

**Fishery Management Report No. 17-40**

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**Prince William Sound Registration Area E  
Groundfish Fisheries Management Report, 2014–2017**

by

**Jan Rumble**

**Elisa Russ**

**Chris Russ**

and

**Mike Byerly**

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October 2017

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient (simple)	r
		corporate suffixes:		covariance	cov
<b>Weights and measures (English)</b>		Company	Co.	degree (angular)	$^\circ$
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	degrees of freedom	df
foot	ft	Incorporated	Inc.	expected value	$E$
gallon	gal	Limited	Ltd.	greater than	>
inch	in	District of Columbia	D.C.	greater than or equal to	≥
mile	mi	et alii (and others)	et al.	harvest per unit effort	HPUE
nautical mile	nmi	et cetera (and so forth)	etc.	less than	<
ounce	oz	exempli gratia	e.g.	less than or equal to	≤
pound	lb	(for example)		logarithm (natural)	ln
quart	qt	Federal Information Code	FIC	logarithm (base 10)	log
yard	yd	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
		latitude or longitude	lat or long	minute (angular)	'
<b>Time and temperature</b>		monetary symbols (U.S.)	\$, ¢	not significant	NS
day	d	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	$H_0$
degrees Celsius	°C	registered trademark	®	percent	%
degrees Fahrenheit	°F	trademark	™	probability	P
degrees kelvin	K	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
hour	h	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
minute	min	U.S.C.	United States Code	second (angular)	"
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
<b>Physics and chemistry</b>				standard error	SE
all atomic symbols				variance	
alternating current	AC			population sample	Var
ampere	A			sample	var
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				

***FISHERY MANAGEMENT REPORT NO. 17-40***

**PRINCE WILLIAM SOUND REGISTRATION AREA E GROUND FISH  
FISHERIES MANAGEMENT REPORT, 2014–2017**

by  
Jan Rumble, Elisa Russ, Chris Russ, and Mike Byerly  
Alaska Department of Fish and Game, Division of Commercial Fisheries, Homer

Alaska Department of Fish and Game  
Division of Sport Fish, Research and Technical Services  
333 Raspberry Road, Anchorage, Alaska, 99518-1565

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*Jan Rumble, Elisa Russ, Chris Russ, and Mike Byerly,  
Alaska Department of Fish and Game, Division of Commercial Fisheries,  
3298 Douglas Place, Homer, Alaska 99603 USA*

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## ABSTRACT

The Alaska Department of Fish and Game (ADF&G) Division of Commercial Fisheries manages commercial groundfish fisheries within Prince William Sound Registration Area E (PWS) that includes territorial waters of Alaska from Cape Sucking at 144°00'W long to Cape Fairfield at 148°50.25'W long. Harvests of sablefish *Anoplopoma fimbria*, walleye pollock *Gadus chalcogrammus*, lingcod *Ophiodon elongatus*, and Pacific cod *Gadus macrocephalus* are managed on a season basis for specific guideline harvest levels (GHL). Rockfish species (genera *Sebastes* and *Sebastolobus*) are managed collectively as bycatch to other directed fisheries. Miscellaneous groundfish species including flatfish, sharks, and skates, as well as shellfish species including octopus and squid, are also landed incidentally to directed groundfish fisheries. ADF&G also has management authority of lingcod and black rockfish *Sebastes melanops* in federal waters of the exclusive economic zone (EEZ) from 3 nmi to 200 nmi offshore. The 2016 state-managed groundfish harvest totaled 8.43 million pounds. The directed pollock trawl harvest was 8.6 million pounds or 72% of the 13.1 million pound GHL. The total Pacific cod harvest from both parallel and state-waters fisheries was 2.3 million pounds, the second largest harvest historically, and the largest harvest in 2015 was 3.3 million pounds. The 2016 directed sablefish harvest of 40,457 pounds was 37% of the 110,823 pound GHL and the second lowest harvest on record, up from the lowest harvest of 16,910 pounds in 2015. In 2016, the rockfish harvest retained as bycatch to other directed fisheries was 161,512 pounds, the highest since 1996 exceeding the 150,000 pound GHL. Lingcod harvest has been low in recent years and 14,093 pounds were harvested in 2016, the lowest harvest since 1999. In 2016, Pacific cod generated the highest exvessel value of \$724,158, followed by walleye pollock \$629,341, and sablefish \$127,101 for a combined value of \$1.48 million.

Key words: Prince William Sound, Registration Area E, commercial fisheries, groundfish, management, exvessel value, annual management report (AMR), Pacific cod *Gadus macrocephalus*, walleye pollock *Gadus chalcogrammus*, *Theragra chalcogramma*, Sablefish *Anoplopoma fimbria*, lingcod *Ophiodon elongatus*, rockfish *Sebastes melanops*, squid *Beryteuthis majister*, Pacific sleeper shark *Somniosus pacificus*, salmon shark *Lamna ditropis*

## INTRODUCTION

This report describes commercial groundfish fisheries managed by Alaska Department of Fish and Game (ADF&G) in the Prince William Sound Management Area (PWS), Registration Area E, and summarizes the most recent harvest information. ADF&G manages all commercial groundfish fisheries within the territorial waters of PWS, from the shoreline to 3 nautical miles (nmi) offshore. 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 (Table 1). The BOF schedules regular triennial meetings for PWS groundfish. The National Marine Fisheries Service (NMFS) manages groundfish resources in waters of the exclusive economic zone (EEZ), located from 3 nmi to 200 nmi offshore, under fishery management plans (FMP) developed by the North Pacific Fishery Management Council (NPFMC). However, ADF&G manages fishing for any species in the EEZ not covered under a federal FMP, including lingcod *Ophiodon elongatus*, black rockfish *Sebastes melanops*, and dark rockfish *Sebastes ciliatus*.

State of Alaska regulation defines groundfish as all marine finfish except Pacific halibut *Hippoglossus stenolepis*, osmerids, Pacific herring *Clupea pallasii*, and salmonids. The state-managed fisheries for rockfish *Sebastes* spp. and *Sebastolobus* spp., Pacific cod *Gadus macrocephalus*, sablefish *Anoplopoma fimbria*, walleye pollock *Gadus chalcogrammus* and *Theragra chalcogramma*, lingcod, and miscellaneous groundfish species are discussed in this management report. Harvests of black rockfish, dark rockfish, and lingcod in adjacent federal waters are also included because the state has management authority for these species in the EEZ. Miscellaneous groundfish species harvested as bycatch in other directed fisheries, including sharks, skates, flatfish, sculpin, and greenling are also included in this report. Finally,

other non-groundfish bycatch, including Pacific salmon *Oncorhynchus* spp., octopus, and squid *Beryteuthis majister*, are summarized.

Boundaries of PWS have been adjusted several times since 1996. These changes primarily affected rockfish management and are described in the rockfish section of this report. PWS currently encompasses waters of Alaska from 144°00'W long, near Cape Suckling, to the longitude of Cape Fairfield at 148°50.25'W long (Figure 1). The area is divided into the Inside and Outside Districts. The Inside District is waters enclosed by lines from Point Whittshed to Point Bentinck, from Cape Hinchinbrook to Zaikof Point, and from Cape Cleare to Cape Puget. The Outside District, composed of Gulf of Alaska (GOA) waters 0–3 nmi from shore, is divided into the Western and Eastern Sections. The Western Section includes waters between Cape Fairfield and 147°00'W long, and the Eastern Section includes waters between 147°00'W long and 144°00'W long. The BOF adopted regulations giving the commissioner authority to close fishing areas to protect endangered Steller sea lions in 2001. This action complemented NMFS closures at 2 locations in the Outside District. All groundfish fishing was closed within 3 nmi of Seal Rocks in Hinchinbrook Entrance and Wooded Island along outer Montague Island (Figure 2). Additionally, area regulations specify a groundfish pot closure area, to protect recovering Tanner crab *Chionecetes bairdi* populations, in waters of eastern PWS, except Orca Bay and in waters greater than 75 fathoms deep in Hinchinbrook Entrance.

Regulations require all commercial fishing vessels to register with ADF&G prior to fishing for groundfish and restrict legal gear types for groundfish to longline, pelagic trawl, hand troll, seine, mechanical jigging machine, dinglebar troll, and pots. Although area regulations restricted non-pelagic trawl gear in 1997, shrimp trawl vessels may retain groundfish bycatch not to exceed 10% of the gross weight of the landed shrimp, and there is a single limited entry sablefish fishery permit that may be operated on a shrimp trawl vessel (5 AAC 28.230 (f) and (g)). Area regulations also allow groundfish bycatch taken in the salmon gillnet fishery to be retained at specified levels.

Commercial groundfish harvests are monitored inseason primarily through ADF&G fish tickets (5 AAC 39.130) with additional information from dockside sampling of the commercial harvest, dockside interviews, and log sheets for some fisheries. Dockside sampling involves the collection of biological data including species, size, sex, gonad condition, and age structures. Fishermen interviews are conducted dockside to collect information on fishing location and effort. Onboard observers may be deployed during commissioner's permit fisheries and by ADF&G request to gain additional fishery information including discarded harvest. Reporting requirements specify that all groundfish retained, including harvest that is retained for personal use or used as bait at sea, must be reported on ADF&G fish tickets. ADF&G relies on accurate reporting of all fisheries removals for the highest level of fisheries management.

## **ROCKFISH**

### **BACKGROUND**

There are 32 species of rockfish (genera *Sebastes* and *Sebastolobus*) in the GOA, of which 20 are commonly harvested in the commercial fishery. There is no directed fishery in PWS and rockfish may only be retained as bycatch. Rockfish are long-lived with 1 rougheye rockfish *S. aleutianus* from Southeast Alaska aged at 205 years (Munk 2001). Rockfish have a gas-filled swim bladder that allows buoyancy control. Rockfish may experience barotrauma, or injury caused by rapid

decompression and expansion of gases in the swim bladder, during ascent to the surface when caught in deep water; the severity of the condition increases with depth of capture. Rockfish with barotrauma often exhibit exophthalmia, or bulging eyes, and the stomach protruding from the mouth, forced out by the overinflated swim bladder. Rockfish are unable to resubmerge when released in this condition, which results in a high mortality rate after capture. Additionally, rockfish are slow to reach sexual maturity (7 to 27 years); these and other factors make rockfish populations vulnerable to overfishing.

Rockfish are categorized into pelagic shelf (PSR), demersal shelf (DSR), slope species assemblages (all *Sebastes* genus), and thornyhead or “idiot” rockfish (*Sebastolobus* genus) and are defined in regulation 5 AAC 39.975 (37), (34), (38), and (39) respectively. PSR are typically associated with nearshore, rocky reef areas, may exhibit a midwater schooling behavior, and are often harvested in other management areas in directed fisheries with mechanical and hand jig gear; there is no directed rockfish fishery in PWS and PSR harvest typically occurs on longline gear as bycatch in Pacific cod and halibut fisheries. PSR species found in PWS include black *S. melanops*, dusky *S. variabilis*, dark *S. ciliatus*, and yellowtail *S. flavidus* rockfishes. DSR are associated with rocky reef areas, but tend to be bottom dwelling and often occur at greater depths than PSR species (Bechtol 2000). Yelloweye *S. ruberrimus* and quillback *S. maliger* rockfishes are common DSR species in PWS and are most often caught with longline gear during Pacific cod and halibut fisheries. Slope rockfish species include any rockfish not specified as either PSR or DSR, and, for the purposes of this report and PWS rockfish management, thornyhead rockfish data are included with slope species. Slope rockfish are typically found near the bottom in waters deeper than 200 meters and are most often harvested with longline gear, targeting sablefish or halibut, or with trawl gear during the pollock and sidestripe shrimp fisheries. Common slope species in PWS include rougheye and shortraker *S. borealis* rockfishes; the thornyhead rockfish species found in PWS is shortspine thornyhead *S. alascanus*.

## **HARVEST AND EFFORT**

### **Recent**

Between 2014 and 2016, the 150,000 pound rockfish bycatch GHL was achieved and 79 to 90 vessels reported harvest (Tables 2 and 3). The number of landings during this period ranged from 211 to 280 and the majority of rockfish bycatch was harvested by longline gear, between 56% and 85% of the total harvest, or 88,419 pounds and 135,436 pounds, respectively. The walleye pollock pelagic trawl fishery had the second highest percentage of rockfish harvest during this period, ranging from 15% to 44% of the total. Each of the fisheries (species/gear type) has specific associated rockfish bycatch limits. In 2014, pollock trawl fishery vessels harvested the second highest amount of rockfish in the history of the fishery and the pollock fishery was closed after surpassing the bycatch limit of 0.5% (69,132 pounds). Rockfish harvest by pots and jig/hand troll has been minimal since 1998.

In the last 10 years (2007–2016), an average of 83 vessels harvested rockfish as bycatch in 244 landings (Table 3). During this same period, the average harvest for longline and trawl fisheries was 102,565 pounds and 23,487 pounds of rockfish, respectively.

For the past 4 years, rockfish harvest in the Inside District reached the highest levels in the history of the bycatch fishery (since 2000), ranging from 126,623 pounds to 143,978 pounds (Table 2). Between 2007 and 2016, average participation in the Outside and Inside Districts was 67 and 29 vessels, respectively. Average harvest during the same period was 106,972 pounds in

the Inside District (85% of total) and 19,386 pounds in the Outside District. Harvest in the Inside District was less than 100,000 pounds from 2007 to 2012 and then the harvest jumped in 2013 to about 135,000 pounds and remained near this level for the next 3 years. During the last 10 years, harvest in the Outside district ranged from 13,573 pounds in 2014 to 28,419 pounds in 2016.

Species composition of rockfish harvest varied among districts and by gear type (Table 4). During the recent 10 years, slope rockfish was the primary assemblage of all rockfish harvested in PWS at 65%. DSR comprised 33% of rockfish harvested and PSR were a small component at 2%.

Exvessel value of rockfish based on fish ticket reporting was \$74,040 in 2016, the highest value since 2000 (Table 5). Increases in value in recent years was related to increases in harvest of rockfish bycatch, although, average rockfish price of \$0.48/lb in 2016 is lower compared to the peak average price of \$0.72/lb in 2000. Another factor affecting rockfish price is species composition of rockfish because buyers often have differential pricing based on species sold; yelloweye and thornyhead rockfish typically garner a higher price per pound.

## **Historical**

Historic rockfish harvest trends for the Inside District ranged from 35,239 pounds in 2003 to a high of 488,801 pounds in 1990 (Table 2). The peak harvest in 1990 was attributed to market conditions that encouraged targeting rockfish. In the Outside District, harvest ranged from 2,762 pounds in 1991 to 313,489 pounds in 1988. The majority of the record Outside District harvest in 1988 was taken by trawl gear (228,417 pounds; Table 3) and was composed primarily of black rockfish. The relatively high harvests during 1994–1996 were due to misreporting during periods when the directed fishery in state waters was closed but adjacent federal waters remained open. Rockfish harvests declined after the elimination of the directed rockfish fishery in 2000 and have increased in recent years primarily due to the 2009 adoption of longline as a legal gear type in the state-waters Pacific cod fishery and significant increases in walleye pollock pelagic trawl fishery GHs since 2012.

## **MANAGEMENT AND REGULATIONS**

### **Recent**

The most recent regulatory changes occurred at the 2014 BOF PWS Finfish meeting. Regulations adopted included a rockfish bycatch cap of 0.5% during the PWS pollock pelagic trawl fishery. Previously, there had only been a total bycatch cap (all species or species aggregate) of 5% in regulation and the rockfish cap of 0.5% was managed for internally. The other regulation pertaining to rockfish that was adopted by the BOF in 2014 decreased the rockfish bycatch limit during the parallel Pacific cod fishery from 10% to 5%, to mirror the rockfish bycatch allowance during the state-waters Pacific cod fishery. Regulatory changes were amended to the *Prince William Sound Rockfish Management Plan* (5 AAC 28.265).

### **Historical**

Rockfish were not actively managed in PWS prior to 1989, and seasons remained open all year. From 1989 through 1991, rockfish seasons were set by EO to coincide with NMFS inseason adjustments for the federal Central Gulf of Alaska Regulatory Area (CGOA). Favorable market conditions, in conjunction with long seasons in adjacent federal waters, resulted in large annual harvests from PWS. Following dramatic increases in rockfish harvests, the BOF adopted the

*Prince William Sound Rockfish Management Plan* (5 AAC 28.265) in 1992. Original provisions of the management plan included a 150,000 pound guideline harvest level (GHL) for all rockfish species, which was based on mean annual harvests (Bechtol 1992). Additional provisions included a trip limit of 3,000 pounds within a 5-day period and a 20% bycatch allowance after the GHL was achieved and the directed fishery closed. The PWS rockfish directed season opening date remained January 1.

When the management plan was adopted in 1992, PWS was defined to include only that area currently described as the Inside District (Figure 1). In 1996, the management area was expanded to include waters from Cape Fairfield to Cape Suckling, and in 2000, the eastern boundary (Cape Suckling) was redefined as 144°00'W long. Additionally, in 1998, the State of Alaska accepted management authority for black and blue rockfish in adjacent federal (EEZ) waters when NPFMC passed Amendment 46 to the GOA FMP removing these species from the GOA FMP. Similarly, in 2008, Amendment 77 removed dark rockfish from the GOA FMP and the State of Alaska accepted management responsibility for dark rockfish in the EEZ. Although blue rockfish have limited distribution in Alaska waters and dark rockfish are a nearshore, shallow-water species rarely caught in federal waters, harvest of black rockfish from federal waters can be high in some years (Table 4; PSR). Despite these changes in the size of the management area, the rockfish GHL has remained unchanged.

The BOF amended the management plan in 1996 to reduce overall rockfish harvests by managing the 150,000 pound GHL for the combined directed and bycatch harvest of rockfish. Instead of closing the directed rockfish fishery when the GHL was achieved, a harvest level was targeted for the directed fishing season and once this target harvest level was reached, directed fishing was closed and the remainder of the GHL remained available for harvest in the bycatch-only fishery. However, assignment of a directed fishery harvest level proved problematic due to the uncertainty in projecting bycatch levels for other directed fisheries. In addition to the directed rockfish fishery, rockfish were taken as bycatch in fisheries for Pacific cod, halibut *Hippoglossus stenolepis*, sablefish, walleye pollock, and lingcod. Beginning in 1997, ADF&G used EOs to set the rockfish bycatch allowance at 10% of the gross round weight of all delivered groundfish target species. Subsequently, ADF&G increased the rockfish bycatch level to 20% for the 1998 and 1999 PWS sablefish fisheries to accommodate demonstrated bycatch levels.

Because bycatch levels are a percentage of the targeted harvest, if GHLs increase for directed fisheries, the harvest of rockfish may also increase. This has been increasingly apparent in the harvest of rockfish in the PWS walleye pollock pelagic trawl fishery. The GHL for this fishery reached 13.1 million pounds in 2016, which would allow up to 65,588 pounds of rockfish to be harvested as bycatch (Table 6). In 2014, pollock trawl vessels harvested 69,132 pounds of rockfish (Table 3), exceeding the bycatch limit and closing the fishery before the GHL of pollock was reached.

In 2000, the *Prince William Sound Rockfish Management Plan* was significantly amended by eliminating the directed rockfish fishery, requiring full retention of all rockfish, and placing bycatch levels into regulation.

Current regulations for the fishery include the following:

- 1) 150,000 pound GHL for all rockfish species combined;
- 2) A bycatch-only fishery with mandatory full retention of all rockfish bycatch;

- 3) Bycatch allowances of 20% to sablefish, 5% to Pacific cod, and 10% to all other groundfish and halibut; and
- 4) Proceeds from the sale of bycatch overages accrue to the State of Alaska.

## **HARVEST SAMPLING**

Consistent dockside sampling of rockfish species harvested from PWS began in 1993. ADF&G dockside sampling staff conducts interviews with fishermen to obtain fishing location and effort data, and collect biological samples for fish length, weight, sex, maturity stage, and age structures (otoliths).

Rockfish sampling opportunities are variable without a directed rockfish fishery in PWS since 2000. All rockfish harvest is retained as bycatch to other directed fisheries. Therefore, achieving sampling goals for rockfish species can be difficult. However, due to additional sampling coverage beginning in 2013, the highest number of annual rockfish samples were collected during the last 4 years and the highest was in 2014 (Table 7;  $n = 2,178$ ). Sampling goals of 550 specimens for both yelloweye and quillback rockfish were attained or nearly achieved between 2013 and 2015; however, a reduced season and decreased harvest during the PWS Pacific cod fishery in 2016 resulted in fewer sampling opportunities.

Historically, slope rockfish species made up the bulk of samples in most years. Between 1993 and 2016 combined, slope rockfish (primarily shortraker) made up 54% of all rockfish samples collected, DSR (primarily yelloweye) constituted 42% of total rockfish, and the remaining 4% was composed of PSR (primarily black). In 2016, slope rockfish were below the historical contribution at 42% of total rockfish sampled and DSR were above the historical percentage at 49% of the total (Table 7). The highest number of PSR samples were collected in 2016. Because ADF&G staff encountered more black and dusky rockfish during sampled offloads, and although the PSR contribution of 10% to total rockfish samples was higher than the historical component, it was well below sampling goals ( $n = 159$ ).

Since longline became a legal gear type during the state-waters Pacific cod season in 2009, higher numbers of DSR have been harvested as bycatch. Additionally, following the implementation of federal gear sector splits in 2012 for the federal Pacific cod fishery, processors began taking deliveries in the ports of Seward and Whittier from December through February (when halibut season is closed). With more landings occurring in Seward and Whittier in winter and early spring, additional sampling opportunities were provided and ADF&G staff has been stationed in Seward during the Pacific cod fishery since 2013. This resulted in an increase in the annual number of DSR samples collected, and an increase in the proportion of DSR to total rockfish sampled, in recent years.

## **RESEARCH**

There are 3 fishery independent surveys that capture or count rockfish in PWS: (1) multi-species large-mesh trawl survey, (2) sablefish longline survey, and (3) a remotely operated vehicle (ROV) survey. The large-mesh trawl survey is an ongoing, primarily biennial survey in operation since 1989. The sablefish survey was conducted annually from 1996 to 2006, and the ROV surveys were conducted in 2012 and 2016.

