.89	
Value	$42,452	$1,376,799	$323	$62,797	$152,153	$11,051	$608	$1,646,184
2016 Harvest								
Round Weight (lb)	23,393	5,087,484	39,169	144,368	47,241	46,607	614	5,425,034
Price ($/lb)	$0.72	$0.33	$0.03	$0.69	$3.65	$0.39	$0.06	
Value	$16,843	$1,678,870	$1,175	$99,614	$172,428	$18,177	$23,903	$2,011,009
2015 Harvest								
Round Weight (lb)	6,742	5,451,109	42,094	140,819	31,780	164,085	716	5,837,345
Price ($/lb)	$0.76	$0.36	$0.09	$0.59	$3.29	$0.41	$0.02	
Value	$5,124	$1,962,399	$3,788	$83,083	$104,556	$67,275	$14	$2,226,240
2014 Harvest								
Round Weight (lb)	10,221	4,078,396	12,931	60,839	50,703	53,742	246	4,267,078
Price ($/lb)	$1.23	$0.36	$0.28	$0.62	$3.48	$0.40	$0.04	
Value	$12,572	$1,468,223	$3,621	$37,720	$176,447	$21,497	$10	$1,720,089
2013 Harvest								
Round Weight (lb)	12,010	4,166,538	47,314	70,759	42,287	113,288	277	4,452,474
Price ($/lb)	$1.10	$0.30	$0.28	$0.65	$2.93	$0.39	$0.00	
Value	$13,211	$1,249,961	$13,248	$45,994	$123,901	$44,182	$0	$1,490,497
2012 Harvest								
Round Weight (lb)	9,494	6,218,602	4,301	47,041	67,452	124,381	162	6,471,433
Price ($/lb)	$0.79	$0.39	$0.25	$0.52	$2.60	$0.40	$0.01	
Value	$7,500	$2,425,255	$1,075	$24,461	$175,374	$49,753	$2	$2,683,420
2011 Harvest								
Round Weight (lb)	9,195	5,179,196	5,751	66,432	57,350	12,241	215	5,330,379
Price ($/lb)	$0.77	$0.39	$0.21	$0.63	$4.55	$0.36	$0.00	
Value	$7,080	$2,019,886	$1,208	$41,520	$260,941	$4,407	$0	$2,335,042
2010 Harvest								
Round Weight (lb)	21,966	3,549,867	155	52,615	55,899	7,044	4	3,687,550
Price ($/lb)	$0.77	$0.29	$0.20	$0.56	$3.55	$0.22	$0.34	
Value	$16,914	$1,029,461	$31	$29,464	$198,441	$1,550	$1	$1,275,863
2009 Harvest								
Round Weight (lb)	19,180	3,073,988	5,269	31,192	55,263	2442	197	3,187,531
Price ($/lb)	$0.63	$0.34	$0.14	$0.48	$2.89	$0.20	$0.00	
Value	$12,083	$1,045,156	$722	$14,972	$159,959	$488	$0	$1,233,380

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Appendix A1.–Page 2 of 4.

Year	Lingcod	Pacific Cod	Pollock	Rockfish	Sablefish	Skates	Other[a]	Total
2008 Harvest								
Round Weight (lb)	44,032	2,807,005	85	29,930	68,724	11,177	0	2,960,953
Price ($/lb)	$0.66	$0.60	$0.00	$0.58	$2.85	$0.10	$0.00	
Value	$29,061	$1,684,203	$0	$17,359	$195,900	$1,118	$0	$1,927,641
2007 Harvest								
Round Weight (lb)	47,080	2,135,654	1,694	25,388	76,889	252	0	2,286,957
Price ($/lb)	$0.60	$0.51	$0.09	$0.45	$2.44	$0.00	$0.00	
Value	$28,137	$1,089,184	$149	$11,361	$187,461	$0	$0	$1,316,292
2006 Harvest								
Round Weight (lb)	57,588	2,068,642	14	27,924	88,695	0	6,302	2,249,165
Price ($/lb)	$0.58	$0.43	$0.00	$0.54	$2.39	$0.00	$0.18	
Value	$33,674	$883,230	$0	$15,111	$211,554	$0	$1,134	$1,144,703
2005 Harvest								
Round Weight (lb)	20,793	2,511,226	99	65,145	84,023	3,951	25	2,685,262
Price ($/lb)	$0.61	$0.31	$0.00	$0.41	$2.02	$0.10	$0.00	
Value	$12,595	$790,939	$0	$26,873	$169,660	$395	$0	$1,000,462
2004 Harvest								
Round Weight (lb)	36,644	2,499,587	342,305	118,089	82,836	18,728	358	3,098,547
Price ($/lb)	$0.57	$0.32	$0.07	$0.49	$1.70	$0.14	$0.00	
Value	$20,933	$811,610	$23,739	$57,389	$140,580	$2,622	$0	$1,056,873
2003 Harvest								
Round Weight (lb)	27,154	1,874,336	21	142,729	122,098	270	336	2,166,944
Price ($/lb)	$0.60	$0.37	$0.00	$0.53	$2.21	$0.22	$0.06	
Value	$16,306	$693,504	$0	$75,816	$269,355	$59	$20	$1,055,060
2002 Harvest								
Round Weight (lb)	20,177	2,220,817	1,381	111,508	108,966	0	416	2,463,265
Price ($/lb)	$0.58	$0.33	$0.07	$0.55	$1.98	$0.00	$0.00	
Value	$11,621	$732,505	$102	$60,878	$215,613	$0	$0	$1,020,719
2001 Harvest								
Round Weight (lb)	40,793	1,511,103	3,129	116,323	133,435	0	224	1,805,007
Price ($/lb)	$0.51	$0.39	$0.07	$0.40	$1.77	$0.00	$0.00	
Value	$20,782	$586,390	$206	$46,741	$235,581	$0	$0	$889,700
2000 Harvest								
Round Weight (lb)	33,517	2,737,178	615	159,409	103,662	66	288	3,034,735
Price ($/lb)	$0.58	$0.40	$0.06	$0.48	$2.04	$0.00	$0.30	
Value	$19,395	$1,094,871	$37	$77,010	$211,022	$0	$87	$1,402,423
1999 Harvest								
Round Weight (lb)	28,162	4,701,085	2,983,371	87,652	76,741	2,679	93,536	7,973,226
Price ($/lb)	$0.50	$0.37	$0.09	$0.58	$1.52	$0.18	$0.04	
Value	$13,981	$1,724,949	$262,032	$50,499	$116,481	$482	$3,783	$2,172,206