The multi-species large-mesh trawl survey uses a 400 mesh eastern bottom trawl net. The survey occurs mainly in the eastern and south central portions of PWS from Valdez Arm south to Orca

Bay and west to northern Montague Island. This survey provides data on numerous commercially important species (rougheye rockfish, Pacific cod, walleye pollock, sablefish, skates and various flatfish species) some of which may be used as a relative index of abundance or biomass. In addition to catch information, biological data including sex, maturity, size, and age are collected from all rockfishes and sablefish. In the history of the survey, over 99% of the rockfish caught were slope species and rougheye rockfish made up more than 97% of the total by weight (Wessel et al. 2014). This survey only covers a portion of rougheye rockfish habitat within PWS, so any catch information should be considered in this context. Rougheye rockfish catch per unit effort (CPUE) for the core station areas (Port Fidalgo, Orca Bay, and north Montague; Figure 3) that were surveyed each year peaked at 72.28 lb/nmi in 1993 and declined to 25.88 lb/nmi in 1999. CPUE increased to 44.08 lb/nmi in 2003 before decreasing again to 32.21 lb/nmi in 2005. Since 2005, CPUE has been steady but declined in 2014 to 26.89 lb/nmi and was 29.26 lb/nmi in 2015, which was below the long-term survey average of 39.77 lb/nmi (Table 8).

The sablefish longline survey covered depths deeper than 200 m, which shortraker and rougheye rockfish commonly occupy. Rockfish CPUE and biological data including sex, maturity, size, and age were collected for this time series. Sampling effort varied spatially throughout the years, but the northwestern portion of PWS was sampled every survey year. Therefore, data from this section has a higher potential for detecting trends in population abundance. For the northwest section, over 99% of the rockfish catch for all years combined was composed of slope species. Shortraker rockfish made up the highest percentage of the catch at 50.2%, rougheye rockfish made up 23.5%, and shortspine thornyhead rockfish at 8.9% (Wessel et al. 2014). CPUE was low for both species, with a high level of variation in most years.

The 2012 ROV survey was part of a Central Region lingcod and DSR population assessment. For this assessment, a series of index sites were chosen within the Inside and Outside Districts of the PWS Management Area and the North Gulf District of the Cook Inlet Management Area. The size of the index sites range from 150 km<sup>2</sup> to 400 km<sup>2</sup> with 5 sites in the Central Region, 4 sites in North Gulf Coast, and 1 site in PWS. ADF&G research has surveyed 1 to 2 sites per year. After all sites are sampled once, the rotation starts again, to achieve a time series of local abundance to track changes.

Index sites represent a range of harvest histories from low to high harvest and are located on rocky banks or coastlines generally separated by deeper glacial fjords. One of these sites is in southwestern PWS. It includes the passages between Bainbridge Passage and Montague Strait and extends south and west to a 150 m contour. Mechanical issues resulted in an incomplete survey, but for the restricted area that was sampled, yelloweye rockfish density was estimated at 1,697 fish/km<sup>2</sup> (cv = 30%). This density estimate was not significantly different from other areas surveyed in the Cook Inlet Management Area.

In 2016, an ROV survey covering most of PWS was conducted. This included both inside and outside waters including federal waters. Video review of these data has not been completed but will be available in 2018.

# PACIFIC COD

## BACKGROUND

Pacific cod, also known as grey cod, have been fished commercially in Alaska waters since the 19th century and currently support a large and valuable commercial fishery. This species grows quickly, up to 1.5 m in length, and reaches maturity at about 0.5 m or an age of 4–5 years in the GOA. Pacific cod have a relatively short lifespan of less than 20 years. Adult fish are demersal, living near the ocean floor, in habitats of mud, sand, and clay. Pacific cod school together, moving seasonally from deep waters (100–250 m) on the continental shelf edge and upper slope in the winter, to shallower waters (less than 100 m) in the summer, and peak spawning occurs in March.

## HARVEST AND EFFORT

### Recent

Longline is the dominant gear type for Pacific cod in PWS in both parallel and state-waters seasons. The parallel season opens with the New Year, and the state-waters season for each gear type follows the corresponding parallel seasons. Pacific cod harvest in 2015 and 2016, from both parallel and state-waters seasons combined represent the highest harvests on record. Harvest has been at a high level during the last 6 years, in part due to large estimates of acceptable biological catch (ABC) derived from stock assessments conducted by NMFS and corresponding GHs allocated from the Eastern Gulf of Alaska (EGOA) ABC. Additionally, beginning in 2011, longline vessels that historically had fished the parallel season in Kodiak waters transitioned to PWS and the Cook Inlet Area after requesting that buyers in Seward and Whittier open earlier in the year to take Pacific cod. Previously, buyers had traditionally waited until halibut season to open. In addition, management changes provided increased opportunity for longline vessels in PWS and resulted in larger harvests with the implementation of longline as a legal gear type in the state-waters season in 2009 and federal gear sector splits in 2012.

Since federal gear sector splits were implemented in 2012, which separated federal/parallel seasons and total allowable catches (TACs) by gear type, longline harvest in PWS has increased, peaking in 2015 at over 3 million pounds (Table 9). This peak was also due to the federal season, and corresponding parallel season (which is tied to the federal CGOA hook-and-line season for vessels less than 50 ft), remaining open until the federal regulatory closure of June 10 for the first time. The length of the initial parallel season prior to the switch to the state-waters season often drives the amount of harvest taken in both the parallel and state-waters fisheries. During the recent 10 years (2007–2016), longline harvest during the parallel season ranged annually from 64,807 pounds to 3,045,972 pounds. Longline harvest during the last 4 years (2013–2016), was above the recent 10-year average harvest of 694,613 pounds. Effort by all gear types during the parallel season ranged from 31 to 50 vessels and 78 to 188 landings. Following historically minimal Pacific cod harvest by jig gear during the parallel season, the 2016 jig harvest marked the highest on record at 82,109 pounds, with confidential data excluded. The parallel season was open all year except for 3 weeks in March. Harvest and effort by pot gear was confidential following historically low or no harvest since 2001.

The state-waters season for longline gear opens 7 days following the corresponding parallel season closure. State-waters seasons for pot and jig gear open 24 hours following corresponding parallel season closures. The state-waters season GH has been relatively high since 2011, when



the allocated percentage of the EGOA ABC jumped to the maximum of 25% after the GHLL was achieved for 3 consecutive years and moved through step-up provisions. In 2016, the PWS GHLL of 4.8 million pounds was the highest since the fishery began in 1997 (Table 10). Longline gear has been a legal gear type during the state-waters season since 2009. Longline harvest ranged from 193,352 pounds in 2015 to 1,594,590 pounds in 2011. The low harvest in 2015 corresponded to the high longline harvest in the parallel season and was a result of the initial parallel season remaining open until June 10 with no state-waters season during the peak abundance of Pacific cod in early spring. Also, there was a diversification of the fleet into halibut and salmon activities by summer. Since 2009, effort by all vessels has ranged from 9 to 38 vessels in the state-waters season with between 15 and 77 landings. Since 2001, participation by pot and jig gear has been minimal, except for a bump in jig harvest in 2015 to 35,102 pounds. The increase in jig harvest in 2015 during the state-waters season corresponded to a year when the parallel season for jig gear closed in early March, allowing for a longer state-waters season.

The parallel and state-waters seasons have varied in length since the state-waters fishery was created in 1997; however, federal gear sector splits have further compounded the variability in season lengths due to federal step-up and step-down provisions. For example, the state-waters season for vessels using longline gear opened March 18 in 2014 and March 19 in 2016 following federal/parallel season closures for longline gear after federal initial or “A” season TACs were achieved. As a result of achieving TACs the prior year, percentage allocations to federal hook-and-line (longline) gear increased in 2015 and 2017. In both 2015 and 2017, following the step-up in allocation, the A season TAC was not achieved resulting in the federal and parallel seasons remaining open until June 10, the federal regulatory closure of the initial season. The shorter parallel seasons in 2014 and 2016 were largely a result of the step-down provisions in the TACs. Similarly, the parallel season for jig gear has been open all year in both 2014 and 2015 following step-up provisions. The seasons for pot gear have been the most stable since federal gear sector splits; however, increased management has been required to coordinate with federal closures and subsequent reopening of seasons for all gear types.

Exvessel value of Pacific cod, based on fish ticket reporting, was \$724,158 in 2016, down considerably from \$1.1 million in 2015 (Table 5), which correlates with the decrease in harvest of about 1 million pounds. Average Pacific cod price of \$0.32/lb in 2016 is below the recent 10-year average price of \$0.34/lb.

## **Historical**

Prior to 1997, all Pacific cod harvest occurred in parallel seasons managed concurrently with seasons set by NMFS in the CGOA. Peak parallel season harvests occurred between 1990 and 1995 with an average of 1.7 million pounds annually and a high harvest of 2.2 million pounds in 1991 from 88 vessels in 234 landings (Table 9). From 1996 to 2000, harvests declined to less than 1.0 million pounds in all years, except 1999, when the harvest surpassed 1.3 million pounds. In 2001, harvest declined to 143,641 pounds, and then from 2002 to 2006, it declined further averaging just over 15,000 pounds for those years. Harvests began to steadily increase again beginning in 2007, with just over 800,000 pounds harvested in 2013.

Nearly all Pacific cod was harvested by longline gear prior to 1990, although following expansion of the pot fishery for Pacific cod in 1991, the proportion harvested by pot gear increased to a high of 83% in 1994. However, since 2001, longline has again accounted for the majority of the parallel season harvest, ranging from 97% to 100% (confidential data excluded).

The decline in parallel season harvest and effort after 2000 can be attributed to a variety of factors, including shortened seasons, high exvessel prices for halibut and sablefish, increased fixed costs, and loss of a directed yelloweye rockfish harvest opportunity due to restructuring of the PWS rockfish fishery.

The PWS Pacific cod state-waters season was established in 1997; total harvest between 1997 and 2008, when pot and jig gear were the only legal gear types, ranged from 0 to 418,994 pounds, and effort ranged from 0 to 12 vessels (Table 10). The high GHGs between 2000 and 2003 coincided with a period of steady decline in harvest that continued with low harvest levels through 2006; most of the data are confidential due to low participation. The disparity between harvest and GHG was the result of a decline in Pacific cod fishing effort and an increase in Pacific cod ABC in the federal EGOA.

Pot gear harvested up to 45% of the GHG in the early years of the state-waters season, peaking at 385,817 pounds in 1998 and declining to 0 in 2001 (Table 10). Jig harvest peaked in 1999 at 79,147 pounds before declining to 0 in 2002. From 2002 through 2013, fewer than 3 vessels fishing with either pot or jig gear have participated annually, resulting in confidential harvests by those gear types.

In 2009, longline became a legal gear type and the GHG was achieved in 13 days, exclusively by vessels fishing with longline gear, marking the first time the GHG was achieved since the state-waters season began. Short seasons and a fully utilized GHG continued through 2011, when harvest peaked at 1,594,590 pounds (Table 10).

## **MANAGEMENT AND REGULATIONS**

### **Recent**

The BOF adopted several regulations related to the Pacific cod fisheries in December 2014. PWS became a nonexclusive registration area for jig gear during the state-waters Pacific cod season, which allows validly registered vessels to use jig gear in PWS and register to participate in a jig fishery in another management area during the same calendar year. In addition, the regulation was rescinded that mandated the closure of the Pacific cod state-waters season for pot gear after 90% of the GHG had been harvested. Also, a regulation was adopted that provided for a combined jig and pot gear allocation initially set at 15%, and the longline gear allocation set at 85%; the regulation included step-up and step-down provisions of 5% implemented the following year for the pot and jig gear allocation if the GHG was or was not achieved, with a minimum of 15% and a maximum of 30% of the GHG allocated to pot and jig gear. As previously mentioned, the rockfish bycatch limit for the parallel Pacific cod fishery was brought in line with the rockfish bycatch limit for the state-waters fishery at 5% of the directed Pacific cod harvest.

### **Historical**

Historically, commercial Pacific cod seasons in PWS were managed by EO to coincide with NMFS seasons and allowable gear in the adjacent federal CGOA. This fishery was adopted into regulation in November 1996 as part of the *Prince William Sound Pacific Cod Management Plan* (5 AAC 28.267) and defined as a parallel season. Similar to historical seasons, current parallel seasons are 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 are legal in state waters. There is an initial parallel season to coincide with the federal “A” season, and there may be a second

parallel season to coincide with the federal “B” season. Parallel season Pacific cod fishery harvests, as well as any Pacific cod bycatch to other directed fisheries in state waters, are accounted against the TAC set by NMFS for the EGOA. Vessel registration for parallel seasons is nonexclusive, meaning a vessel can register with ADF&G to fish in more than 1 management area within a calendar year.

Additionally, ADF&G can open and close fishing seasons by EO at times other than those specified in the management plan; if ADF&G determines it is necessary to adapt to unanticipated openings or closures of the federal season, maintain sustained yield management, provide for orderly fisheries, or allow for a concurrent state-waters season and a federal season for Pacific cod based on inseason assessment of the fishery. This allows flexibility, and ADF&G has opened additional parallel seasons, concurrent with NMFS CGOA Pacific cod openings. In 2002, the BOF also adopted the federal vessel monitoring system (VMS) requirement for all parallel fisheries in order to provide more precise harvest location information and support fishery enforcement efforts to protect Steller sea lions and their habitats.

The PWS Pacific cod management plan adopted in 1996 also established a state-waters season for vessels fishing with pot or jig gear, to open 7 days following the closure of the initial parallel season. The management plan also specified that the season close to vessels fishing with pot gear when 60% of the GHL was achieved. These state-waters Pacific cod seasons were meant to provide Pacific cod harvest opportunity to local fleets with gear types expected to have low halibut bycatch. Vessel registration for state-waters seasons was exclusive, which restricted a vessel from fishing in another exclusive or superexclusive registration area but would allow a vessel to fish in another nonexclusive area. Another regulation (5 AAC 28.232) required that all groundfish pots be removed from the water following the closure of the parallel season, except that pots may be stored as specified in a designated area 10 days prior to and 10 days following a state-waters season, if the vessel is registered for the state-waters season.

The state-waters season is managed for a GHL that is calculated annually as a fixed percentage of the ABC set by NMFS for adjacent federal waters. The PWS GHL was originally calculated as 25% of the EGOA ABC, but in 2003, the BOF reduced the allocation of the EGOA ABC for the GHL to 10% and provided for the allocation to increase to 15%, and then 25%, following years when the GHL was harvested. Providing for an incremental percentage increase was consistent with the initial structure of other state-waters Pacific cod fisheries. However, the GHL was not achieved for the next 6 years until 2009, when new regulations adopted by the BOF added longline as a legal gear type in the PWS state-waters Pacific cod fishery. The regulation specified a date certain closure of May 1 for longline gear. The addition of longline as a legal gear type resulted in consistent achievement of the GHL and increases in percent allocation for the GHL to the current 25% maximum. Also in 2008, the BOF expanded fishing into the Eastern Section of Outside District waters located west of Hook Point (146°15.12'W longitude).

In October of 2011, the BOF amended the *Prince William Sound Pacific Cod Management Plan* in response to new federal gear sector allocations, as follows:

- For longline gear, the parallel season now coincides with the federal season in the CGOA for the less than 50 ft hook and line gear sector. The state-waters season for longline gear now opens 7 days following the closure of the parallel longline season or concurrent with the individual fishing quota (IFQ) halibut season opening date, whichever occurs later.

- For pot gear, the parallel season now coincides with the federal season in the CGOA for pot gear. The state-waters season for pot gear now opens 24 hours following the closure of the parallel season for pot gear.
- For jig gear (mechanical or hand troll), the parallel season now coincides with the federal season in the CGOA for jig gear. The state-waters season for mechanical jigging machines and hand troll gear now opens 24 hours following the closure of the parallel season for jig gear.
- The May 1 closure for longline gear was removed, and a harvest cap was set at 85% of the GHL for vessels fishing with longline gear.
- The harvest cap for vessels fishing with pot gear was raised from 60% to 90% of the GHL.

Other important elements of the management plan and related regulations include the following:

- Any state-waters season GHL remaining on September 1 may become available to all legal gear types.
- Gear restrictions of no more than 60 groundfish pots and no more than 5 mechanical jigging machines in the state-waters season.
- After October 30, ADF&G may relax gear limits and registration requirements in the state-waters season to promote full utilization of the GHL.
- In a state-waters season, Pacific cod may be taken in the waters of PWS, except those waters of the Outside District east of 146°15.12'W long (Figure 2).
- A separate 20% bycatch allowance of Pacific cod may be established by EO, in addition to any other bycatch allowance.
- For vessels fishing with longline or pot gear, registration is nonexclusive for the parallel season and exclusive for the state-waters season. For vessels fishing with jig gear, registration for parallel and state-waters seasons is nonexclusive.
- A vessel may not participate in a state-waters season and any other Pacific cod season at the same time.

## **HARVEST SAMPLING**

Dockside sampling of Pacific cod and fishermen interviews were conducted during the PWS state-waters and parallel seasons. Pacific cod were sampled consistently since 1994 but there were years when low participation in the state-waters season led to few sampling opportunities and samples collected (Table 11). Dockside samplers conducted interviews with fisheries participants for information on fishing location and effort, and collected biological samples for fish length, weight, sex, and maturity stage. Age structures (otoliths) were also collected for archiving and future analysis.

In 2016, 2,000 Pacific cod were sampled from 40 landings by vessels using longline gear in PWS directed Pacific cod fisheries. Since 2013, sample sizes have averaged 1,800 annually, a large increase from previous years, primarily due to increased sampling coverage in Seward and Whittier. Since implementation of longline as a legal gear type during the state-waters season for

Pacific cod in 2009, the number of landings in Seward and Whittier has significantly increased from January through April, providing additional sampling opportunities. Following implementation of federal gear sector splits in 2012, buying operations, which historically had not started buying fish until halibut season opened sometime in March, began to respond to Pacific cod fishermen, who wanted to shift their effort from Kodiak to PWS and Cook Inlet areas to be closer to home, and started buying Pacific cod earlier in the year. Since 2013, an additional ADF&G dockside sampler was hired and stationed in Seward during January through March or early April, covering the peak of the Pacific cod seasons (may include both parallel and state-waters season depending on fishery dynamics), resulting in the increased sampling coverage. After March, many processors stop buying Pacific cod and fishermen also begin to drop out of the Pacific cod fishery as they prepare to enter other fisheries such as halibut and salmon.

In 2016, the majority of Pacific cod sampled came from the Cape Puget vicinity followed by the area around Knight Island. Pacific cod sampled in 2016 were the smallest size historically and averaged 60.5 cm in fork length and 2.7 kg (6.0 pounds) in whole weight (Table 11), well below the average of 66.8 cm and 3.8 kg (8.4 pounds) since biological sampling began in 1994. This drop in size was echoed by the buyers and the fleet, also citing difficulty finding fish and lower pounds of harvest for similar effort in recent years. This drop in CPUE was corroborated by harvest data that showed average landing size during the parallel Pacific cod fishery had dropped by nearly half from 2015 to 2016, 16,206 pounds and 8,442 pounds, respectively (derived from Table 9). Pacific cod from PWS have shown a downward trend in size since 2008, with a slight increase in 2013 and 2014, and then decreasing again in 2015 and 2016.

Otoliths were collected from 20% 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 length, rather than an age-structured model, otolith sampling was reduced and otoliths collected were archived. However, recent indications of greater site fidelity in Pacific cod than previously assumed suggests further analysis and more focused assessment of state-waters Pacific cod may be warranted.

There is no ADF&G-directed research on PWS Pacific cod. Although Pacific cod are captured in Central Region multi-species trawl surveys, the survey gear and design does not lend itself to accurate abundance and biomass estimates.

## **RESEARCH**

Stock assessment trawl surveys have been conducted by the NMFS/Alaska Fisheries Science Center (AFSC) every 2 years since 2001; from 1984 through 2000, they were done every 3 years (Dorn et al. 2013). The survey uses a stratified random design with 49 strata that are based on depth, habitat, and management area (Martin 1997). Biomass is estimated using mean CPUE and stratum area. Commercial bottom trawlers are used to conduct the survey using standardized trawls; typically, 800 tows are completed in a survey.

The current assessment model for GOA Pacific cod uses the following information from the GOA NMFS bottom trawl survey: biomass and abundance estimates, age composition, and mean length at age. Additional information that is used in the assessment includes federal and state fishery catch, federal fishery catch at length, and state fishery catch at length. The most recent

stock assessment used Stock Synthesis version 3.24U (Methot and Wetzel 2013; Methot 2013<sup>1</sup>) to run all the model configurations in the analysis (Barbeaux et al. 2016).

The GOA ABC was apportioned as follows: 41% in the Western GOA, 50% in the Central GOA, and 9% in the Eastern GOA (from 2015) (Barbeaux et al. 2016). For 2017, the ABC in the Eastern GOA was 7,871 tons and the total for the GOA was 88,342 tons. This resulted in a state-waters GHLL that was 4,338,146 pounds, a half million pound decrease from 2016; the 2 were the highest GHLLs in the history of the fishery.

Trawl survey CPUE estimates are available for all survey years from 1991 to 2015 (Table 8). Survey CPUE is generally low for Pacific cod and may be reflective of their distribution within the survey area. CPUE estimates were above the long-term survey average of 15.64 lb/nmi for the first 4 years of the survey (1991 to 1994) followed by below average estimates through 2007. Estimates of CPUE for recent surveys, from 2009 to 2015, was above average for 4 of the 5 years and similar to CPUE in the first year of the survey. The most current CPUE estimate in 2015 was the highest in the time-series at 26.43 lb/nmi.

## **SABLEFISH**

### **BACKGROUND**

Sablefish, also known as black cod, are a commercially important species throughout their range, and typically harvested using longline or pot gear. They are a relatively long-lived species (maximum age 94; Munk 2001), and maximum age estimated from the PWS commercial fishery is 50 years old. Adult sablefish occur in deep water ranging from 150 to 1500 m and are generally found in soft substrates, although they are caught in soft, hard, and mixed substrates.

Sablefish are a highly valuable commercial fish species and have the highest exvessel price per pound of all commercial groundfish species in PWS at an average of \$3.40/lb over the most recent 5 years (2012–2016; Table 5). The PWS sablefish fishery developed in the late 1970s in response to increased sablefish value and declines in shrimp and crab fisheries (Bechtol and Morrison 1997).

### **HARVEST AND EFFORT**

#### **Recent**

In 2015 and 2016, PWS sablefish harvest was at the lowest annual levels in its history, 16,910 pounds and 40,457 pounds, respectively (Table 12). Before 2013, harvest levels were above 185,000 pounds. Also, participation and landings were at historically low levels; 21 vessels made 40 landings in 2015 and 22 vessels made 43 landings in 2016. Over the last 10 years (2007–2016), the annual harvest averaged 157,327 pounds and effort averaged 28 vessels with 78 landings. In 2017, inseason data indicate an increase in harvest from 2016.

Exvessel value of sablefish based on fish ticket reporting was \$68,913 in 2015 and \$127,101 in 2016, the 2 lowest values historically and far below the recent 10-year average of \$502,022 (Table 5). Decreasing value in recent years correlates with low harvests. However, average sablefish prices per pound have been the highest during the recent 10 years, with an average

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<sup>1</sup> Methot, R. D. 2013. User manual for stock synthesis, model version 3.24q. Unpublished manuscript.

price of \$3.30/lb, peak prices of \$4.25/lb in 2011 and \$4.23/lb in 2015, and a low of \$2.76/lb in 2013 (Table 5); the price dropped to \$3.19/lb in 2016.

## **Historical**

Annual sablefish harvest and effort between 1988 and 1995, when the fishery was open access, ranged from 188,788 pounds by 25 vessels in 1989 to 577,315 pounds by 126 vessels in 1995 (Table 12). The 1995 peak in catch and effort was attributed to speculation about qualifying for the limited entry program. Between 1996 and 2002, following the implementation of the limited entry program, harvest and effort in the Inside District directed sablefish fishery ranged from 196,370 pounds by 51 vessels in 1997 to 342,854 pounds by 32 vessels in 2000, with a maximum effort of 69 vessels in 1996. The shared quota fishery was implemented in 2003; following this, harvest has ranged from a high of 225,002 pounds by 38 vessels in 2004 to a low of 16,910 pounds by 21 vessels in 2015.

Most sablefish harvests historically occurred in the Inside District. However, before regulations restricted the fishery to the Inside District in 1997, harvest from the Outside District was significant in some years. Most of the Inside District fishing effort has concentrated in a deep water trench between Lone Island and the Naked Island group (Figure 1). Other harvest areas include Port Wells, Knight Island Passage, and the deeper waters of central PWS near the tanker traffic lane.

## **MANAGEMENT AND REGULATIONS**

### **Recent**

Between 1993 and 2014, the PWS sablefish fishery had a static GHF of 242,000 pounds, based on the midpoint of a 97,000–385,900 pound guideline harvest range (GHR) derived from a yield-per-habitat model (Bechtol and Morrison 1997). Harvest and CPUE declined in the PWS sablefish fishery from 2011 to 2015. Other options for GHF development were examined.

Currently, there is no directed sablefish stock assessment research being conducted but there have been tagging studies conducted by both the NMFS and ADF&G that indicate that sablefish populations are mixed throughout the GOA, which includes PWS. In addition, NMFS conducted biennial stock assessment surveys for sablefish in the GOA; their harvest levels or ABC is derived from these surveys. Beginning in 2015, the sablefish GHF was adjusted by applying the relative change each year in the NMFS GOA sablefish ABC, retroactively beginning in 1994, the year following implementation of the final yield per habitat model. This resulted in a 122,000 pounds GHF for the 2015 season and 110,823 pounds for the 2016 season (Table 12).

### **Historical**

Between 1986 and 1992, the PWS sablefish fishery was managed for the midpoint of an 88,200 to 308,650 pounds (40–140 mt (metric ton)) GHR. This GHR was based on a yield per habitat model developed for similar habitat in Clarence Strait in Southeast Alaska (Bechtol and Morrison 1997) with an estimated yield of 132 to 551 pounds (0.06–0.25 mt) per square nautical mile. In 1993, following the improvement of bathymetric techniques, the area deemed as suitable sablefish habitat was increased by 26% and the GHR was modified to 97,000 to 385,900 pounds (44–175 mt).

Prior to 1993, PWS sablefish seasons opened concurrently with sablefish seasons in federal waters of the CGOA and closed by EO when the state-waters GHF was attained. From 1993 to

1995, ADF&G staff established the duration of the fishing period based on the GHL, the projected number of participants, and past fishery performance. As effort and efficiency of the PWS fleet increased, fishing seasons became more restrictive. Seasons were composed of 1 or 2 fishing periods with total fishery duration ranging from 96 hours in 1993 to 48 hours in 1995. A season opening date of May 1 was first effective in 1997.

In 1996, the Commercial Fisheries Entry Commission (CFEC) adopted a limited entry program for the PWS sablefish fishery that established 4 vessel size classes (90 ft, 60 ft, 50 ft, and 35 ft) and 2 gear classes, fixed (longline) and net (trawl) gears (Muse et al. 1995). Based on the qualifying years 1991–1994, the program initially established a target of 49 permanent permits, and more recently the target number of permits was increased to 59. In 2013, the adjudication process was completed for the fishery and the CFEC issued 58 permanent fixed-gear permits and 1 permanent net gear permit.

Despite adoption of the limited entry program, competition intensified during 1997–2002, which caused shorter season durations and gear conflicts, with tangled longlines and vessel crowding resulting in lost gear when ground lines were parted. In response to the gear conflicts and the undocumented mortality from lost gear, and to provide for conservation of the resource, the BOF adopted a shared quota approach for the PWS sablefish fishery (5 AAC 28.272) in 2003. This approach successfully lengthened the season to at least 82 days in all subsequent years and achieved a significant reduction in gear loss. Quota allocations were derived such that half of the GHL was allocated equally among registered participants and the balance of the GHL allocated according to the permit's vessel size class: Classes A and B (90 ft and 60 ft maximum length) vessels = 18.53%; Class C (50 ft maximum length) vessels = 70.33%; and Class D (35 ft maximum length) vessels = 11.14%. These percentages were derived from average harvest by each vessel size class from 2000 through 2002.

Original regulations in the development of the limited entry program specified that permit holders were restricted in the maximum overall length of vessel they could use based on past participation (20 AAC 05.779). When the shared quota approach was adopted, ADF&G petitioned the CFEC to remove the restriction on using vessels of a larger size class while maintaining the vessel size classification for the purposes of issuing the permit and allocating the resource among permit holders. This change became effective for the 2005 season and has since allowed stakeholders to benefit from the efficiency of being able to harvest quota from any size vessel. Other elements of the restructured fishery included possession requirements, retention of all sablefish fish tickets aboard a sablefish fishing vessel, a registration deadline, and a split fishing season. A registration deadline was set at 5:00 PM March 1 and registration occurred via a commissioner's permit. Season dates were March 15–May 15 and August 1–August 21. Commissioner permit stipulations included a logbook requirement and a 6-hour prior notice of landing requirement to allow adequate sampling of the sablefish harvest.

Killer whale *Orcinus orca* depredation on hooked sablefish during the March, April, and early May portions of the season were a negative component of the extended season. Complaints from fishery participants regarding killer whale depredations peaked during the 2005 season. Estimates of sablefish lost to whales during some trips were 50–80% of the trip total. In an attempt to reduce the occurrences of killer whale depredation, the BOF approved a proposal in December 2005 to allow longline groundfish pot gear to be used by fixed gear permit holders in the PWS sablefish fishery. However, the use of longline pot gear in the fishery has been very limited, and the harvest by this gear type remains confidential due to the limited number of



participants. In time, fishery participants realized the best means to avoid killer whale depredations was to forfeit fishing opportunity during the spring season until the first week of May, when many of the killer whales depart PWS in pursuit of other available food sources. Recognizing the forfeited early season fishing opportunity, ADF&G extended the summer season 17 days to include the last week of July and the later part of August during 2006 to 2008 by EO. In December 2008, the BOF adopted a proposal amending the season dates to April 15 through August 31 to minimize killer whale depredation in early spring and maximize opportunity for fishery participants to achieve the GHL. At the same time, the conditions of the commissioner's permit and a season registration deadline of 5:00 PM April 1 were formally adopted into regulation (5 AAC 28.272 and 5 AAC 28.206 (c)).

## **HARVEST SAMPLING**

Dockside sampling of sablefish from PWS was conducted in the ports of Cordova, Seward, and Whittier in 2016. Sampling operations have been conducted consistently since 1995 on PWS sablefish. Biological samples were collected for fish length, weight, sex, gonad maturity, and age (Table 13). Logbook data and dockside interviews provide information on fishing location and effort (Figure 4).

In 2016, ADF&G staff sampled 686 sablefish from 15 dockside deliveries from vessels using longline gear (Table 13). Sablefish fork length averaged 56.8 cm and weight averaged 2.2 kg (4.9 pounds). The average length from 2016 samples was the smallest size observed since sampling began in 1995, was well below the historical average of 61.7 cm, and was 2.5 cm shorter than the previous minimum size of 59.3 cm recorded in 2000 and 2006. Small sablefish size was echoed by buyers and the fleet, although it was reported that ability to find fish was slightly better than in 2015, which was the lowest harvest on record (Table 12). The harvest in 2016 was the second lowest historically, although the slight fishery improvement and predominance of small fish was interpreted positively by fishermen in terms of potential recruitment into the fishery for future years. Preliminary data indicates an increase in sablefish size, total harvest, and CPUE in 2017. Age structures (otoliths) from sablefish were sent to ADF&G Age Determination Unit (ADU) in Juneau for processing, and age data was not yet available for 2015 or 2016. The average age of sablefish between 1995 and 2014 ranged from 5 years to 8 years, with an average age of 7 years.

Logbook data collected from fishery participants indicates sablefish CPUE in pounds per hook increased in 2016 to approximately 0.14 lb/hook after falling steadily from 2011 through 2014 with a sharp decline in 2015 to approximately 0.04 lb/hook (Figure 4).

## **RESEARCH**

Sablefish research in Central Region began in 1996 when ADF&G initiated an assessment program with a goal to develop a fishery-independent index of sablefish abundance (Bechtol and Vansant 1998; Bechtol 2001). This survey was discontinued after 2006 because of survey design and lack of funding.

Sablefish tagging results helped with management. To date, 1,552 sablefish were tagged, with 1,203 tagged in 2011, 318 tagged in 2013, and 31 tagged in 2015 (Table 14). Of those tagged in 2011, 319 (27%) were recaptured, 56 (18%) were recaptured from the 2013 marked releases, and 5 (16%) were recaptured from 2015 releases. Recapture rate in the first year for fish tagged in 2011 was 13% and 8% for fish tagged in 2013. In the first year, 94% and 81% of recaptures

came from inside PWS in 2011 and 2013, respectively. The percentage of marked fish recaptured outside PWS steadily increased in subsequent years, with the majority of recaptures occurring outside of PWS after 2 years at large. Distance traveled increased with days at large through the second year but remained similar for subsequent years (Figure 5). Of fish that were recaptured outside PWS, more moved south to Southeast Alaska and beyond than moved west (Figure 6).

Trawl survey CPUE estimates of sablefish are available for surveys conducted between 1992 and 2015 (Table 8). The CPUE estimates in pounds per nautical mile for core stations of the survey ranged from 0.16 lb/nmi in 2014 to 32.66 lb/nmi in 1993. The CPUE of sablefish since 2007 has averaged 1.27 lb/nmi, well below the average CPUE of 10.48 lb/nmi for the time series. Trawl survey depths range from 100 to 250 m and have averaged 155 m. These depths are on the shallow end of adult sablefish distributions, and therefore many of the sablefish captured are smaller immature individuals. In addition, survey estimates are highly variable.

## **POLLOCK**

### **BACKGROUND**

Walleye pollock grow to a maximum size of 1 m and a maximum weight of 6 kg, but average 30–50 cm and 0.25–0.90 kg. Pollock are semipelagic schooling fish, which become increasingly demersal with age, and are relatively fast growing and short-lived. They are caught in the trawl fishery beginning at age 2 and may live to a maximum age of 22 years. Because many other species including Stellar sea lions feed on pollock, they play an important role in the ecosystem. At the same time, their survival rate is highly variable, which can potentially cause large fluctuations in pollock abundance over short periods of time.

The pollock trawl fishery off of Alaska is one of the largest and most valuable fisheries in the world, and the PWS directed pollock trawl fishery is the only pollock trawl fishery that is prosecuted entirely in state waters. It began in 1995 when Kodiak-based trawlers and a Cordova processor combined efforts to establish the fishery, and in 2000 the *Prince William Sound Pollock Pelagic Trawl Management Plan* was adopted into regulation (5 AAC 28.263).

### **HARVEST AND EFFORT**

#### **Recent**

Between 2014 and 2017, the PWS pelagic trawl pollock fishery harvest ranged from 4.1 million pounds in 2017 to 9.8 million pounds in 2015 (Table 6). Participation in those years ranged from 8 vessels in 2017 to 19 vessels in 2014. During the recent 10 years, from 2008 to 2017, harvest in the directed fishery averaged 5.1 million pounds, effort averaged 11 vessels with 20 landings, and season length averaged 38 days. The highest GHLS and highest harvests in the history of the fishery occurred in 2015 and 2016. The season in 2015 was 16 days after attaining the GHL. In both 2016 and 2017, the length of the season was 71 days, closing by regulation, not due to achieving the GHL; this was a significant change from previous years. In 2016, 72% of the 13.1 million pound peak GHL was harvested, and in 2017, only 44% of the 9.4 million pound GHL was harvested. The season length in 2014 was 7 days, the shortest season since 1998.

In 2014, the pollock pelagic trawl fishery was closed after attaining regulatory rockfish bycatch limits in the fishery prior to the GHL being achieved. In that year, rockfish bycatch was high with a harvest of 67,466 pounds or 1.29% of the directed pollock harvest, more than twice the 0.5% rockfish bycatch cap (Table 15). Rockfish bycatch harvest has decreased since 2014, and in

2017 was down to 2,552 pounds (0.06%). Other notable bycatch was 240,125 pounds of squid caught during the fishery in 2015. This high level of squid was mirrored in the NOAA/NMFS stock assessment survey and squid biomass estimates.

Total pollock harvest for all gear types was 9.8 million pounds in 2015 and 9.4 million pounds in 2016 (Table 16), the largest harvests on record, largely driven by the directed pollock pelagic trawl fishery. Harvest by other gear types (primarily longline bycatch) was the second highest on record in 2016 at 13,268 pounds.

## **Historical**

Prior to the beginning of the directed pollock trawl fishery in 1995, an average of 4,551 pounds of pollock was harvested annually between 1988 and 1994 (Table 16). Interest and participation in the PWS directed pollock fishery has varied since 1995 with a maximum of 35 vessels participating during the 2010 season and a minimum of 3 vessels during the 2002 season. Prior to the recent record harvests in 2015 and 2016, harvest ranged from 1.4 million pounds in 2008 (39% of the GHL) to 6.3 million pounds in 1995 (144% of the GHL).

The length of the season also varied. Following the initial season that lasted 26 days and the GHL was exceeded, from 1996 to 1998, the season lasted approximately 1 week. Between 1999 and 2010, season length varied between 36 days and 84 days, and between 2011 and 2013, the season shortened from 14 to 24 days. Because of section harvest caps instituted in 2000, individual sections may close in advance of season closures.

## **MANAGEMENT AND REGULATIONS**

### **Recent**

At the 2014 PWS Finfish BOF meeting, a regulation was adopted to set a 0.5% rockfish bycatch limit in the pollock pelagic trawl fishery. This rockfish bycatch limit had been used previously as a management tool by ADF&G, as part of the overall bycatch limit of 5%.

### **Historical**

The directed pollock pelagic trawl fishery GHL is deducted from the combined federal Western, Central, and West Yakutat GOA Regulatory Areas (W/C/WYAK) ABCs, and ranged from 2.0 million pounds in 2004 and 2005 to 13.1 million pounds in 2016 (Table 6). ADF&G used several different approaches to determine the GHL through the years, including 1) applying 8–10% harvest rates to biomass estimates derived from ADF&G's summer bottom trawl assessment surveys, 2) using derivations from a spring acoustic survey biomass estimate, 3) mirroring relative annual changes in harvest levels in federal waters of the GOA, and 4) applying the Tier 5 approach similar to that used by the NPFMC to establish the ABC for some groundfish species. Starting with the 2013 season, ADF&G and the NPFMC Groundfish Plan Team agreed to calculate the PWS directed pollock trawl fishery GHL as 2.5% of the W/C/WYAK ABC. This percentage was the midpoint between the 2001–2010 average of GHL percent of the W/C/WYAK ABC (2.44%) and the 1996 and 2012 level (2.55%). ADF&G has reserved a percentage of the calculated GHL for a test fishery. Test fisheries were conducted in all years except 2008, 2012, 2014, 2015 and 2017, and revenues were used to fund PWS commercial fishery management, including groundfish stock assessment and inseason pollock catch sampling.

The fishery has an annual registration deadline of January 13 (5 AAC 28.206), and the season opens at 12:00 noon on January 20. There is a regulatory closure date of March 31 in order to avoid herring bycatch. The fishery occurs in the Inside District, which is further divided into 3 sections: Bainbridge, Knight Island, and Hinchinbrook, described in 5 AAC 28.263 (a), and no more than 60% of the GHL may be taken from any one of these sections (Figure 7). In 2002, when there was a dramatic increase in bycatch rates for all species (Table 15), committee meetings at the BOF determined that ADF&G would encourage cleaner fishing practices by instituting bycatch limits; bycatch is restricted to no more than 5% of the total round weight of pollock harvested, and ADF&G further manages bycatch by apportioning the percentage among the following species groups: rockfish (0.5%), salmon (0.04%), shark (0.96%), squid (3.0%), and other species (0.5%).

Inseason management during the PWS directed pollock fishery can be intensive, with close contact between the fleet and the manager with attention to the 60% section harvest limit and bycatch limits. ADF&G management requirements include mandatory check-in and check-out procedures before fishing in or leaving a management section, as well as recording fishing information in log sheets. The majority of the fleet transits from Kodiak, which increases the lead time necessary to make management decisions. Trip limits of 300,000 pounds are established in regulation (5 AAC 28.073) and are an important management tool helping control the rate of harvest in the fishery. Historically, vessels have typically achieved this harvest trip limit in less than 10 hours of fishing time.

Although bycatch in this fishery is low relative to other groundfish fisheries, bycatch rates have sometimes warranted management measures. The amount of bycatch is estimated by fishery participants and communicated to ADF&G during the fishery. At times, full accounting of bycatch may not be available until after the closure, when all fish ticket data are processed. Inseason estimates are often different than the actual bycatch reported on the fish tickets. Rockfish caught as bycatch during this fishery accrue to the rockfish GHL of 150,000 pounds for that bycatch-only fishery. Because rockfish bycatch levels are a percentage of the directed harvest, as pollock GHGs increase, rockfish bycatch in this fishery can be a significant proportion of the rockfish GHG (Table 15).

Examples of fishery closures due to bycatch limits being achieved include the following:

- In 2008, 38% of the 2008 GHG was harvested due to closure of the fishery when the rockfish bycatch cap was exceeded; the Hinchinbrook section was closed on March 7, and the remaining sections (Knight Island and Bainbridge) closed on March 17.
- In 2009, the fishery was closed before the GHG was achieved because both the miscellaneous finfish and rockfish bycatch caps were exceeded; the Hinchinbrook section was closed on February 11 and the remaining sections closed on March 21; 90% of the GHG was harvested.
- In 2014, the fishery was closed before the GHG was achieved when the rockfish bycatch cap was exceeded; all sections were closed on January 27, and 61% of the GHG was harvested.

In recent seasons, ADF&G has worked with the fleet to rotate vessels through PWS with the goal of minimizing bycatch harvest and targeting the GHG closely. This has been effective; no regulatory action has occurred due to excessive bycatch following the 2014 closure.

## **HARVEST SAMPLING**

Dockside sampling of walleye pollock from the PWS trawl fleet was conducted in the ports of Seward and Kodiak in 2016, and sampling operations have been conducted since 1995. Biological samples were collected from pollock including fish length, weight, sex, gonad maturity, and age. Logbook data provided information on fishing location and effort. ADF&G onboard observers were deployed during 2 of the 3 test fishery trips in 2016 to collect additional samples, and obtain information on fishing activity, gear deployment, and bycatch. Also in 2016, ADF&G observers were deployed during 4 commercial trips to collect similar information that was collected during the test fishery, and also to monitor rockfish bycatch harvest.

In 2016, ADF&G staff sampled 1,854 pollock for length and, of those, 908 fish were sampled for all parameters (Table 17). Samples were collected from 8 trawl vessel landings, including 2 trips from the test fishery. Pollock had an average fork length of 45.4 cm and an average weight of 0.7 kg (1.5 pounds) in 2016; this was the lowest average weight observed historically through 2016. In 2017, ADF&G staff sampled 1,400 pollock for length and 699 fish for all parameters from 7 trawl vessel trips; there was no test fishery in 2017 (Table 6). Pollock had an average fork length of 42.4 cm and an average weight of 0.6 kg (1.3 pounds) in 2017. This was the shortest average fish length and the lowest average weight observed historically (since 1995), and well below the average length of 49.7 cm and nearly half the average weight of 1.1 kg for the time series. The sex ratio in 2016 pollock samples was 29% female, and in 2017 the female percentage dropped down to 22%, the second lowest on record. Low fish weight and low female percentage was a concern of buyers and the fleet in both 2016 and 2017, and resulted in less effort hence less sampling opportunities both years, although sampling goals were achieved.

There was no effort during the month of February in 2017 and when fishing resumed in March, the sex ratio was the same at 22% female. This poor quality of pollock, low price, and no payment by some processors for fish under 0.8 kg, probably contributed to less than half of the GHL being harvested in 2017 (Table 6). The age structures collected from pollock are otoliths, ear bones, and age reading occurs at the laboratory in Homer. Processing of age data are not yet complete for 2016 and 2017. The average age of walleye pollock from 1996 to 2015 ranged from 4 years to 8 years and averaged 6 years (Table 17).

## **RESEARCH**

There is no directed ADF&G research on PWS pollock. Although pollock are captured in Central Region multi-species trawl surveys, the survey gear and design does not lend itself to quality assessment work for this species.

Stock assessment trawl surveys have been conducted by the NMFS/AFSC every 2 years since 2001. From 1984 through 2000, they were done every 3 years (Dorn et al. 2013). The survey uses a stratified random design with 49 strata that are based on depth, habitat, and management area (Martin 1997). Biomass is estimated using mean CPUE and stratum area. Commercial bottom trawlers are used to conduct the survey using standardized trawls; typically, 800 tows are completed with 70% of the trawls containing pollock. PWS is not surveyed by the AFSC bottom trawl survey, but a total pollock biomass estimate including PWS is derived by applying an adjustment factor described in Dorn et al. (2013). The AFSC's Resource Assessment and Conservation Engineering Division conducted surveys in the summer of 2013 and 2015. AFSC conducted a winter acoustic pollock survey in 2016 inside PWS.