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Year	Lingcod	Pacific Cod	Pollock	Rockfish	Sablefish	Skates	Other[a]	Total
1998 Harvest								
Round Weight (lb)	41,239	3,414,058	9,693,429	80,321	69,689	62,381	48,190	13,409,307
Price ($/lb)	$0.47	$0.24	$0.08	$0.51	$1.43	$0.19	$0.01	
Value	$19,368	$819,374	$744,006	$40,816	$99,800	$11,852	$636	$1,735,852
1997 Harvest								
Round Weight (lb)	32,147	4,112,154	3,895,099	217,364	125,349	22,006	53,038	8,457,157
Price ($/lb)	$0.47	$0.27	$0.09	$0.59	$2.33	$0.09	$0.04	
Value	$15,109	$1,110,281	$350,559	$128,245	$292,064	$1,981	$2,122	$1,900,360
1996 Harvest								
Round Weight (lb)	59,296	4,644,945	1,943,659	196,577	81,067	48,405	150,365	7,124,314
Price ($/lb)	$0.52	$0.24	$0.09	$0.57	$1.94	$0.14	$0.03	
Value	$30,951	$1,105,026	$171,700	$111,450	$157,502	$6,777	$4,755	$1,588,161
1995 Harvest								
Round Weight (lb)	77,176	4,408,651	2,995	502,045	22,551	180	389	5,013,987
Price ($/lb)	$0.46	$0.24	$0.00	$0.58	$2.06	$0.00	$0.04	
Value	$35,865	$1,045,991	$3	$291,247	$46,489	$0	$17	$1,419,612
1994 Harvest								
Round Weight (lb)	56,836	2,685,562	238,264	402,040	45,008	68	4,583	3,432,361
Price ($/lb)	$0.38	$0.19	$0.00	$0.42	$1.38	$0.00	$0.00	
Value	$21,690	$511,595	$0	$168,348	$62,097	$0	$0	$763,730
1993 Harvest								
Round Weight (lb)	87,370	3,661,744	154,345	189,396	95,016	2,976	5,061	4,195,908
Price ($/lb)	$0.43	$0.24	$0.08	$0.32	$0.87	$0.40	$0.12	
Value	$37,498	$880,826	$13,007	$59,947	$83,002	$1,190	$598	$1,076,068
1992 Harvest								
Round Weight (lb)	42,218	5,441,421	3,875	358,877	126,852	6,004	2,095	5,981,342
Price ($/lb)	$0.22	$0.23	$0.01	$0.25	$0.69	$0.31	$0.04	
Value	$9,434	$1,250,924	$45	$89,927	$87,269	$1,861	$83	$1,439,543
1991 Harvest								
Round Weight (lb)	62,183	1,916,636	9,528	223,822	103,597	2,321	31,905	2,349,992
Price ($/lb)	$0.24	$0.27	$0.06	$0.20	$0.48	$0.25	$0.34	
Value	$15,134	$513,991	$534	$44,971	$49,533	$580	$10,871	$635,614
1990 Harvest								
Round Weight (lb)	6,769	378,799	61,817	30,580	8,480	0	2,309	488,754
Price ($/lb)	$0.36	$0.13	$0.07	$0.29	$0.55	$0.00	$0.03	
Value	$2,432	$49,851	$4,441	$8,930	$4,631	$0	$65	$70,350
1989 Harvest								
Round Weight (lb)	2,894	36,846	250	81,060	2,996	0	234	124,280
Price ($/lb)	$0.37	$0.07	$0.00	$0.07	$0.71	$0.00	$0.14	
Value	$1,058	$2,587	$0	$5,662	$2,116	$0	$33	$11,456