Pollock CPUE estimates from the ADF&G large-mesh trawl survey are available for 1994 to 2015 (Table 8). Estimated CPUE increased for the first 3 years pollock were accounted for in the survey to a peak of 150.19 lb/nmi in 1997 for the time series. Pollock CPUE then dropped dramatically in 1999 to 28.82 lb/nmi and remained below average through 2003. CPUE estimates were above average in 4 out of the next 5 surveys from 2005 to 2013 with a high of 94.41 lb/nmi in 2009. CPUE declined after 2009 dropped to very low levels of approximately 19.70 lb/nmi in 2014 and 2015. Survey estimates are highly variable and the survey is not an accurate tool for assessing pollock (targets Tanner crab); therefore, the survey is unable to provide abundance and biomass estimates for the pollock population in PWS.

## **LINGCOD**

### **BACKGROUND**

Lingcod belong to the greenling (Hexagrammidae) family. Male lingcod begin to sexually mature at age 2 and 50 cm length, whereas female lingcod begin to mature around 3–5 years of age and 60–76 cm length. Lingcod can reach sizes of 38 kg and 1.5 m, females exhibit a faster growth rate and grow larger than males. The maximum age reported is 25 years (Munk 2001). Adult male lingcod do not generally move far from where they are born and engage in guarding the “nests” where eggs are deposited for 8–10 weeks during winter and early spring. An unguarded nest can be destroyed within 48 hours by predators. Because of these behaviors, this species is highly susceptible to overfishing.

### **HARVEST AND EFFORT**

#### **Recent**

Lingcod harvest in PWS occurs in a directed lingcod fishery and as bycatch to other groundfish fisheries. Retention of lingcod is allowed beginning on July 1 and the state manages lingcod in both state and federal waters. The total lingcod harvest between 2014 and 2016, directed and bycatch, including federal waters, ranged from 14,093 pounds to 20,364 pounds with 18 to 27 vessels participating and an average of about 33 landings annually (Table 18). Lingcod harvest during that period was well below the recent 10-year average (2007–2016) of 36,426 pounds. Most of the harvest of lingcod occurs in federal waters of PWS, and, between 2014 and 2016, the federal waters harvest averaged 74% of the total harvest.

Directed harvest for lingcod in the Inside District of PWS (Figure 1) from 2014 to 2016 has ranged from 0 pounds in 2016 to 4,008 pounds in 2014 (Table 19). Directed harvest in the Outside District (including federal waters) during the same period has been higher, ranging from 5,132 pounds in 2016 to 7,740 pounds in 2015. Bycatch harvest of lingcod during the recent 3-year period has been low in the Inside District ranging from 192 pounds to 1,400 pounds and has been higher in the Outside District ranging from 4,727 pounds in 2014 to 9,656 pounds in 2015.

During the recent 3 years, from 2014 to 2016, an average of 50% of all harvested lingcod was landed as bycatch to other halibut and groundfish fisheries, with 50% landed in the directed lingcod fishery.

Exvessel value of lingcod based on fish ticket reporting was \$16,910 in 2015 and \$10,663 in 2016, below the recent 10-year average of \$28,363 (Table 5). Decreasing value in recent years correlates with low harvests. However, average lingcod price per pound have been the highest

during the recent 10 years, with an average price of \$0.87/lb, peak prices of \$0.98/lb in 2014 and \$0.97/lb in 2015 (Table 5); the price dropped to \$0.86/lb in 2016.

### **Historical**

Since 1988, lingcod harvest and effort varied between 9,344 pounds by 16 vessels with 18 landings in 1999, to 72,472 pounds by 42 vessels with 89 landings in 2009 (Table 18). In the Inside District of PWS, harvest of lingcod peaked in 1997 at 22,890 pounds with the second highest harvest of 19,358 pounds in 1991 but in most years was less than 7,000 pounds. In the state waters of the Outside District, harvest peaked at 18,796 pounds in 2001 but in most years was also less than 7,000 pounds. The majority of the harvest in most years occurred in adjacent federal waters of the EEZ; harvest in these waters peaked at 66,202 pounds in 1995 with a low of 2,509 pounds in 1999 and has been highly variable annually.

Historically, the PWS lingcod fishery was a bycatch fishery composed of many small landings primarily by jig gear and to a lesser extent longline gear. However, in recent years longline has been the dominant gear type harvesting lingcod, although some landings were made by jig, hand troll, and trawl gear.

## **MANAGEMENT AND REGULATIONS**

### **Recent**

At the 2014 PWS Finfish BOF meeting, a regulation was adopted that clarified lingcod may be taken in a directed fishery only from July 1 through December 31. Lingcod may also be retained as bycatch beginning July 1: up to 20% by weight of the directed finfish species on board a vessel.

### **Historical**

ADF&G manages lingcod harvest in both state and federal waters. The regulatory season from July 1 to December 31 exists to protect spawning and nest-guarding lingcod during the first half of the year. 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, is intended to allow at least 1 spawning opportunity for a lingcod prior to being susceptible to harvest (5 AAC 28.270 (a)).

Beginning in 1998, ADF&G established a lingcod fishery GHL calculated as 50% of the most recent (1986–1995) 10-year average harvest. In 2000, ADF&G increased the GHL to 75% of the average for those years, consistent with the most conservative alternative used by the NPFMC when considering fisheries with little data on abundance or stock structure. This resulted in a 5,500 pound GHL for the Inside District and a 19,000 pound GHL for the Outside District and adjacent federal waters. Since 2008, the GHL has been set at 7,300 pounds for the Inside District and 25,300 pounds for the Outside District and adjacent federal waters, 100% of the historical harvest.

The BOF adopted a regulation in 2008 allowing retention of lingcod as bycatch to other directed fisheries up to 20% by weight of the directed finfish species on board a vessel, both during and after the closure of the directed lingcod season (5 AAC 28.210 (c) (2)). Retention of lingcod following the closure of the directed fishery in 2009 resulted in the peak recorded lingcod harvest of 72,472 pounds which included the highest lingcod bycatch harvest of 52,087 pounds. However, harvest of lingcod has declined in subsequent years. No lingcod retention is allowed before July 1, and mortality of released lingcod is believed to be low (Albin and Karpov 1998).

To facilitate biological sampling, the BOF adopted a regulation in 2003 (5 AAC 28.270 (c)) that provides ADF&G with EO authority to require that all lingcod be delivered with the head attached and with the vent and area 1.0 inch forward of the vent intact as proof of gender. An EO has been issued each season since 2003 to allow ADF&G greater opportunity to achieve necessary sample sizes.

## **HARVEST SAMPLING**

Dockside sampling of lingcod from PWS was conducted in the ports of Cordova, Seward, and Homer in 2016. Although there has been some sporadic sampling of lingcod dating back to 1993, sampling operations have been conducted consistently since 2003 on PWS lingcod. Sampling efforts have improved due to ADF&G issuing the annual EO requiring lingcod be landed with head on and vent intact since 2003. Biological samples were collected for fish length, weight, sex, gonad maturity, and age, and dockside interviews were conducted for information on fishing location and effort.

ADF&G staff sampled 186 lingcod from 12 dockside deliveries in 2016, from vessels using longline gear. Lingcod had an average fork length of 109.2 cm and an average whole weight of 13.4 kg (29.5 pounds; Table 20). The average length of lingcod in 2016 was above the historical average of 107.5 cm. For the past 6 years, between 2011 and 2016, lingcod have had the highest average lengths since sampling began, peaking in 2014 at 110.9 cm. The average weight of lingcod in 2016 was also above the historical average of 13.0 kg, and similarly, average weights in recent 6 years have been among the highest for the time series with a peak of 14.1 kg (31.1 pounds) in 2014 (maximum of 14.2 kg in 2005). The larger size of lingcod in recent years may be attributed to higher proportions of females in samples collected (93% average for 2011-2016). Since 2003, the proportion of females in the samples has been at least 79%, with a historical average of 88%. Lingcod must be 35 inches (89 cm) in total length to be retained, and the fact that female lingcod grow to a larger size than males (Jagiello 1990 and Gordon 1994) results in a higher proportion of females being harvested in the fishery.

Otoliths are the current age structures collected from lingcod to determine age. Prior to 2006, fin rays were the age structure used to age lingcod. An experiment comparing ages estimated from otoliths and fin ray sections was conducted between 2001 and 2005 at the Homer lab, and analysis produced comparable results. Less labor is required to process otoliths versus fin rays, and therefore the decision was made in 2006 to switch to otoliths as the preferred age structure for all lingcod age determination in Central Region (PWS and Cook Inlet Areas) from the commercial fishery. However, lingcod from the sport fishery continue to use fin rays to assess age. Otoliths from lingcod were sent to the ADU laboratory for processing, and age data are not available for 2015 or 2016 at this time. The average age of lingcod for between 2003 and 2014 ranged from 14 to 17 years, with an average age for all years combined of 15 years.

## **RESEARCH**

An ROV survey was conducted in 2012 to estimate lingcod and DSR density and local abundance in the southwestern portion of PWS (see Rockfish section above). Mechanical issues resulted in an incomplete survey, but for the restricted area that was sampled, lingcod density was estimated at 2,889 fish/km<sup>2</sup>. This density estimate was not significantly different from that in other areas sampled in the Cook Inlet Management Area, although the PWS estimate had lower precision. Based on stereo video measurements, 57% of lingcod observed were estimated to be



of legal size. In 2016, an ROV survey covering most of PWS was conducted. This included both inside and outside waters including federal waters. Video review of these data has not been completed but will be available in 2018.

Very few lingcod are captured in the large-mesh trawl survey or in the sablefish longline survey (probably because these surveys are depth limited), and as such, those data are of little use for assessment purposes.

Size at maturity was estimated for lingcod collected throughout Central Region. Length at 50% maturity was estimated at 85.65 cm (33.72 inch), which is smaller than the 35-inch size restriction in regulation. There were 198 lingcod in the analysis with 106 fish collected from chartered vessels for the maturity study. There were 2 collecting trips: 1 in the North Gulf Coast District of the Cook Inlet Management Area and the other in PWS. The remaining 82 fish were collected from ADF&G surveys (trawl and jig) and from commercial sampling. Samples were collected between 1998 and 2005; 51% of the samples came from PWS. There is a latitudinal trend of increasing size at maturity from southern Canada to Southcentral Alaska.

## **MISCELLANEOUS GROUND FISH**

### **SKATES**

#### **BACKGROUND**

Skates are not specified in PWS groundfish fishery regulations and are therefore classified as a miscellaneous groundfish. A directed fishery for big (*Raja binoculata*) and longnose (*Raja rhina*) skates occurred in PWS during 2009 and 2010 following the ADF&G's receipt of a capital budget increment. Big and longnose skates are the 2 most frequently landed skate species in PWS. The majority of the skate harvest occurs as bycatch in the state-waters Pacific cod fishery, although skates are also harvested in all directed longline groundfish fisheries. Both of these species are long lived, have slow growth rates, and mature late in life, making them vulnerable to overfishing. The directed skate fishery was discontinued for several reasons, including the lack of comprehensive stock assessment data, relative catch and composition of skate species, halibut bycatch in the directed skate fishery, other skate harvest opportunities, and cost of management.

#### **HARVEST AND EFFORT**

##### **Recent**

Since 2011, skate harvested as bycatch in PWS has been at higher levels and ranged from 92,168 pounds in 2016 to 268,440 pounds in 2015 (Table 5). The harvest of skates as bycatch, following the closure of the directed fishery, was similar to levels harvested when the directed fishery was open in 2009 and 2010, mainly due to the continued interest of buyers. Skates had an exvessel value of \$110,329 in 2015, the second highest on record (highest in 2009); however, value dropped to \$31,982 pounds in 2016 with a decrease in harvest and lower price of \$0.35/lb. Price per pound was highest in 2012 and 2015 at \$0.42/lb and \$0.41/lb, respectively.

##### **Historical**

Skates were open to directed fishing until 1998, although harvest levels remained low. As a market for skates was developed and with the advent of the PWS state-waters Pacific cod fishery

opening to longline gear in 2009, harvest of skates as bycatch within PWS has increased (Table 5).

In the directed skate fishery in 2009, 9 vessels harvested 258,389 pounds in 17 landings. Landings of big skate ranged from 1,067 pounds to 26,718 pounds in the Inside District, and from 604 pounds to 20,903 pounds in the Outside District. The largest landing of big skate in the Inside District exceeded the Inside District GHL (20,000 pounds), and several big skate landings of approximately 19,000 pounds in the Outside District caused the harvest to exceed the Outside District GHL (30,000 pounds). The directed season for big skate closed on March 29 in the Inside District and on April 2 in the Outside District. Landings of longnose skate ranged from 424 pounds to 15,274 pounds, and the season within both the Inside and Outside districts remained open through April 30 (Wessel et al. 2014).

In the 2010 directed skate fishery, 6 vessels harvested 104,509 pounds in 16 landings. Landings of big skate were restricted by a 2,500 pound trip limit, to avoid exceeding the skate GHL as they did in 2009. The directed season for big skate closed on March 21 in the Inside District and on April 30 in the Outside District. Landings of longnose skate ranged from 738 pounds to 15,793 pounds, and the season in the Inside and Outside districts remained open through April 30. Effort and harvest in the 2010 skate fishery declined as a result of the 2,500 pound big skate trip limit and other skate harvest opportunities; vessels targeting Pacific cod in the federal EGOA were allowed to retain skate at a bycatch allowance of 20%, which resulted in greater amounts of big skate than could be retained under trip limits in the directed state-waters fishery.

## **MANAGEMENT AND REGULATIONS**

Seasons for miscellaneous groundfish were historically set by EO to coincide with seasons set by NMFS in the adjacent federal waters of the EEZ. However, BOF actions in 1998 and in 2000 made 2 significant changes to management of miscellaneous groundfish. The 1998 action closed directed fishing for sharks and established a commissioner's permit requirement to target skates (5 AAC 28.084 and 5 AAC 28.083). These actions were consistent with the lack of information on stock size necessary to conduct a sustainable fishery. After this regulatory addition, ADF&G issued no PWS skate permits. In 2000, the BOF adopted into regulation a miscellaneous groundfish commissioner's permit requirement (5 AAC 28.220(c)) for PWS. This provided a mechanism for developing fisheries and provided ADF&G a flexible tool to ensure adequate data collection and manageability. In 2003, when NMFS adopted a bycatch-only fishery for skates, ADF&G adopted a similar approach, with the exception of the 2009 and 2010 directed pilot commissioner's permit fishery.

The directed skate fishery in 2009 and 2010 was managed under a commissioner's permit, described in regulation 5 AAC 28.083, which stipulated, among other things, species, season, fishing area, log sheets, catch reporting, prior notice of departure and landing, and accommodation of an ADF&G observer. In 2010, the permit also stipulated a big skate trip limit of 2,500 pounds per 2 day period to slow the pace of harvest because the GHL had been exceeded the previous year.

GHLS for the directed fishery were set independently for longnose and big skate for the PWS Inside and Outside districts using estimates of skate abundance derived from PWS Inside District trawl survey data and applying an exploitation rate taken from the most recent 5-year average of the federal Bering Sea/Aleutian Islands model. Because survey data were lacking for the Outside District, big and longnose skate GHLS were set based upon Inside District survey data expanded

to account for an Outside District fishing area that was 50% larger than the Inside District fishing area. For longnose skate, a harvest rate of 0.034% (2009) and 0.045% (2010) was used, whereas for big skate, the 0.034% harvest rate was applied for both years. This approach resulted in Inside District GHGs of 20,000 pounds for big skate and 100,000 pounds (110,000 pounds in 2010) for longnose skate. Resulting GHGs in the Outside District were 30,000 pounds for big skate and 150,000 pounds (155,000 pounds in 2010) for longnose skate.

ADF&G has not issued skate permits since 2010 for several reasons: lack of comprehensive stock assessment data, relative catch and composition of skate species, bycatch in the directed skate fishery, and other existing skate harvest opportunities.

Concern over skate abundance levels derived from NMFS stock assessment surveys in recent years resulted in a reduction in maximum retainable amounts (MRA) from 20% to 5% for skate bycatch in federal waters fisheries in 2016, reacting to concerns about the skate population stock assessment information and of vessels “topping off” their harvest with maximum allowed bycatch. Additionally, the CGOA TAC was achieved for big skate in 2013 through 2016, and big skate was closed to retention in federal waters adjacent to PWS. ADF&G closed big skate in state waters of PWS in those years to mirror the NMFS action as there was no GHG set for skate species. The PWS allowable bycatch level of skate species in aggregate had been reduced by EO from 20% to 15% in 2014 due to a conservation concern. Following suit after the recent federal action, ADF&G reduced allowable skate bycatch levels in PWS by EO from 15% to 5% in 2016.

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, where the ABC and overfishing levels (OFL) are based on survey biomass estimates and mortality rate. The GOA ABC for big skate remained the same from 2016 to 2017 at 3,814 mt. The longnose ABC also remained the same for the past 2 years, at about 3,200 mt.

## **HARVEST SAMPLING AND RESEARCH**

Currently, there is no dockside sampling efforts on skate species.

During the directed skate fishery in 2009 and 2010, both big and longnose skates were sampled for total length, disc width, weight, sex, gonad maturity, and age (vertebrae collected as age structures). For both years combined, big skate had an average weight of 16.6 kg (36.6 pounds), average length of 123.6 cm, and average age of 7 years, and the sex ratio was 74% female (Table 21). Female percentage increased between 2009 and 2010. Longnose skate had an average weight of 10.0 kg (22.0 pounds), average length of 116.9 cm, average age of 11 years, and the sex ratio was 44% female. Measurements of longnose skate were similar for both years.

Skates are captured in multispecies trawl surveys. Skate survey information has been used to estimate biomass to set commercial harvest levels in PWS, but the data lacked strength due to the poor gear efficiency for capturing these species. The relative abundance of longnose and big skates captured by the trawl survey differed substantially from that captured in the commercial fishery. To address this discrepancy, shallow stations were added in an attempt to better sample presumed big skate habitat. Despite this, relative abundance was similar to previous surveys. The discrepancy in relative abundance of these species between survey and directed commercial fishery may be explained by seasonal movement patterns.

Estimates of pounds per nautical mile towed for big and longnose skate have been generated since 1999 from the PWS large-mesh trawl survey (Table 8). CPUE for longnose skate has

remained consistent over the past 3 surveys, and similar to the long-term average of 87.99 lb/nmi. Big skate CPUE has been increasing since 2007, when it reached the lowest level of 0.91 lb/nmi, and was at its highest point in 2015 of 33.90 lb/nmi.

Biological data are collected on all skate mortalities from surveys, and ADF&G has been collaborating on a big skate satellite tagging and tag and recapture research project with a graduate student at the University of Alaska, Fairbanks, to examine skate movements within PWS and the GOA.

## **OTHER SPECIES**

### **BACKGROUND**

Other miscellaneous groundfish, including numerous species of flatfish, and sharks are landed incidentally to PWS groundfish fisheries and have been targeted only sporadically (Table 22). Octopus and squid are also landed incidental to PWS groundfish fisheries; although they are considered shellfish under state regulation, they fall under the “other” groundfish category in federal regulation. Many of these species are discarded at sea during other directed fisheries.

### **HARVEST AND EFFORT**

Although much of the miscellaneous groundfish catch in commercial fisheries (with the exception of skate) is discarded at sea and is probably largely undocumented, some abundance information is available from observer coverage in the pollock trawl and shrimp trawl fisheries as well as other agency stock assessment survey data and CPUE from the ADF&G large-mesh trawl survey (Appendix B1). An indication of incidental catch in longline fisheries has also been provided by the ADF&G’s longline survey. Shark bycatch, particularly Pacific sleeper shark *Somniosus pacificus* in longline and trawl fisheries, has been reported to be significant (Table 22). Similarly, there is an incidental catch of salmon sharks *Lamna ditropis* during salmon seine fisheries. Squid has been a significant bycatch component in the pollock trawl fishery in some years (Table 15).

### **MANAGEMENT AND REGULATIONS**

There are no directed fisheries for miscellaneous groundfish within PWS and harvest occurs as bycatch to other directed groundfish and halibut fisheries. Bycatch limits are set in accordance with 5 AAC 28.070 and allow retention of a bycatch species up to 20% by weight of the directed species on board a vessel. Prior to 2014, bycatch limits in PWS were managed under a 20% aggregate allowance or cap for all species, meaning that the weight of all bycatch species combined could be up to 20% by weight of the directed species on board the vessel. In 2014, ADF&G began issuing an EO each year that set individual species or aggregate species bycatch allowances; miscellaneous groundfish species bycatch limits were set at 15% for shark species in aggregate, and 20% for all other groundfish species (not specified in the EO) in aggregate.

Although octopus is a miscellaneous shellfish species, octopus may be retained in groundfish fisheries. ADF&G manages octopus as bycatch only under *Registration Area E Octopus Management Plan* (5 AAC 38.217). This plan, adopted by the BOF in 2012, specifies a GHR of 0–35,000 pounds and a bycatch limit of 20% to directed groundfish and halibut fisheries or 35% to directed shrimp fisheries.

## **HARVEST SAMPLING AND RESEARCH**

There have been no other samples collected to date on miscellaneous groundfish from commercial fisheries in PWS. All of the species listed under miscellaneous groundfish (flatfish, sharks, skates) are captured in various PWS surveys; the survey gear and design does not lend itself to quality abundance estimates for sharks, although CPUE is estimated for spiny dogfish and other various groundfish species and smelt caught in the large-mesh trawl survey including flatfish and sculpin (Appendix B1).

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## **TABLES AND FIGURES**

Table 1.–Groundfish emergency orders issued for Prince William Sound Registration Area E, 2014–2016.

Fishery	Emergency order	Effective date	Explanation
2014 Calendar Year			
Global bycatch	2-GF-E-01-14	1/1/2014	Set groundfish bycatch limits.
Pacific cod	2-GF-E-02-14	1/1/2014	Opens parallel season concurrent with federal Central Gulf of Alaska Area.
Pollock	2-GF-E-03-14	1/24/2014	Closes directed season in the Hinchinbrook Section effective 8:00 a.m.
Pollock	2-GF-E-04-14	1/24/2014	Opens directed season in the Hinchinbrook Section effective 2:00 p.m.
Pollock	2-GF-E-05-14	1/27/2014	Closes directed season in the PWS Area effective 3:00 p.m.
Skate	2-GF-E-06-14	2/6/2014	Closes the PWS Area to retention of big skate as bycatch.
Pacific cod	2-GF-E-07-14	2/13/2014	Closes parallel season to vessels fishing with pot gear 12:00 noon February 13 and opens state-waters season to vessels fishing with pot gear effective 12:00 noon February 14.
Pacific cod	2-GF-E-08-14	3/11/2014	Closes parallel season to vessel fishing with longline gear 12:00 noon March 11 and opens state-waters season to vessels fishing with longline gear effective 12:00 noon March 18.
Pacific cod	2-GF-E-09-14	3/26/2014	Closes the state-waters season to vessels fishing with longline gear.
Pacific cod	2-GF-E-10-14	3/28/2014	Closes the state-waters season to vessels fishing with pot gear.
Lingcod	2-GF-E-11-14	7/1/2014	Requires all lingcod taken in the PWS Area to be landed with the head on and evidence of gender retained.
Pacific cod	2-GF-E-12-14	9/1/2014	Opens the parallel season to vessels fishing with pot or longline gear.
Rockfish	2-GF-E-13-14	9/27/2014	Requires all rock taken in the PWS Area to be coded as an overage and all profits forfeited to the state while maintaining mandatory retention of all rockfish caught.
Pacific cod	2-GF-E-14-14	11/10/2014	Closes parallel season to vessels fishing with pot gear, opens state-waters season to vessels fishing with pot gear, removes pot limits effective 12:00 noon.
Pacific cod	2-GF-E-15-14	12/18/2014	Closes parallel season to vessels fishing with longline gear and opens state-waters season to vessels fishing with longline gear effective 12:00 noon.
2015 Calendar Year			
Global bycatch	2-GF-E-01-15	1/1/2015	Set groundfish bycatch limits.
Pacific cod	2-GF-E-02-15	1/1/2015	Opens parallel season concurrent with federal Central Gulf of Alaska Area.
Pollock	2-GF-E-03-15	1/20/2015	Sets bycatch limits for pollock pelagic trawl fishery.
Pollock	2-GF-E-04-15	2/5/2015	Closes directed season in the PWS Area effective 12:00 noon.
Skate	2-GF-E-05-15	2/11/2015	Closes the PWS Area to retention of big skate as bycatch.
Pacific cod	2-GF-E-06-15	2/16/2015	Closes parallel season to vessels fishing with pot gear 12:00 noon February 16 and opens state-waters season to vessels fishing with pot gear effective 12:00 noon February 17.
Pacific cod	2-GF-E-07-15	3/2/2015	Closes parallel season to vessels fishing with jig gear 12:00 noon March 2 and immediately opens state-waters season to vessels fishing with jig gear effective 12:00 noon March 3.
Pacific cod	2-GF-E-08-15	6/10/2015	Closes parallel season to vessels fishing with longline gear 12:00 noon June 10 and opens state-waters season to vessels fishing with longline gear 12:00 noon June 17. Also, closes the state-waters season to vessels fishing with jig gear 12:00 noon and immediately opens a parallel season to vessels fishing with jig gear.
Lingcod	2-GF-E-09-15	7/1/2015	Requires all lingcod taken in the PWS Area to be landed with the head on and evidence of gender retained.

-continued-



Table 1.–Page 2 of 2.

Fishery	Emergency order	Effective date	Explanation
2015 Calendar Year continued			
Pacific cod	2-GF-E-10-15	9/1/2015	Closes the state-waters season to vessels fishing with pot or longline gear 12:00 noon September 1 and immediately opens the parallel season to vessels fishing with pot or longline gear.
Pacific cod	2-GF-E-11-15	12/15/17	Closes parallel season to vessels fishing with longline and opens state-waters season to vessels fishing with longline gear effective 12:00 noon December 15.
2016 Calendar Year			
Global bycatch	2-GF-E-01-16	1/1/2016	Set groundfish bycatch limits.
Pollock	2-GF-E-02-16	1/20/2016	Sets bycatch limits for pollock pelagic trawl fishery.
Pacific cod	2-GF-E-03-16	1/1/2016	Opens parallel season concurrent with federal Central Gulf of Alaska Area.
Pacific cod	2-GF-E-04-16	2/1/2016	Closes parallel season to vessel fishing with pot gear 12:00 noon February 1 and opens state-waters season to vessels fishing with pot gear effective 12:00 noon February 2.
Pacific cod	2-GF-E-05-16	3/1/2016	Closes parallel season to vessel fishing with jig gear 12:00 noon March 1 and opens state-waters season to vessels fishing with jig gear effective 12:00 noon March 2.
Pacific cod	2-GF-E-06-16	3/11/2016	Closes parallel season to vessels fishing with longline gear 12:00 noon March 11 and opens state-waters season to vessels fishing with longline gear 12:00 noon March 19.
Pacific cod	2-GF-E-07-16	3/12/2016	Closes state-waters season to vessels fishing with pot gear opens parallel season to vessels fishing with pot gear effective 12:00 noon March 12.
Pacific cod	2-GF-E-08-16	3/21/2016	Closes the state-waters season to vessels fishing with jig gear 12:00 noon March 21 and immediately opens the parallel season to vessels fishing with jig gear.
Pacific cod	2-GF-E-09-16	3/31/2016	Closes parallel season to vessels fishing with pot gear 12:00 noon March 31 and immediately opens state-waters season to vessels fishing with pot gear.
Lingcod	2-GF-E-10-16	7/1/2016	Requires all lingcod taken in the PWS Area to be landed with the head on and evidence of gender retained.
Rockfish	2-GF-E-11-16	8/1/2016	Reduces rockfish bycatch percentages in all fisheries.
Pacific cod	2-GF-E-12-16	9/1/2016	Closes the state-waters season to vessels fishing with pot and longline gear 12:00 noon September 1 and immediately opens the parallel season to vessels fishing with pot gear.

Table 2.—Prince William Sound Area commercial rockfish harvest and effort from the Inside and Outside Districts including black and dark rockfish from federal waters, 1988–2016.

Year	Inside District			Outside District			Total harvest (lb)
	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)	
1988	64	170	113,253	18	25	313,489	426,742
1989	35	90	88,280	5	6	17,350	105,630
1990	92	390	488,801	10	11	17,314	506,115
1991	88	239	153,888	6	6	2,762	156,650
1992	106	275	178,519	16	24	12,882	191,401
1993	66	175	81,015	20	33	27,478	108,493
1994	64	151	94,894	31	51	104,493	199,387
1995	121	211	153,075	35	60	143,585	296,660
1996	86	208	108,392	31	51	76,295	184,687
1997	89	234	136,237	26	35	29,245	165,482
1998	77	194	99,957	13	23	8,914	108,871
1999	81	214	60,540	21	31	11,447	71,987
2000	98	263	111,170	18	31	10,749	121,919
2001	92	205	60,575	18	40	13,485	74,060
2002	82	168	67,243	13	26	7,369	74,612
2003	74	194	35,239	29	57	12,751	47,990
2004	64	160	40,582	23	47	12,219	52,801
2005	71	163	47,216	15	47	13,194	60,410
2006	61	168	61,089	22	51	15,176	76,265
2007	59	164	66,322	25	57	15,282	81,604
2008	58	161	92,077	20	49	14,692	106,769
2009	69	198	96,524	36	66	21,498	118,022
2010	69	210	89,712	30	53	14,905	104,617
2011	65	183	96,366	32	53	22,244	118,610
2012	72	184	90,367	28	60	23,155	113,522
2013	75	234	134,655	28	50	14,586	149,241
2014	71	171	143,978	32	46	13,573	157,551
2015	63	235	126,623	25	51	25,505	152,128
2016	71	219	133,093	29	52	28,419	161,512
Average 2007–2016	67	196	106,972	29	54	19,386	126,358
Percent of total			85%			15%	

Table 3.–Prince William Sound Area commercial rockfish harvest by gear type, including black and dark rockfish from federal waters, 1988–2016.

Year	Vessels	Landings <sup>a</sup>	Harvest (lb)				Total <sup>b</sup>
			Jig	Trawl	Longline	Pots	
1988	80	195	54,097	228,417	144,228	0	426,742
1989	39	103	<sup>c</sup>	997	104,633	0	105,630
1990	96	402	30,088	20,238	455,789	<sup>c</sup>	506,115
1991	89	247	15,624	11,162	129,864	0	156,650
1992	114	299	9,946	28,510	152,945	<sup>c</sup>	191,401
1993	80	209	13,905	12,610	81,978	<sup>c</sup>	108,493
1994	92	211	94,588	<sup>c</sup>	104,799	<sup>c</sup>	199,387
1995	134	269	168,777	267	127,616	<sup>c</sup>	296,660
1996	99	257	57,103	3,507	124,077	0	184,687
1997	106	266	34,047	1,294	130,141	<sup>c</sup>	165,482
1998	88	220	2,903	1,079	104,889	<sup>c</sup>	108,871
1999	92	244	1,130	1,951	68,906	0	71,987
2000	100	284	2,401	2,061	117,210	247	121,919
2001	101	233	1,165	4,495	68,400	<sup>c</sup>	74,060
2002	87	190	0	30,553	44,059	0	74,612
2003	89	243	256	4,752	42,982	0	47,990
2004	71	197	283	3,735	48,783	0	52,801
2005	80	206	<sup>c</sup>	8,863	51,547	0	60,410
2006	72	226	1,008	12,391	62,866	<sup>c</sup>	76,265
2007	73	213	1,215	10,970	69,419	0	81,604
2008	69	203	<sup>c</sup>	21,656	85,113	0	106,769
2009	88	256	<sup>c</sup>	22,359	95,663	<sup>c</sup>	118,022
2010	87	262	<sup>c</sup>	6,500	98,117	<sup>c</sup>	104,617
2011	81	232	<sup>c</sup>	8,113	110,497	<sup>c</sup>	118,610
2012	94	245	881	18,054	94,587	<sup>c</sup>	113,522
2013	85	277	<sup>c</sup>	29,680	119,561	<sup>c</sup>	149,241
2014	90	211	0	69,132	88,419	0	157,551
2015	79	280	0	23,293	128,835	0	152,128
2016	87	265	966	25,110	135,436	83	161,512
Average							
2007-2016	83	244	<sup>b</sup>	23,487	102,565	<sup>b</sup>	126,358

<sup>a</sup> Total landings may be less than total combined district tallies due to vessels fishing multiple districts in a single trip.

<sup>b</sup> Confidential data excluded from total harvest; recent average harvest not calculated for jig and pot gear.

<sup>c</sup> Confidential data due to less than 3 participants.

Table 4.–Prince William Sound Area commercial rockfish harvest rockfish by species assemblage, 1988–2016.

Year	Pelagic Shelf <sup>a</sup>		Demersal Shelf		Slope/Thornyhead		Total harvest (lb)
	Harvest (lb)	% of Total	Harvest (lb)	% of Total	Harvest (lb)	% of Total	
1988	312,178	73%	27,733	6%	86,831	20%	426,742
1989	19,150	18%	15,674	15%	70,806	67%	105,630
1990	26,868	5%	24,239	5%	455,008	90%	506,115
1991	26,146	17%	31,893	20%	98,611	63%	156,650
1992	51,595	27%	42,921	22%	96,886	51%	191,401
1993	27,632	25%	14,246	13%	66,615	61%	108,493
1994	116,431	58%	22,904	11%	60,052	30%	199,387
1995	175,699	59%	29,154	10%	91,807	31%	296,660
1996	71,507	39%	53,719	29%	59,461	32%	184,687
1997	37,833	23%	41,315	25%	86,334	52%	165,482
1998	4,283	4%	56,952	52%	47,636	44%	108,871
1999	3,164	4%	43,395	60%	25,429	35%	71,987
2000	3,103	3%	72,742	60%	46,074	38%	121,919
2001	2,195	3%	31,203	42%	40,663	55%	74,060
2002	510	1%	14,647	20%	59,455	80%	74,612
2003	2,011	4%	22,945	48%	23,034	48%	47,990
2004	2,028	4%	23,764	45%	27,009	51%	52,801
2005	1,126	2%	21,137	35%	38,147	63%	60,410
2006	1,733	2%	22,480	29%	52,052	68%	76,265
2007	1,815	2%	24,128	30%	55,661	68%	81,604
2008	644	1%	23,948	22%	82,177	77%	106,769
2009	1,071	1%	32,195	27%	84,756	72%	118,022
2010	1,283	1%	25,124	24%	78,210	75%	104,617
2011	3,302	3%	47,002	40%	68,306	58%	118,610
2012	3,824	3%	38,304	34%	71,395	63%	113,522
2013	982	1%	50,345	34%	97,914	66%	149,241
2014	3,654	2%	31,444	20%	122,453	78%	157,551
2015	8,548	6%	60,200	40%	83,380	55%	152,128
2016	7,455	5%	94,793	59%	59,264	37%	161,512
Average 2007-2016	3,258	2%	42,748	33%	80,351	65%	126,358

<sup>a</sup> Includes black and dark rockfish from federal waters.

Table 5.—Prince William Sound Area state-managed groundfish harvest, whole pounds sold and exvessel values, 1985–2016.

Year	Lingcod		Pacific cod		Pollock		Rockfish		Sablefish		Skate		Total
	Sold lb	Value	Sold lb	Value	Sold lb	Value	Sold lb	Value	Sold lb	Value	Sold lb	Value	Value
1985	3,992	\$0	724	\$0	0	\$0	50,535	\$0	506,901	\$319,348	0	\$0	\$319,348
1986	7,284	\$2,202	79,165	\$16,235	358	\$44	66,365	\$20,288	253,802	\$134,428	1,566	\$0	\$173,197
1987	2,592	\$774	534,203	\$143,649	1,366	\$200	336,903	\$101,534	200,964	\$132,952	11,004	\$2,232	\$381,341
1988	26,952	\$9,903	330,718	\$93,884	1,548	\$124	426,742	\$136,172	247,374	\$240,816	11,770	\$4,325	\$485,224
1989	20,409	\$6,546	73,600	\$16,232	1,558	\$208	118,431	\$38,590	188,788	\$150,328	614	\$61	\$211,965
1990	42,899	\$15,313	1,219,979	\$312,658	7,335	\$1,074	506,468	\$181,954	216,414	\$142,271	0	\$0	\$653,269
1991	31,845	\$13,003	2,223,513	\$612,614	0	\$0	156,373	\$56,910	350,625	\$309,549	0	\$0	\$992,076
1992	25,746	\$8,222	1,972,071	\$451,966	5,956	\$1,663	190,476	\$61,964	465,784	\$425,386	0	\$0	\$949,201
1993	66,475	\$25,341	1,304,977	\$239,758	5,627	\$1,258	108,573	\$37,687	391,133	\$383,606	815	\$245	\$687,894
1994	43,672	\$14,159	1,893,797	\$354,436	5,583	\$2,234	199,615	\$80,696	341,049	\$414,929	0	\$0	\$866,454
1995	58,757	\$21,015	1,595,068	\$383,219	6,408,234	\$643,543	296,180	\$182,143	576,466	\$1,305,937	1,713	\$206	\$2,536,063
1996	27,855	\$11,145	852,726	\$193,151	3,675,835	\$339,913	179,947	\$105,227	291,396	\$539,122	22,381	\$3,322	\$1,191,879
1997	37,364	\$15,197	1,121,309	\$290,346	4,837,150	\$461,248	162,784	\$90,945	208,353	\$481,755	36,149	\$3,261	\$1,342,751
1998	10,242	\$3,897	1,093,126	\$266,789	4,584,823	\$375,173	107,549	\$71,687	243,847	\$415,659	44,613	\$4,684	\$1,137,889
1999	8,832	\$6,179	1,720,332	\$581,483	4,815,987	\$468,424	69,275	\$39,987	213,851	\$383,972	169	\$69	\$1,480,114
2000	17,562	\$12,291	1,024,641	\$389,644	2,607,542	\$208,858	117,236	\$83,916	356,146	\$805,048	48	\$33	\$1,499,790
2001	24,808	\$22,590	168,830	\$60,132	3,499,850	\$243,088	63,649	\$25,950	323,697	\$605,388	0	\$0	\$957,147
2002	19,436	\$17,403	15,461	\$4,190	2,535,764	\$183,398	38,335	\$15,594	326,896	\$623,268	508	\$102	\$843,955
2003	23,796	\$17,245	313,329	\$104,480	2,366,451	\$157,859	36,904	\$18,379	223,558	\$515,207	786	\$105	\$813,275
2004	29,550	\$22,269	328,673	\$152,390	2,225,760	\$141,094	45,218	\$19,226	234,617	\$497,961	56	\$7	\$832,945
2005	23,834	\$17,033	130,113	\$58,232	1,913,562	\$267,778	47,756	\$25,865	225,825	\$494,148	83,867	\$10,064	\$873,120
2006	26,794	\$24,559	43,915	\$19,718	3,455,403	\$414,540	68,165	\$33,005	194,813	\$456,258	0	\$0	\$948,079
2007	28,645	\$24,206	423,651	\$205,815	2,555,327	\$297,775	70,974	\$35,731	198,047	\$488,807	0	\$0	\$1,052,334
2008	33,137	\$28,885	73,184	\$43,037	1,224,193	\$186,964	92,499	\$42,171	206,030	\$613,325	9,449	\$3,609	\$917,992
2009	68,334	\$60,290	867,185	\$301,138	3,322,977	\$524,005	106,741	\$51,134	218,219	\$657,600	328,548	\$119,216	\$1,713,382
2010	52,786	\$41,434	910,558	\$256,857	3,928,617	\$689,089	92,950	\$43,075	211,453	\$714,992	212,317	\$61,879	\$1,807,327
2011	41,932	\$31,808	1,935,455	\$698,293	3,717,004	\$534,592	109,773	\$47,300	221,349	\$940,493	200,883	\$68,261	\$2,320,746
2012	36,738	\$34,474	1,818,631	\$659,024	5,692,107	\$919,274	102,641	\$47,024	202,449	\$654,892	146,567	\$61,650	\$2,376,337
2013	26,821	\$21,229	2,076,903	\$577,254	6,200,135	\$963,400	137,106	\$64,026	154,249	\$425,321	237,137	\$93,538	\$2,144,768
2014	14,012	\$13,732	2,173,962	\$739,147	5,185,700	\$674,141	148,279	\$66,726	95,854	\$328,779	119,242	\$47,697	\$1,870,222
2015	17,433	\$16,910	3,274,188	\$1,142,692	9,782,766	\$1,076,104	141,438	\$55,161	16,307	\$68,913	268,440	\$110,329	\$2,470,109
2016	12,399	\$10,663	2,277,227	\$724,158	7,866,758	\$629,341	154,251	\$74,040	39,843	\$127,101	92,168	\$31,982	\$1,597,285
Average													
2007-2016	33,224	\$28,363	1,583,094	\$534,742	4,947,558	\$649,469	115,665	\$52,639	156,380	\$502,022	161,475	\$59,816	\$1,827,050

<sup>a</sup> Exvessel value: Price per pound was calculated on only records that returned a dollar value, was based on whole pounds, and was then applied to all records where harvest was characterized as sold, bait sold, or overages.

Table 6.—Prince William Sound Area directed pollock trawl fishery annual harvest, effort, guideline harvest level (GHL), and season length, 1995–2017.

Year	GHL (million lb)	Season days	Vessels	Landings	Harvest (lb)	Harvest % of GHL	Test fish (lb)
1995	2.1-4.4	26	9	35	6,325,575	144%	215,025
1996	3.1	5	11	24	3,265,740	105%	421,137
1997	3.9	8	10	31	4,319,707	111%	539,123
1998	3.9	7	11	29	4,031,725	103%	631,751
1999	4.6	36	6	38	4,673,074	102%	490,761
2000 <sup>a</sup>	3.1	70	4	20	2,256,504	73%	366,724
2001	3.1	64	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	381,502
2002	3.8	70	3	22	2,364,143	62%	177,071
2003 <sup>c</sup>	3.8	84	3	17	2,421,773	64%	54,224
2004	2.0	68	3	9	1,928,458	96%	400,677
2005	2.0	48	6	8	1,677,157	84%	317,183
2006	3.6	58	8	15	3,486,449	97%	590
2007	3.6	69	5	12	2,339,978	65%	259,155
2008 <sup>d</sup>	3.6	56	5	7	1,395,933	39%	0
2009	3.6	60	8	14	3,249,441	90%	300,806
2010	3.6	42	11	15	3,662,919	102%	311,853
2011	3.6	17	7	13	3,377,325	94%	339,683
2012	6.1	24	9	21	5,785,295	95%	0
2013	5.8	14	14	23	5,770,151	99%	496,856
2014 <sup>d</sup>	8.6	7	19	22	5,220,121	61%	0
2015	9.9	16	17	35	9,818,616	99%	0
2016	13.1	71	10	33	8,573,163	72%	779,979
2017	9.43	71	8	15	4,143,533	44%	0
Average 2008–2017	6.7	38	11	20	5,099,650	80%	222,918

<sup>a</sup> Pollock harvest sections were created in 2000.

<sup>b</sup> Confidential information due to less than 3 vessels participating.

<sup>c</sup> Total bycatch cap of 5% implemented with species group caps.

<sup>d</sup> Rockfish bycatch cap reached and season closed.

Table 7.—Species composition of sampled rockfish, grouped by rockfish assemblage, including number sampled (*n*) and proportion, from commercially harvested rockfish from the Prince William Sound Area, 1993–2016.

Year	Slope Rockfish						Demersal Shelf Rockfish (DSR)						Pelagic Shelf Rockfish (PSR) <sup>c</sup>		Total samples
	Rougheye		Shorthead		Total Slope <sup>a</sup>		Yelloweye		Quillback		Total DSR <sup>b</sup>		<i>n</i>	%	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%			
1993	158	36%	226	51%	405	91%	23	5%	1	0%	38	9%	2	0%	445
1994	111	34%	102	31%	229	71%	52	16%	41	13%	95	29%			324
1995							29	18%			29	18%	134	82%	163
1996	1	1%	82	73%	112	100%									112
1997	31	16%	71	38%	189	100%									189
1998	90	8%	198	18%	375	35%	602	56%	96	9%	699	65%	6	1%	1,080
1999	70	19%	221	61%	350	97%	10	3%			10	3%			360
2000	97	23%	224	53%	415	99%	4	1%			4	1%	1	0%	420
2001	96	26%	61	16%	171	46%	186	50%			192	52%	8	2%	371
2002	92	21%	300	68%	397	90%	45	10%			45	10%			442
2003	10	4%	88	31%	121	43%	133	47%	23	8%	156	56%	4	1%	281
2004	29	13%	158	69%	212	93%	15	7%	1	0%	16	7%			228
2005	38	35%	51	46%	107	97%							3	3%	110
2006	30	21%	32	22%	79	55%	44	31%	18	13%	62	43%	2	1%	143
2007	59	15%	112	29%	218	57%	135	35%	24	6%	162	43%			381
2008	32	10%	59	19%	132	43%	142	46%	17	5%	172	55%	6	2%	310
2009	165	29%	146	25%	456	79%	56	10%	47	8%	113	20%	7	1%	576
2010	71	20%	113	32%	298	86%	4	1%	35	10%	50	14%			348
2011	168	18%	278	29%	717	75%	121	13%	79	8%	209	22%	33	3%	959
2012	201	22%	234	25%	488	53%	170	18%	191	21%	395	43%	46	5%	929
2013	167	9%	330	17%	652	34%	592	30%	618	32%	1,232	63%	58	3%	1,942
2014	237	11%	487	22%	960	44%	536	25%	546	25%	1,153	53%	65	3%	2,178
2015	366	20%	197	11%	690	37%	598	32%	477	26%	1,113	60%	64	3%	1,867
2016	191	12%	375	23%	673	42%	397	24%	324	20%	789	49%	159	10%	1,621
Total	2,510	16%	4,145	26%	8,446	54%	3,894	25%	2,538	16%	6,734	43%	598	4%	15,779

<sup>a</sup> Total slope rockfish includes rougheye, shorthead, thornyhead, redbanded, silvergray, darkblotched, redstripe, sharpchin, Pacific ocean perch, and unidentified slope rockfish species.