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Year	Lingcod	Pacific Cod	Pollock	Rockfish	Sablefish	Skates	Other[a]	Total
1988 Harvest								
Round Weight (lb)	24,948	517,497	2,380	213,298	136,260	275	2,544	897,202
Price ($/lb)	$0.22	$0.21	$0.08	$0.12	$1.02	$0.28	$0.20	
Value	$5,487	$107,970	$193	$26,307	$139,421	$77	$491	$279,946

Note: Prices and values are derived from fish ticket information.

[a] Other includes flatfish, sharks, salmon, and other miscellaneous finfish.

APPENDIX B

Appendix B1.–Species encountered in Central Region groundfish management.

ADF&G Species Code	Common Name	Scientific Name
710	Sablefish	*Anoplopoma fimbria*
110	Pacific Cod	*Gadus macrocephalus*
270	Walleye Pollock	*Theragra chalcogramma*
130	Lingcod	*Ophiodon elongatus*
870	Giant Pacific Octopus	*Octopus dofleini*
875	Majestic Squid	*Berryteuthis magister*
692	Pacific Sleeper Shark	*Somniosus pacificus*
690	Pacific Salmon Shark	*Lamna ditropis*
691	Pacific Spiny Dogfish	*Squalus suckleyi*
700	Other Skates	*Family Rajidae*
701	Longnose Skate	*Raja rhina*
702	Big Skate	*Raja binoculata*
703	Alaska Skate	*Bathyraja parmifera*
704	Aleutian Skate	*Bathyraja aleutica*
NA	Assorted Flatfishes	*Order Pleuronectiformes*
Pelagic Shelf Rockfish		
142	Black Rockfish	*Sebastes melanops*
155	Yellowtail Rockfish	*Sebastes flavidus*
172	Dusky Rockfish	*Sebastes variabilis*
173	Dark Rockfish	*Sebastes ciliatus*
Demersal Shelf Rockfish		
138	Copper Rockfish	*Sebastes caurinus*
145	Yelloweye Rockfish	*Sebastes ruberrimus*
146	Canary Rockfish	*Sebastes pinniger*
147	Quillback Rockfish	*Sebastes maliger*
148	Tiger Rockfish	*Sebastes nigrocinctus*
149	China Rockfish	*Sebastes nebulosus*
150	Rosethorn Rockfish	*Sebastes helvomaculatus*
Slope Rockfish		
136	Northern Rockfish	*Sebastes polyspinis*
137	Bocaccio Rockfish	*Sebastes paucispinis*
141	Pacific Ocean Perch	*Sebastes alutus*
151	Rougheye Rockfish	*Sebastes aleutianus*
152	Shortraker Rockfish	*Sebastes borealis*
153	Redbanded Rockfish	*Sebastes babcocki*
157	Silvergray Rockfish	*Sebastes brevispinis*
158	Redstripe Rockfish	*Sebastes proriger*
159	Darkblotched Rockfish	*Sebastes crameri*
166	Sharpchin Rockfish	*Sebastes zacentrus*
182	Splitnose Rockfish	*Sebastes diploproa*
176	Harlequin Rockfish	*Sebastes variegatus*
143	Shortspine Thornyhead	*Sebastolobus alascanus*

Appendix B2.–Frequently used acronyms and key words.

Acronym	Definition
ABC	Acceptable biological catch, stock specification as set annually by the NPFMC.
ADF&G	Alaska Department of Fish and Game
BOF	The Alaska Board of Fisheries
CGOA	Central Gulf of Alaska; management areas 620 and 630
EGOA	Eastern Gulf of Alaska; management area 640
EEZ	Exclusive economic zone; from 3 to 200 nautical miles offshore
EO	Emergency order; management action taken by ADF&G to effect regulatory change
GHL	Guideline harvest level
GOA	Gulf of Alaska
mt	Metric tons (equal to 2,204.62 pounds)
nmi	Nautical mile (equal to 6,076 feet)
NMFS	National Marine Fisheries Service
NPFMC	North Pacific Fishery Management Council
Parallel fishery	State waters from 0 to 3 nautical miles opened via EO but with the same gear and seasons that apply to the federal fishery in the adjacent EEZ
State waters	Territorial sea from shore to 3 nautical miles offshore
State-waters fishery	Fishery occurring from shore to 3 nautical miles, open under state rules and managed exclusively by ADF&G
TAC	Total allowable catch; final federal harvest specification as recommended by NPFMC and set by NMFS