<sup>b</sup> Total demersal shelf rockfish (DSR) also includes yelloweye, quillback, canary, china, copper, and tiger rockfish.

<sup>c</sup> Pelagic shelf rockfish (PSR) includes black (primarily), dusky, dark, and yellowtail rockfish.

Table 8.—Relative catch per unit effort (CPUE) for select species from Prince William Sound large-mesh trawl survey, 1991–2015.

Year	Number of Stations	CPUE <sup>a</sup>					
		Sablefish	Pacific cod	Pollock	Rougheye rockfish	Longnose skate	Big skate
1991	29	NA	24.37	NA	34.94	NA	NA
1992	37	14.53	20.64	NA	53.32	NA	NA
1993	38	32.66	20.31	NA	72.28	NA	NA
1994	38	6.12	16.53	59.28	56.91	NA	NA
1995	32	8.66	8.91	69.38	45.87	NA	NA
1997	39	17.43	12.80	150.19	32.53	NA	NA
1999	40	10.62	7.95	28.82	25.88	92.63	21.68
2001	40	16.28	5.01	16.76	36.38	116.41	3.56
2003	40	19.36	11.45	20.39	44.08	110.15	4.61
2005	40	23.91	9.45	64.91	32.21	114.48	8.64
2007	32	1.35	8.51	62.13	32.16	54.31	0.91
2009	43	3.85	25.14	94.41	38.34	64.17	18.20
2011	43	0.80	25.24	51.42	36.68	70.17	18.27
2013	43	0.22	11.33	61.73	38.56	85.09	10.40
2014	41	0.16	16.11	19.76	26.89	83.70	28.62
2015	43	1.22	26.43	19.64	29.26	88.78	33.90
Average		10.48	15.64	55.29	39.77	87.99	14.88

<sup>a</sup> CPUE is pounds per nautical mile tow distance with 40 ft wide trawl net.



Table 9.—Prince William Sound Area Pacific cod parallel fisheries annual harvest and effort by gear type, 1988–2016.

Year	Vessels	Landings	Harvest (lb) <sup>a</sup>				Total <sup>d</sup>
			Other <sup>b</sup>	Longline	Pot	Jig <sup>c</sup>	
1988	39	87	0	330,718	0	0	330,718
1989	23	45	<sup>e</sup>	71,845	<sup>e</sup>	<sup>e</sup>	71,845
1990	84	307	<sup>e</sup>	1,203,118	<sup>e</sup>	<sup>e</sup>	1,203,118
1991	88	234	17,074	1,248,218	961,912	<sup>e</sup>	2,227,204
1992	140	524	<sup>e</sup>	1,359,176	594,741	<sup>e</sup>	1,953,917
1993	57	205	<sup>e</sup>	810,831	466,202	<sup>e</sup>	1,277,033
1994	46	197	0	316,550	1,584,722	<sup>e</sup>	1,901,272
1995	75	205	24,539	359,765	1,204,450	6,982	1,595,736
1996	50	135	218,170	214,021	420,183	1,663	854,037
1997	60	172	1,506	334,086	582,324	4,333	922,249
1998	50	150	5,879	534,553	138,243	0	678,675
1999	54	196	1,909	687,169	641,523	<sup>e</sup>	1,330,601
2000	58	175	<sup>e</sup>	403,230	332,310	0	735,540
2001	23	63	<sup>e</sup>	143,641	<sup>e</sup>	<sup>e</sup>	143,641
2002	22	51	<sup>e</sup>	17,700	0	0	17,700
2003	26	45	234	14,051	<sup>e</sup>	<sup>e</sup>	14,285
2004	17	45	<sup>e</sup>	13,247	0	0	13,247
2005	24	38	221	11,073	0	0	11,294
2006	30	59	587	18,407	0	0	18,988
2007	31	82	<sup>e</sup>	64,807	<sup>e</sup>	<sup>e</sup>	64,807
2008	35	78	0	66,563	0	0	66,563
2009	41	90	<sup>e</sup>	166,190	0	0	166,190
2010	40	93	326	88,700	0	0	89,026
2011	39	93	345	359,402	<sup>e</sup>	<sup>e</sup>	359,747
2012	32	82	1,963	420,544	<sup>e</sup>	<sup>e</sup>	422,507
2013	32	92	182	806,281	<sup>e</sup>	<sup>e</sup>	806,463
2014	33	82	415	791,448	<sup>e</sup>	<sup>e</sup>	791,863
2015	44	188	782	3,045,972	0	0	3,046,754
2016	50	145	5,766	1,136,224	<sup>e</sup>	82,109	1,224,099
Average 2007–2016	38	103	1,222	694,613			703,802

<sup>a</sup> Harvest is reported in round pounds.

<sup>b</sup> “Other” includes trawl and gillnet gear.

<sup>c</sup> Includes mechanical jig and hand troll.

<sup>d</sup> Total harvest does not include confidential data.

<sup>e</sup> Confidential data due to limited number of participants.

Table 10.–Prince William Sound Area state-waters Pacific cod annual harvest, effort, and guideline harvest level (GHL), by gear type of from the season, 1997–2016.

Year	Vessels	Landings	GHL (lb)	Harvest (lb)			Total <sup>b</sup>
				Longline	Pot	Jig <sup>a</sup>	
1997	9	36	880,000		192,142	8,378	200,520
1998	9	33	860,000		385,817	33,177	418,994
1999	7	27	930,000		314,987	79,147	394,134
2000	12	36	2,950,000		268,765	22,377	291,142
2001	3	3	2,620,000		0	228	228
2002	0	0	1,900,000		0	0	0
2003	c	c	750,000		c	0	c
2004	c	c	970,000		c	0	c
2005	c	c	897,000		c	0	c
2006	c	c	911,000		c	c	c
2007	3	20	911,000		c	c	c
2008	4	6	586,000		0	7,557	7,557
2009 <sup>d</sup>	19	37	487,746	704,866	0	0	704,866
2010	24	45	784,735	822,747	c	0	822,747
2011	25	63	1,435,195	1,594,590	0	0	1,594,590
2012 <sup>e</sup>	38	70	1,448,437	1,395,483	0	c	1,395,483
2013	25	77	1,781,335	1,275,245	0	0	1,275,245
2014	30	61	1,463,318	1,384,749	0	0	1,384,749
2015	9	15	1,558,668	193,352	0	35,102	228,454
2016	28	76	4,841,902	1,061,974	0	c	1,061,974
Average 2007–2016	21	47	1,529,834	1,054,126 <sup>f</sup>			941,741

<sup>a</sup> Includes mechanical jig and hand troll.

<sup>b</sup> Total harvest does not include confidential data.

<sup>c</sup> Confidential data due to limited number of participants.

<sup>d</sup> Longline became an allowable gear type for the Prince William Sound Area state-waters season.

<sup>e</sup> Regulatory change implemented to close season to longline gear when 85% of GHL attained.

<sup>f</sup> Longline harvest average for 2009–2016.

Table 11.—Average length, average weight, sex ratio (percent female), and number sampled (*n*) of Pacific cod from commercial fisheries in the Prince William Sound Area, 1994–2016.

Year	Average length (cm)	<i>n</i>	Average weight (kg)	<i>n</i>	Percent female	<i>n</i>
1994	71.3	102	4.1	102	56	102
1995	70.0	145	4.3	145	63	145
1996-1997 <sup>a</sup>						
1998	69.2	481	4.5	62	50	481
1999	66.1	640	3.6	72	59	639
2000	66.5	794	4.0	83	59	794
2001-2002 <sup>b</sup>						
2003	71.1	135	4.2	50	60	50
2004-2006 <sup>a</sup>						
2007	67.5	419	3.8	205	78	88
2008	70.3	79	4.4	79	65	79
2009	67.5	281	3.8	132	62	131
2010	65.8	750	3.9	374	62	375
2011	65.3	600	3.4	300	62	300
2012	63.5	500	3.3	250	65	250
2013	65.6	1,673	3.6	825	59	845
2014	65.4	1,799	3.8	860	57	899
2015	63.6	2,054	3.4	1,054	63	1,053
2016	60.5	2,000	2.7	998	56	964
Average	66.8		3.8		61	

<sup>a</sup> No Pacific cod samples were collected 1996–1997 or 2004–2006.

<sup>b</sup> Sample sizes in 2001 and 2002 insufficient for biological data analysis.

Table 12.–Prince William Sound Area annual sablefish effort, guideline harvest level (GHL), and harvest, including test fish, from the Inside and Outside Districts, 1988–2016.

Year	Vessels	Landings	GHL	Annual harvest (lb)			Total <sup>b</sup>
				Inside	Outside	Test fishery <sup>a</sup>	
1988	54	145	192,063	219,416	27,958		247,374
1989	25	95	192,063	188,042	746		188,788
1990	71	251	192,063	211,485	4,929		216,414
1991	78	157	192,063	326,235	24,398		350,633
1992	63	126	192,063	432,172	33,684		465,856
1993	60	92	242,000	316,603	74,943		391,546
1994	66	102	242,000	280,700	60,359		341,059
1995	126	134	242,000	565,548	11,767		577,315
Limited entry program implemented							
1996	69	77	242,000	247,545	33,475	10,376	291,396
1997	51	81	242,000	196,370	2,689	9,311	208,370
1998	59	60	242,000	233,005	14	11,676	244,695
1999	42	45	242,000	206,142	0	7,765	213,907
2000	32	32	242,000	342,854	77	13,582	356,513
2001	47	49	242,000	310,216	0	13,692	323,908
2002	49	51	242,000	320,694	0	7,924	328,618
Shared quota fishery implemented							
2003	39	67	242,000	213,932	0	9,914	223,846
2004	38	67	242,000	225,002	0	9,994	234,996
2005	34	70	242,000	220,392	0	6,687	227,079
2006	27	73	242,000	185,494	0	10,068	195,562
2007	28	61	242,000	199,213	0	0	199,213
2008	31	70	242,000	206,888	<sup>c</sup>	0	206,888
2009	32	104	242,000	219,438	0	0	219,438
2010	30	112	242,000	212,229	0	0	212,229
2011	29	94	242,000	222,099	0	0	222,099
2012	26	87	242,000	203,824	0	0	203,824
2013	30	93	242,000	155,488	0	0	155,488
2014	27	72	242,000	96,726	<sup>c</sup>	0	96,726
2015	21	40	122,000	16,910	0	0	16,910
2016	22	43	110,823	40,457	0	0	40,457
Average							
2007–2016	28	78		157,327			157,327

<sup>a</sup> Fish landed and sold under ADF&G’s program receipts authority are listed as “test fishery” and not included in vessels or landings.

<sup>b</sup> Confidential data excluded from total harvest.

<sup>c</sup> Confidential data due to fewer than 3 participants.

Table 13.—Average length, weight, and age; sex ratio (percent female); and number sampled (*n*) of commercially harvested sablefish sampled from the Prince William Sound Area, 1995–2016.

Year	Average length (cm)	<i>n</i>	Average weight (kg)	<i>n</i>	Average age (years)	<i>n</i>	Percent female	<i>n</i>
1995	62.6	220	2.4	220	6	35	64	220
1996	62.6	221	2.1	220	7	221	59	215
1997	65.8	327	2.7	316	7	325	67	325
1998	62.3	409	2.4	111	7	404	62	323
1999	59.9	470	2.1	464	7	163	<sup>a</sup>	
2000	59.3	471	2.3	471	5	442	<sup>a</sup>	
2001	61.7	464	2.2	464	7	461	<sup>a</sup>	
2002	61.4	759	2.7	349	8	755	63	677
2003	62.7	650	3.0	514	7	640	71	631
2004	62.0	993	2.9	962	6	958	70	947
2005	62.9	619	3.0	605	7	604	63	606
2006	59.3	589	2.4	590	5	585	62	587
2007	61.9	666	2.8	666	7	645	61	666
2008	64.1	619	3.0	619	7	591	61	618
2009	61.4	722	2.6	722	7	720	61	722
2010	60.1	777	2.4	777	7	777	56	777
2011	60.3	629	2.4	629	6	626	62	629
2012	60.7	688	2.5	688	7	686	59	688
2013	60.3	664	2.6	664	6	665	60	662
2014	65.5	758	3.5	758	7	758	59	758
2015	63.6	170	3.3	170	<sup>b</sup>		56	170
2016	56.8	686	2.2	686	<sup>b</sup>		57	675
Average	61.7		2.6		7		62	

<sup>a</sup> Insufficient gender data to evaluate sex ratio for 1999 to 2001 samples; in 1999, 94%; in 2000, 57%; and in 2001, 100% were recorded as sex unknown.

<sup>b</sup> Age structures submitted to Age Determination Unit; data for 2015 and 2016 have not yet been analyzed.

Table 14.–Prince William Sound Area sablefish tagging project numbers of tagged released fish, number of fish recaptured by recapture location (inside or outside PWS), and percent recaptured, 2011–2017

Released		Recaptured					%
Year	Number	Year	Inside	Outside	Unknown	Total	Recaptured
2011	1,203	2011	152	8	1	161	13%
		2012	32	24	1	57	5%
		2013	6	30	2	38	3%
		2014	1	29	1	31	3%
		2015	1	19	1	21	2%
		2016	0	11	0	11	1%
		Total		192	121	6	319
2013	318	2013	22	4	1	27	8%
		2014	7	10	2	19	6%
		2015	0	2	0	2	1%
		2016	0	7	0	7	2%
		2017	0	1	0	1	0%
		Total		29	24	3	56
2015	31	2016		3		3	10%
		2017		2		2	6%
Total	1,552	Total	0	5	0	5	16%

Table 15.—Prince William Sound Area directed pollock fishery harvest and bycatch by species or species group, in pounds and as a percentage of the directed pollock harvest, 1995–2017.

Year	Pollock harvest (lb)	Reported bycatch <sup>a,b</sup>										Total Bycatch	
		Rockfish		Salmon		Shark		Squid		Other			
		lb	%	lb	%	lb	%	lb	%	lb	%	lb	%
1995	6,325,575	67	0.00%	76	0.00%	378	0.01%	1,346	0.02%	5,135	0.08%	7,002	0.11%
1996	3,265,552	0	0.00%	0	0.00%	2,724	0.08%	437	0.01%	3,836	0.12%	6,997	0.21%
1997	4,319,707	12	0.00%	42	0.00%	648	0.02%	17,016	0.39%	2,076	0.05%	19,794	0.46%
1998	4,013,725	10	0.00%	285	0.01%	7,825	0.19%	21,663	0.54%	11,909	0.30%	41,692	1.04%
1999	4,673,074	260	0.01%	2,088	0.04%	14,022	0.30%	5,968	0.13%	2,727	0.06%	25,065	0.54%
2000	2,256,504	1,368	0.06%	535	0.02%	2,024	0.09%	5,487	0.24%	974	0.04%	10,388	0.46%
2001	3,128,036	4,031	0.13%	372	0.01%	4,061	0.13%	30,499	0.98%	1,594	0.05%	40,557	1.30%
2002	2,364,143	28,993	1.23%	1,262	0.05%	52,480	2.22%	179,933	7.61%	3,431	0.15%	266,099	11.26%
2003 <sup>c</sup>	2,421,772	3,824	0.16%	189	0.01%	7,254	0.30%	20,417	0.84%	8,319	0.34%	40,003	1.65%
2004	1,928,458	2,086	0.11%	151	0.01%	3,148	0.16%	10,890	0.56%	3,848	0.20%	20,123	1.04%
2005	1,677,157	8,289	0.49%	775	0.05%	11,483	0.68%	6,044	0.36%	9,841	0.59%	36,432	2.17%
2006	3,486,499	11,303	0.32%	635	0.02%	3,461	0.10%	31,813	0.91%	17,846	0.51%	65,058	1.87%
2007	2,339,978	10,262	0.44%	836	0.04%	2,650	0.11%	11,155	0.48%	2,233	0.10%	27,136	1.16%
2008 <sup>d</sup>	1,395,933	20,790	1.49%	48	0.00%	1,550	0.11%	30,619	2.19%	1,066	0.08%	54,073	3.87%
2009	3,249,441	21,093	0.65%	142	0.00%	19,101	0.59%	15,747	0.48%	14,115	0.43%	70,199	2.16%
2010	3,662,919	3,594	0.10%	223	0.01%	3,133	0.09%	17,052	0.47%	21,854	0.60%	45,856	1.25%
2011	3,377,325	5,290	0.16%	50	0.00%	411	0.01%	15,006	0.44%	2,410	0.07%	23,167	0.69%
2012	5,785,295	16,904	0.29%	1,431	0.02%	1,810	0.03%	8,123	0.14%	12,682	0.22%	40,950	0.71%
2013	5,779,241	27,824	0.48%	61	0.00%	3,230	0.06%	86,116	1.49%	3,401	0.06%	120,632	2.09%
2014 <sup>d</sup>	5,220,121	67,446	1.29%	260	0.00%	526	0.01%	171,946	3.29%	24,322	0.47%	264,500	5.07%
2015	9,818,616	20,785	0.21%	442	0.00%	889	0.01%	240,125	2.45%	7,337	0.07%	269,578	2.75%
2016	8,573,163	21,992	0.26%	1,067	0.01%	2,720	0.03%	41,993	0.49%	12,286	0.14%	80,058	0.93%
2017	4,143,533	2,552	0.06%	177	0.00%	117	0.00%	259	0.01%	2,857	0.07%	5,962	0.14%

<sup>a</sup> Includes discards at sea.

<sup>b</sup> Test fish not included.

<sup>c</sup> Total bycatch cap of 5% implemented with species group caps.

<sup>d</sup> Rockfish bycatch cap reached and season closed.

Table 16.–Prince William Sound Area pollock harvest and effort by gear type, 1988–2016.

Year	Vessels	Landings	Harvest (lb)			Total
			Other gear <sup>a</sup>	Trawl gear <sup>b</sup>	Test fishery <sup>c</sup>	
1988	<sup>d</sup>	<sup>d</sup>	1,548	<sup>d</sup>		1,548
1989	6	9	639	919		1,558
1990	8	14	1,514	6,588		8,102
1991	5	7	272	0		272
1992	15	23	2,591	6,341		8,932
1993	3	7	191	5,442		5,633
1994	5	7	5,811	0		5,811
Average	6	10	1,795	2,756		4,551

Directed trawl fishery begins

1995	23	66	10,220	6,325,575	215,025	6,550,820
1996	13	28	1,296	3,271,583	421,137	3,694,016
1997	16	49	3,762	4,323,129	539,123	4,866,014
1998	17	51	2,680	4,013,725	631,751	4,648,156
1999	15	62	11,890	4,673,074	490,761	5,175,725
2000	16	49	4,039	2,260,510	366,724	2,631,273
2001	5	20	<sup>d</sup>	3,128,066	381,502	3,509,669
2002	3	21	0	2,364,143	177,071	2,541,214
2003	5	28	0	2,422,364	54,224	2,476,588
2004	5	18	0	1,929,009	400,677	2,329,686
2005	8	20	0	1,677,157	317,183	1,995,145
2006	8	15	0	3,486,499	590	3,487,089
2007	7	16	6	2,340,728	259,155	2,599,889
2008	6	8	5	1,395,933	0	1,395,938
2009	10	17	<sup>d</sup>	3,249,442	300,806	3,550,268
2010	35	52	5,094	3,662,919	311,853	3,979,866
2011	28	46	13,608	3,377,325	339,683	3,730,616
2012	14	26	168	5,785,295	0	5,785,463
2013	29	53	3,484	5,770,151	496,856	6,270,491
2014	28	33	1,096	5,220,121	0	5,221,217
2015	27	57	3,674	9,818,616	0	9,822,290
2016	31	77	13,268	8,573,163	779,979	9,366,410

<sup>a</sup> Includes jig, pot, and longline harvest from the Inside and Outside Districts.

<sup>b</sup> Includes pollock bycatch in PWS shrimp trawl fishery.

<sup>c</sup> Fish landed and sold under the ADF&G's program receipts authority are listed as "test fishery" and not included in vessels or landings.

<sup>d</sup> Confidential data due to the low number of participants.



Table 17.—Prince William Sound Area commercially harvested pelagic trawl fishery pollock average length, weight, and age; sex ratio (percent female); and number sampled (*n*), 1995–2017.

Year	Average length (cm)	<i>n</i>	Average weight (kg)	<i>n</i>	Average age (years)	<i>n</i>	Percent female	<i>n</i>
1995	53.4	500	1.3	500	NA		54	500
1996	54.3	498	1.4	498	8	440	44	498
1997	55.1	1,153	1.5	887	7	703	49	1,153
1998	54.2	1,096	1.6	995	8	858	40	1,094
1999	50.4	1,534	1.0	1,534	7	629	43	1,534
2000	48.6	1,005	1.0	1,005	<sup>a</sup>	280	42	1,005
2001	50.9	1,492	1.1	1,492	<sup>a</sup>	994	42	1,487
2002	51.9	628	1.3	623	<sup>a</sup>	552	39	626
2003	43.1	697	0.8	557	<sup>a</sup>	697	25	697
2004	45.0	1,604	0.9	639	4	639	41	639
2005	47.4	930	1.0	480	4	743	43	744
2006	50.2	650	1.1	624	6	624	26	625
2007	52.7	1,956	1.2	730	7	730	49	730
2008	50.8	1,074	1.3	350	6	349	12	349
2009	45.1	1,024	0.9	677	5	692	25	681
2010	48.3	2,383	1.0	1,064	5	1,199	39	1,267
2011	49.0	1,900	1.1	950	5	949	33	950
2012	50.0	1,600	1.1	800	5	798	36	800
2013	50.0	2,184	1.3	1,100	5	1,096	34	1,099
2014	52.4	1,400	1.3	700	6	695	36	697
2015	51.8	1,800	1.2	900	6	894	37	900
2016	45.4	1,854	0.7	908	<sup>b</sup>		29	906
2017	42.4	1,400	0.6	699	<sup>b</sup>		22	699
<b>Average</b>	<b>49.7</b>		<b>1.1</b>		<b>6</b>		<b>37</b>	

<sup>a</sup> Age data produced 2000–2003 using criteria inconsistent with remaining years; age data scheduled to be reproduced.

<sup>b</sup> Analysis of age data at the ADF&G lab in Homer is not yet complete.

Table 18.—Annual effort and harvest in the commercial lingcod fishery, directed and bycatch, from the Prince William Sound Area, including adjacent federal waters, 1988–2016.

Year	Vessels	Landings	Harvest (lb)			Total
			Inside	Outside	Federal	
1988	20	27	1,338	7,106	18,508	26,952
1989	20	24	1,279	5,335	15,096	21,710
1990	25	31	8,117	3,154	31,628	42,899
1991	21	34	19,358	4,928	7,559	31,845
1992	43	55	2,349	3,786	19,611	25,746
1993	25	45	246	7,462	58,873	66,581
1994	27	52	9,542	831	33,300	43,673
1995	32	44	138	2,751	66,202	69,091
1996	27	46	5,799	790	22,164	28,753
1997	42	73	22,890	2,933	12,375	38,198
1998	18	27	3,399	1,468	6,229	11,096
1999	16	18	1,483	5,352	2,509	9,344
2000	18	41	5,113	12,174	6,568	23,855
2001	32	49	4,359	18,796	3,657	26,812
2002	20	27	1,007	777	18,386	20,170
2003	32	51	5,593	7,023	11,619	24,235
2004	30	47	6,024	6,791	17,477	30,292
2005	30	46	6,193	8,986	9,065	24,244
2006	22	46	5,911	6,303	15,869	28,083
2007	34	41	6,866	2,615	21,215	30,695
2008	30	49	8,051	1,822	30,728	40,601
2009	42	89	8,492	8,782	55,198	72,472
2010	21	39	6,670	4,115	44,141	54,925
2011	29	49	7,141	5,072	32,210	44,422
2012	45	69	4,114	5,665	30,706	40,485
2013	26	35	1,527	4,986	23,818	30,331
2014	20	25	4,199	1,000	10,671	15,870
2015	18	35	2,968	1,778	15,618	20,364
2016	27	40	404	2,563	11,127	14,093
Average 2007–2016	29	47	5,043	3,840	27,453	36,426

Table 19.–Prince William Sound Area commercial lingcod, directed fishery harvest, bycatch harvest, and GHLs by district, 2006–2016.

Year	GHL	District	Harvest (lb)		Total
			Directed	Bycatch	
2006	5,500	Inside District	5,041	870	5,911
	19,000	Outside District	9,795	12,377	22,173
2007	5,500	Inside District	6,480	386	6,866
	19,000	Outside District	5,798	18,031	23,829
2008	7,300	Inside District	7,500	551	8,051
	25,300	Outside District	21,929	10,620	32,550
2009	7,300	Inside District	2,147	6,345	8,492
	25,300	Outside District	18,238	45,742	63,980
2010	7,300	Inside District	4,643	2,027	6,670
	25,300	Outside District	13,031	35,225	48,256
2011	7,300	Inside District	5,956	1,997	7,952
	25,300	Outside District	19,998	17,860	37,858
2012	7,300	Inside District	4,056	58	4,114
	25,300	Outside District	22,025	14,346	36,371
2013	7,300	Inside District	0	1,527	1,527
	25,300	Outside District	17,405	11,399	28,804
2014	7,300	Inside District	4,008	192	4,199
	25,300	Outside District	6,945	4,727	11,672
2015	7,300	Inside District	1,568	1,400	2,968
	25,300	Outside District	7,740	9,656	17,396
2016	7,300	Inside District	0	404	404
	25,300	Outside District	5,132	8,558	13,690
Average %		Inside District	76%	24%	100%
		Outside District	44%	56%	100%

Table 20.—Average length, weight, and age; sex ratio (percent female); and number sampled (*n*) of commercially harvested lingcod sampled from the Prince William Sound Area, 2003–2016.

Year	Average length (cm)	<i>n</i>	Average weight (kg)	<i>n</i>	Average age (years)	<i>n</i>	Percent female	<i>n</i>
2003	105.9	243	13.1	191	17	124	79	236
2004	107.4	453	13.1	403	15	450	92	453
2005	108.0	257	14.2	177	16	254	83	254
2006	106.1	372	13.3	164	15	367	85	317
2007	105.5	368	11.0	108	15	241	80	254
2008	103.1	392	11.1	377	14	383	87	392
2009	105.1	530	12.1	511	14	524	90	530
2010	105.1	133	12.3	133	15	133	80	133
2011	108.6	484	13.4	420	16	482	89	480
2012	108.9	314	12.9	314	17	314	95	314
2013	110.1	281	13.9	281	16	281	98	280
2014	110.9	96	14.1	96	15	96	95	96
2015	110.7	277	13.7	277	<sup>a</sup>		89	276
2016	109.2	186	13.4	186	<sup>a</sup>		93	182
Average	107.5		13.0		15		88	

<sup>a</sup> Age structures submitted to Age Determination Unit; age data for 2015 and 2016 have not yet been analyzed.

Table 21.—Average length, weight, and age; sex ratio (percent female); and number sampled (*n*) of big and longnose skates collected during the directed commercial fishery in Prince William Sound Area in 2009 and 2010.

Big skate								
Year	Average length (cm)	<i>n</i>	Average weight (kg)	<i>n</i>	Average age (years)	<i>n</i>	Percent female	<i>n</i>
2009	121.2	626	17.4	145	7	115	70	626
2010	125.9	410	15.8	410	7	126	77	410
Average	123.6		16.6		7		74	

Longnose skate								
Year	Average length (cm)	<i>n</i>	Average weight (kg)	<i>n</i>	Average age (years)	<i>n</i>	Percent female	<i>n</i>
2009	117.6	619	10	93	12	105	45	619
2010	116.2	464	9.99	464	11	115	43	464
Average	116.9		10.0		11		44	

Table 22.—Prince William Sound Area annual reported harvest (lb) of miscellaneous groundfish species including discards at sea, 1988–2016.

Year	Vessels	Landings	Flatfish <sup>a</sup>	Salmon	Sharks <sup>b</sup>	Skates	Other <sup>c</sup>	Octopus	Squid	Totals
1988	12	20	15,457	0	<sup>d</sup>	11,770	<sup>d</sup>	0	0	27,227
1989	4	10	<sup>d</sup>	0	0	<sup>d</sup>	0	0	<sup>d</sup>	<sup>d</sup>
1990	20	85	72,973	0	0	0	<sup>d</sup>	0	<sup>d</sup>	72,973
1991	28	58	5,742	0	0	11,022	2,124	<sup>d</sup>	510	19,398
1992	34	79	8,942	0	1,338	19,192	17,035	1,230	<sup>d</sup>	47,737
1993	18	72	664	0	<sup>d</sup>	1,565	2,781	5,625	917	11,552
1994	21	74	1,216	0	2,465	4,435	19,203	5,798	2523	35,640
1995	34	110	10,421	79	1,368	9,668	5,534	3,814	3,134	34,018
1996	33	87	76,346	0	32,052	26,700	3,636	<sup>d</sup>	1873	140,607
1997	27	84	320	72	4,840	37,256	1,326	3,547	19,191	66,552
1998	24	70	4,182	371	8,692	44,790	6	2,928	23,782	84,751
1999	10	72	462	2,148	14,233	868	1,240	0	6,897	25,848
2000	13	55	7,637	545	2,044	999	129	0	6,227	17,581
2001	10	50	1,235	<sup>d</sup>	7,149	4,158	457	0	31,388	44,387
2002	11	66	4,214	1,274	188,256	6,783	776	<sup>d</sup>	180,250	381,553
2003	11	60	3,893	189	47,939	8,938	5,718	<sup>d</sup>	21,612	88,289
2004	12	43	4,527	156	42,869	7,748	1,850	<sup>d</sup>	11,947	69,097
2005	21	56	5,624	775	76,558	87,044	5,456	<sup>d</sup>	7,117	182,574
2006	16	48	6,826	635	159,462	10,845	11,254	<sup>d</sup>	32,770	221,792
2007	10	27	2,449	872	11,169	2,587	535	0	11,805	29,417
2008	17	44	515	<sup>d</sup>	19,613	13,741	911	0	31,559	66,339
2009 <sup>e</sup>	38	81	10,551	142	31,572	333,777	4,989	0	16,022	397,053
2010 <sup>f</sup>	46	109	12,360	229	47,464	228,837	11,511	939	17,210	318,550
2011	39	105	1,723	73	25,659	216,426	1,347	0	16,841	262,069
2012	59	129	6,739	1,431	28,291	154,781	6,328	104.84	8,123	205,798
2013	57	205	1,292	61	76,231	245,215	2,163	1,160	88,210	414,332
2014	66	160	13,605	260	15,322	124,576	11,303	482	171,949	337,496
2015	46	208	3,799	442	17,255	284,026	5,484	1,278	240,125	552,409
2016	51	186	9,620	1,271	10,469	103,886	1,515	596	57,906	185,262

<sup>a</sup> Flatfish includes general flatfish, flounders, sole and turbot.

<sup>b</sup> Sharks include spiny dogfish, salmon, Pacific sleeper, and unspecified sharks.

<sup>c</sup> Other includes general groundfish, miscellaneous unidentified fish, eel, greenling, and sculpin.

<sup>d</sup> Confidential data.

<sup>e</sup> 2009 skate harvest includes 258,389 pounds harvested by 9 vessels in 17 landings in the directed fishery.

<sup>f</sup> 2010 skate harvest includes 104,509 pounds harvested by 6 vessels in 16 landings in the directed fishery.

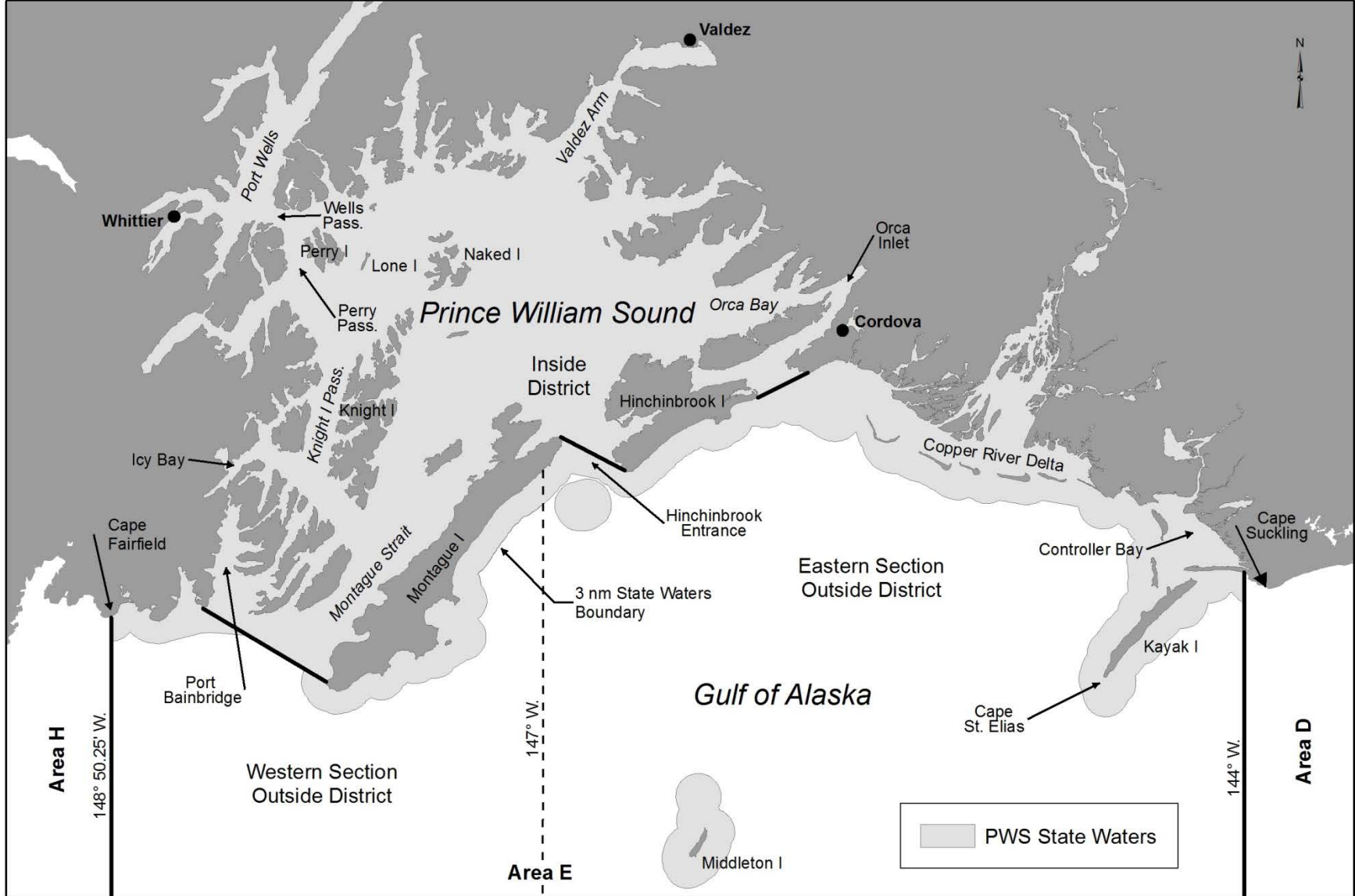


Figure 1.—Prince William Sound Area groundfish fishing districts and other landmarks.

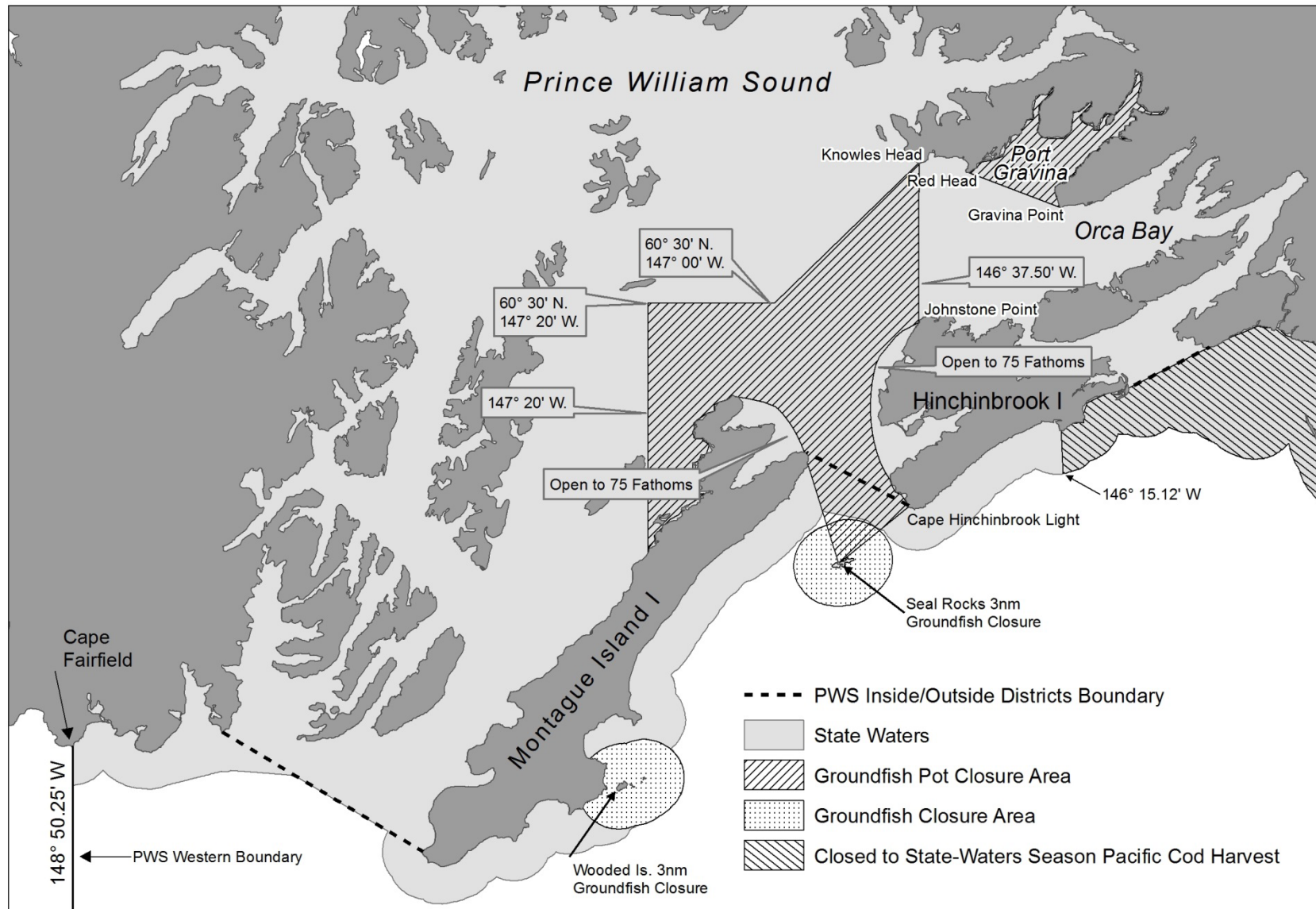


Figure 2.—Prince William Sound Area groundfish fishing closures implemented for Stellar sea lion and Tanner crab protection.



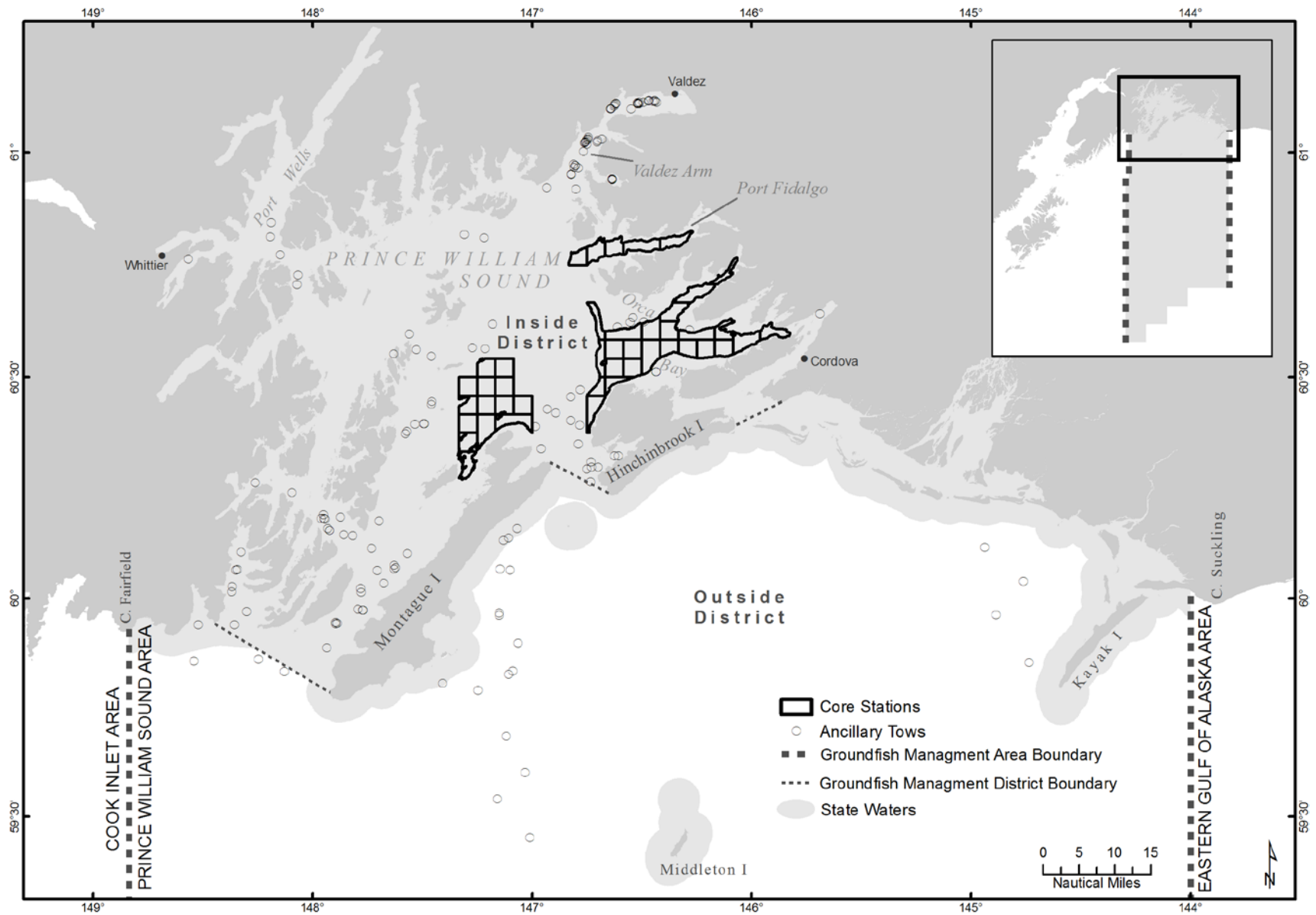


Figure 3.—Prince William Sound large mesh trawl survey core stations.

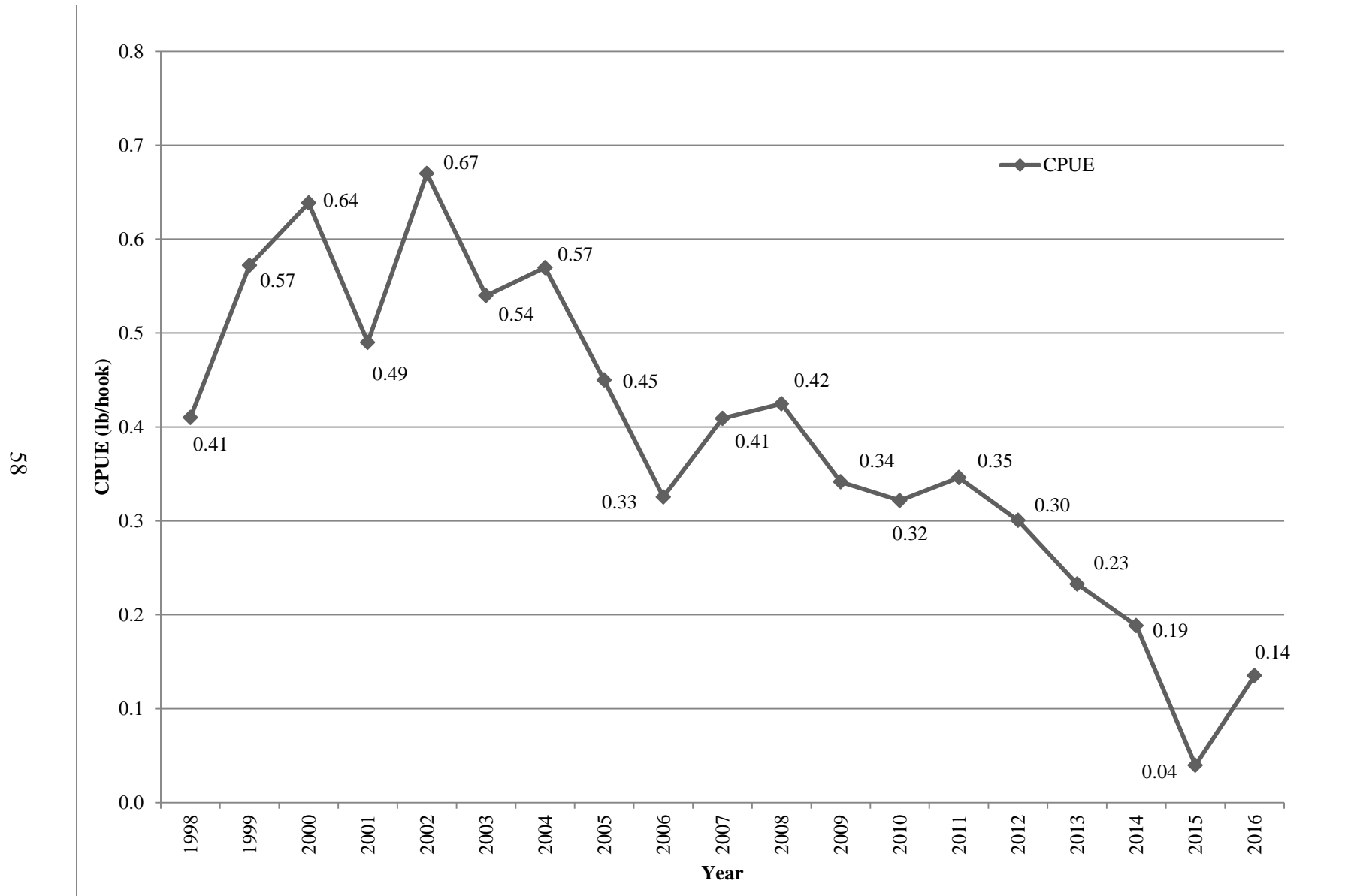


Figure 4.—Prince William Sound Area catch per unit effort (CPUE) of sablefish in pounds per hook from logbook data, 1998–2016.

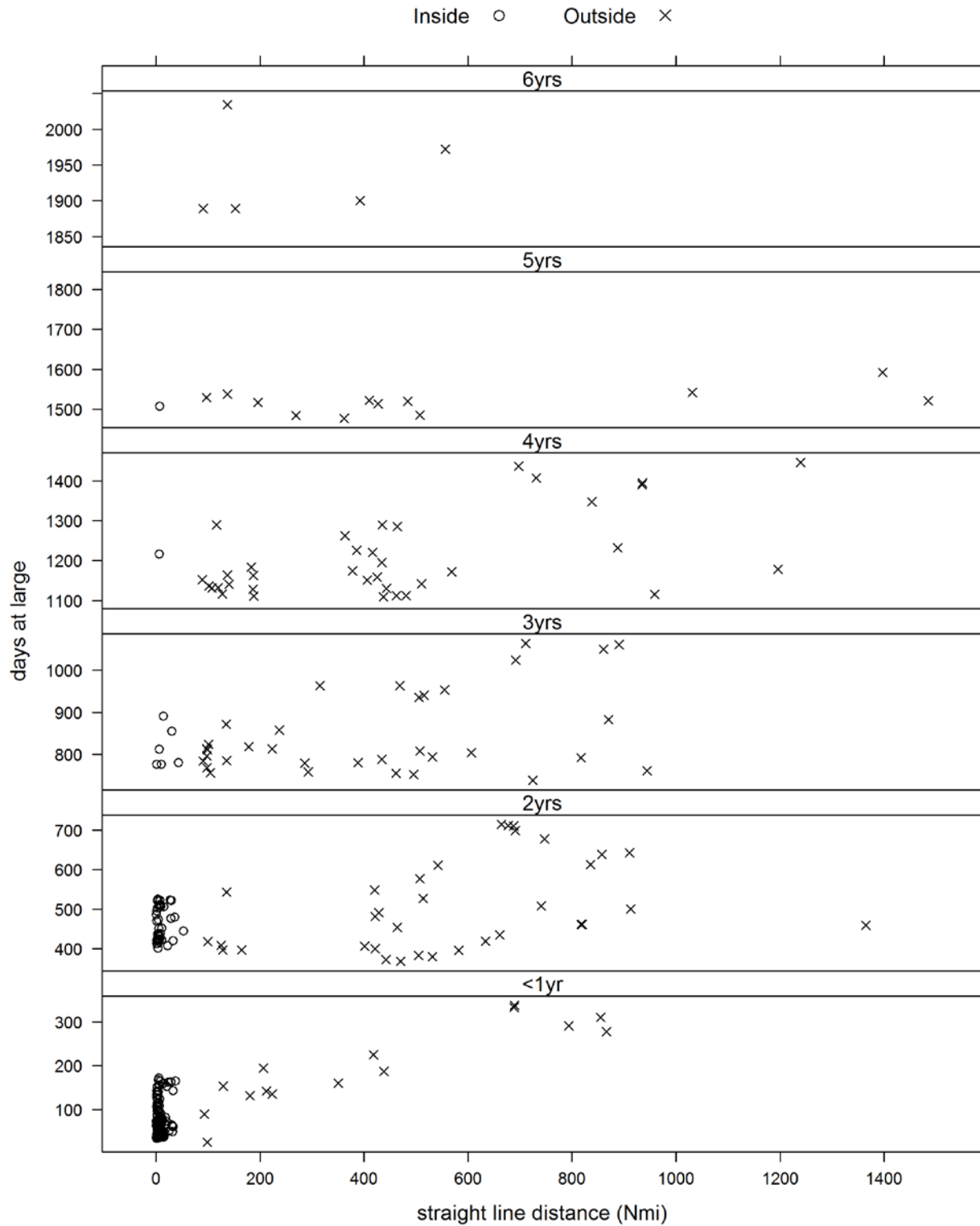


Figure 5.—Prince William Sound Area sablefish tagging project recapture distance and timing 2011–2016.

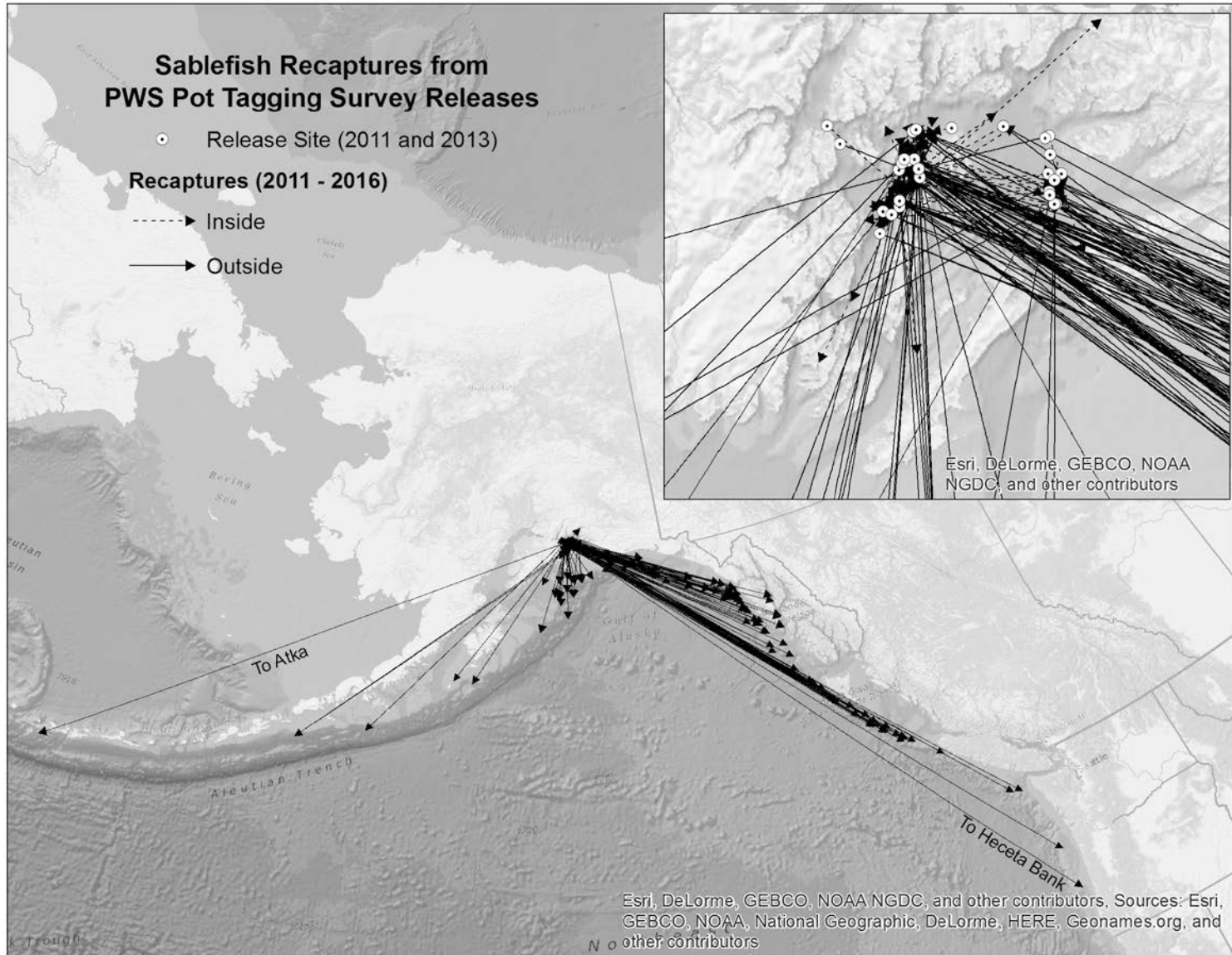


Figure 6.—Prince William Sound Area sablefish tagging project recapture sites, 2011–2016.

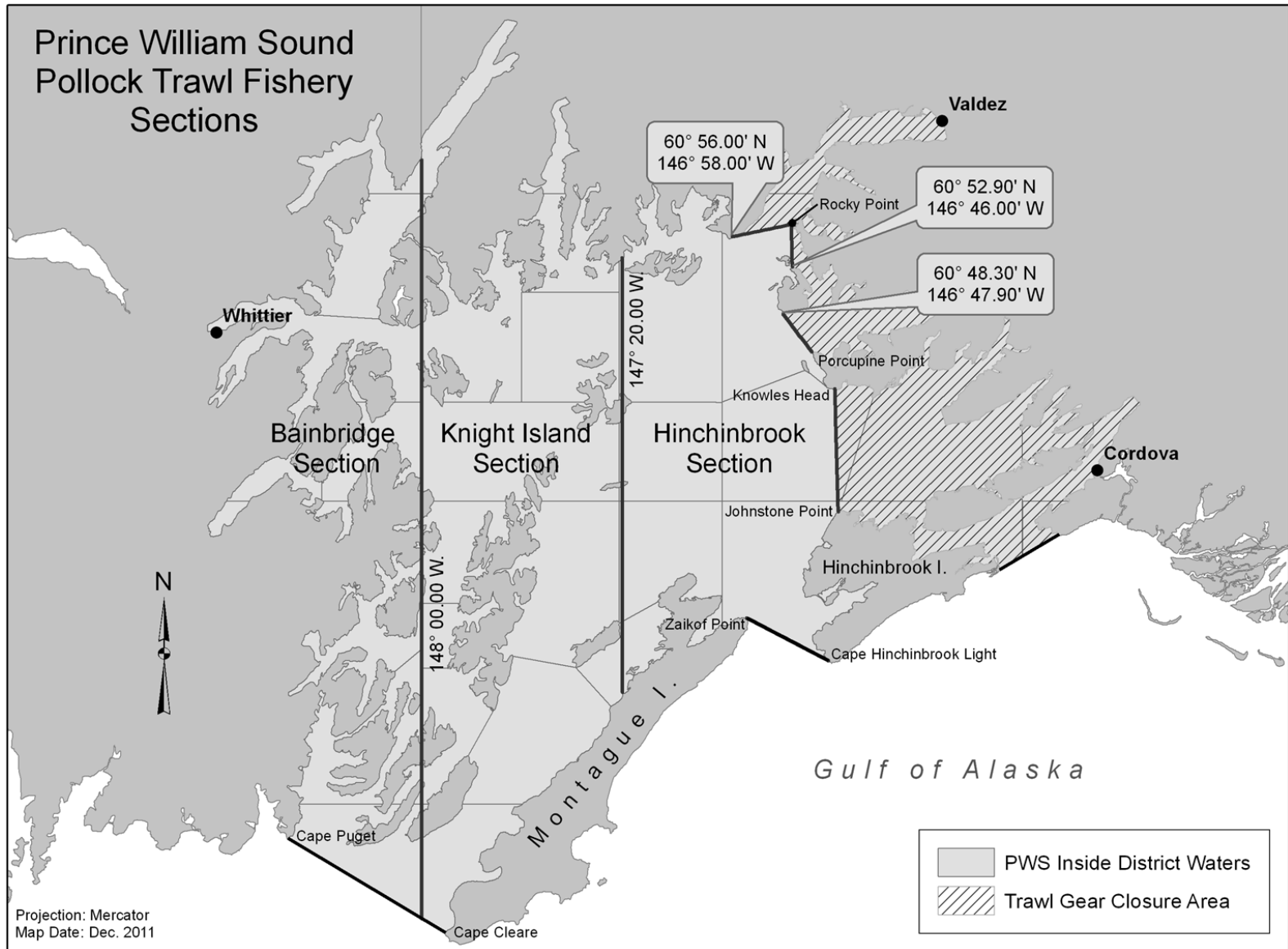
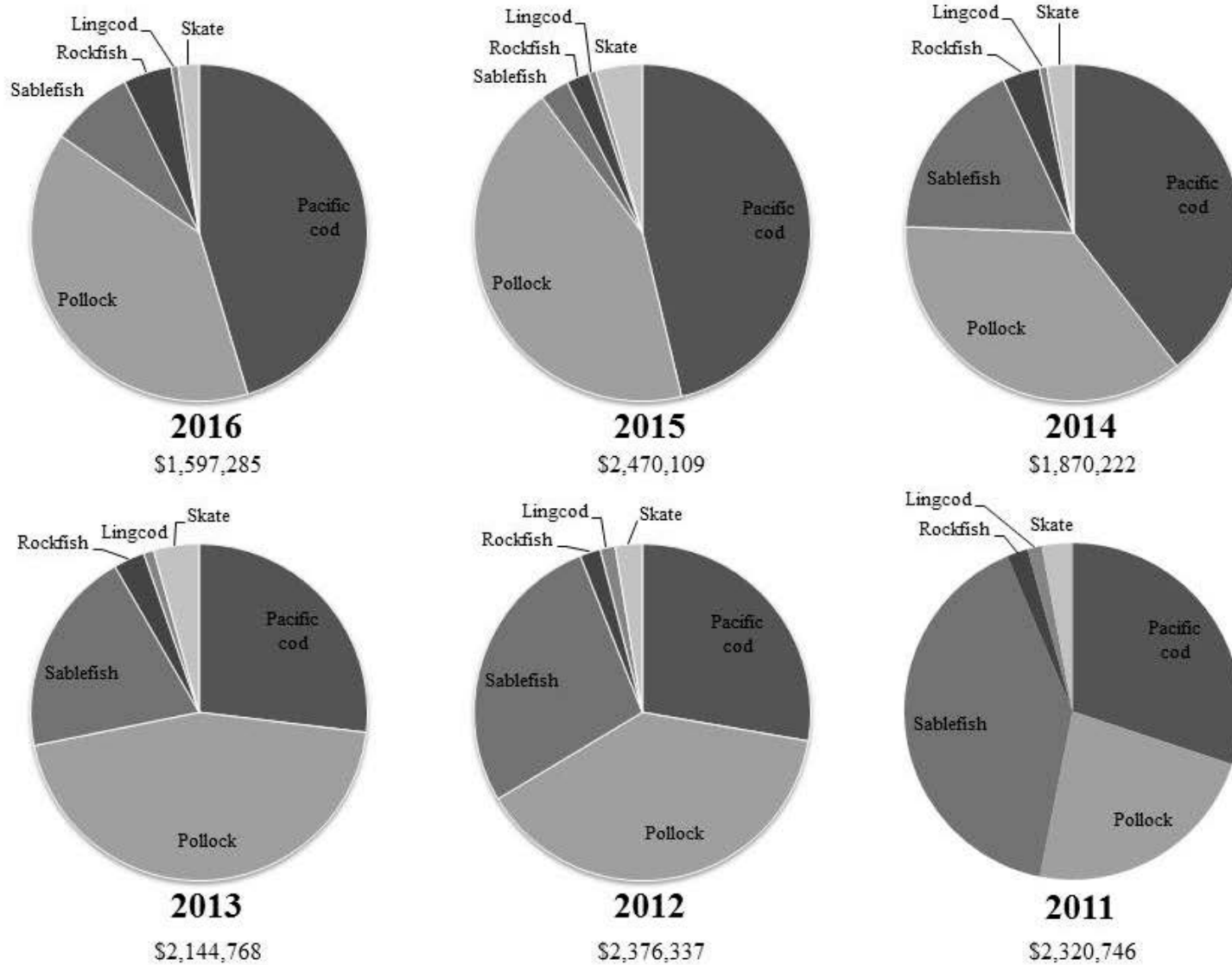


Figure 7.—Prince William Sound Area Inside District pollock management sections.



**APPENDIX A: PRINCE WILLIAM SOUND STATE  
MANAGED GROUND FISH HARVEST VALUES**

Appendix A1.–Prince William Sound Area state managed groundfish, percent of fishery contribution to total exvessel value, 2011–2016.





**APPENDIX B: PRINCE WILLIAM SOUND MULTI-SPECIES  
LARGE-MESH TRAWL SURVEY FISH SPECIES CATCH  
PER UNIT EFFORT**

Appendix B1.—Fish species catch per unit effort (CPUE) in pounds per nautical mile for the core stations of the multi-species large-mesh trawl survey, 2011, and 2013–2015.

Group	Species	Year				
		2011	2013	2014	2015	
Cod	Pacific Cod	25.24	11.33	16.11	26.43	
	Walleye Pollock	51.42	61.73	19.76	19.64	
Eelpout	Alaska Eelpout	0.01	0.00	0.04	0.01	
	Eelpout Unidentified	0.14	0.00	0.00	0.00	
	Shortfin Eelpout	0.63	0.92	1.74	1.51	
	Wattled Eelpout	0.07	0.71	1.04	0.80	
Flatfish	Arrowtooth Flounder	257.53	364.67	171.71	367.39	
	Pacific Halibut	19.56	29.82	16.54	14.95	
Flatfish	Slender Sole	0.20	0.00	0.14	0.00	
	Dover Sole	18.19	12.10	6.44	9.26	
	English Sole	0.21	0.46	0.39	0.04	
	Flathead Sole	167.57	118.12	149.55	171.20	
	Rex Sole	24.96	13.67	18.03	10.39	
	Rock Sole	0.00	0.00	0.24	1.29	
	Lingcod	0.00	0.00	0.08	0.41	
	Pacific Herring	0.02	0.00	0.00	0.02	
	Greenling	Bigeye Poacher	0.00	0.00	0.00	0.02
	Herring	Blackfin Poacher	0.03	0.00	0.04	0.00
Poacher	Starsnout Poacher Unidentified	0.00	0.02	0.00	0.00	
	Sturgeon Poacher	0.00	0.08	0.03	0.04	
Prickleback	Longsnout Prickleback	0.08	0.12	0.03	0.13	
	Pacific Ocean Perch	0.00	0.97	0.25	1.11	
	Dusky	0.06	0.00	0.00	0.41	
Rockfish	Rougheye	36.68	38.56	26.89	29.26	
	Sharpchin	0.00	0.23	0.04	0.00	
	Silvergray	0.28	0.00	0.06	0.04	
	Unspecified	0.00	0.00	0.00	0.00	
	Shortspine Thornyhead	0.15	0.68	0.22	0.28	
Sablefish	Sablefish	0.80	0.22	0.16	1.22	
	Chum	0.00	0.00	0.00	0.12	
Sculpin	Bigmouth Sculpin	6.30	8.24	5.07	4.58	
	Blackfin Sculpin	0.05	0.00	0.00	0.00	
	Darkfin Sculpin	0.40	0.53	1.10	0.41	
	Great Sculpin	0.00	0.00	0.00	1.28	
	Roughspine Sculpin	0.03	0.00	0.01	0.01	
	Spinyhead Sculpin	1.94	3.29	2.31	2.65	
	Tadpole Sculpin	0.00	0.00	0.00	0.00	
	Thorny Sculpin	0.00	0.00	0.00	0.03	
Shark	Spiny Dogfish	3.76	0.11	11.75	45.74	
Skate	Aleutian	10.13	4.69	4.61	2.81	
	Bering Skate	26.83	27.10	28.13	29.43	
	Other Bathyrāja Sp.	0.00	0.00	0.11	0.00	
	Big Skate	18.27	10.40	28.62	33.90	
	Longnose Skate	70.17	85.09	83.70	88.78	

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Group	Species	Year			
		2011	2013	2014	2015
Smelt	Capelin	0.00	0.00	0.00	0.00
	Eulachon	3.27	0.86	0.97	3.06
Snailfish	Salmon Snailfish	0.00	0.00	0.03	0.01
	Smalldisk Snailfish	0.06	0.00	0.00	0.00
	Snailfish	0.43	0.00	0.43	0.00
Wrymouth	Giant Wrymouth	1.42	2.85	2.65	0.00
	Unspecified Wrymouth	0.00	0.00	0.00	3.15

*Note:* There was no survey in 2012.