Fishery Management Report No. 14-42

Prince William Sound Registration Area E Groundfish Fisheries Management Report, 2009–2013

by

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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PRINCE WILLIAM SOUND REGISTRATION AREA E GROUNDFISH FISHERIES MANAGEMENT REPORT, 2009–2013

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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 that includes territorial waters of Alaska from Cape Sucking at 144°00′W longitude to Cape Fairfield at 148°50.25′W longitude. Harvests of sablefish *Anoplopoma fimbria*, walleye pollock *Gadus chalcogrammus*, lingcod *Ophiodon elongates*, 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 octopus and squid, are also landed incidentally to directed 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 to 200 nmi offshore. The 2013 state-managed groundfish harvest totaled 8.43 million lb. The total pollock harvest was 5.8 million lb or 100% of the 5.8 million lb GHL. The total Pacific cod harvest from both parallel and state-waters fisheries was 2,081,708 lb, the largest harvest since 1992. The directed sablefish harvest of 155,448 lb was 64% of the 242,000 GHL and only 73% of the recent 5-year average harvest. The rockfish harvest retained as bycatch to other directed fisheries was 149,161 lb and increased compared to recent years, whereas the lingcod harvest (30,331 lb) decreased. Walleye pollock generated the highest exvessel value ($963,400), Pacific cod generated the second-highest exvessel value ($577,254), and sablefish generated the third-highest exvessel value ($425,321). The combined value of the pollock, Pacific cod, and sablefish harvest was $1.97 million, or 92% of the total value of the groundfish harvest. Harvest information from the 2014 pollock and sablefish fisheries are also presented.

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 (PWS) Management Area, Registration Area E, and summarizes the most recent harvest information, 2013 or 2014. 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 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*.

Under state regulation, groundfish are defined as all marine finfish except halibut, osmerids, herring, and salmonids. The state-managed fisheries for rockfish *Sebastes* spp. and *Sebastolobus* spp., Pacific cod *Gadus macrocephalus,* sablefish *Anoplopoma fimbria*, walleye pollock *Gadus chalcogrammus*, 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 are reported in other directed fisheries fish tickets, including sharks, skates, flatfish, sculpin, and greenling that are harvested as bycatch. Finally,

other non-groundfish bycatch of significance, including salmon, octopus, and squid, is summarized.

Boundaries of the PWS Management Area have been adjusted several times since 1996. These changes primarily affected rockfish management and are described in that section of this report. The PWS Management Area currently encompasses waters of Alaska from 144°00'W longitude, near Cape Suckling, to the longitude of Cape Fairfield at 148°50.25'W longitude (Figure 1). The area is divided into the Inside and Outside Districts. The Inside District is waters enclosed by lines from Point Whitshed to Point Bentinck, from Cape Hinchinbrook to Zaikof Point, and from Cape Cleare to Cape Puget. The Outside District, composed of the Gulf of Alaska 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 longitude, and the Eastern Section includes waters between 147°00'W longitude and 144°00'W longitude. 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 populations (*Chionecetes bairdi*), 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 logbooks 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 documentation of fisheries mortality and reporting of all harvest removals for the highest level of fisheries management.

ROCKFISH

BACKGROUND

There are 32 species of rockfish (genera *Sebastes* and *Sebastolobus*) in the Gulf of Alaska, although less than 10 are commonly harvested in the commercial fishery. Rockfish are very long-lived with one rougheye rockfish from Southeast Alaska aged at 205 years (Munk 2001).

Rockfish have a swim bladder that is not vented. This causes them to experience compression of their internal organs when brought to the surface, and they are unable to resubmerge when released in this condition, which results in a low survival rate after capture. Additionally, rockfish are slow to reach sexual maturity (5 to 7 years old); these and other factors make rockfish populations vulnerable to overfishing.

Rockfish are categorized into pelagic shelf (PSR), demersal shelf (DSR), and slope species assemblages defined in regulation 5 AAC 39.975 (37), (34), and (38) respectively. PSR are usually associated with nearshore, rocky reef areas; may exhibit a midwater schooling behavior; and are often harvested in directed fisheries with mechanical and hand jig gear. PSR species found in PWS include black (*S. melanops*), dusky (*S. variabilis*), dark (*S. ciliatus*), and yellowtail (*S. flavidus*) rockfishes (Bechtol 1999) and are associated with rocky reef areas, but they tend to be bottom dwelling and often occur at greater depths than PSR species. Yelloweye (*S. ruberrimus*) and quillback (*S. maliger*) rockfishes are common DSR species in PWS and are most likely to be caught with longline gear. Slope rockfish include any rockfish not specified as either PSR or DSR. Slope rockfish are typically found near the bottom in waters deeper than 200 meters and therefore are most likely to be taken with longline or trawl gear. Common slope species in PWS include rougheye (*S. aleutianus*), shortraker (*S. borealis*), and thornyhead (*Sebastolobus* spp.) rockfishes.

HARVEST AND EFFORT

In 2013, 149,161 lb of rockfish were harvested by 76 vessels in 232 landings from the Inside District and 22 vessels in 49 landings from the Outside District. Average harvest for the most recent 10-year period (2004–2013) was 98,300 lb (Table 2). Harvests from PWS since 1998 have ranged from a low of 47,990 lb by 89 vessels in 2003, to a high of 506,468 lb by 96 vessels in 1990 (Table 3). During the same time period, trends for the Inside District harvests had a low of 35,240 lb in 2003 and a high of 489,154 lb in 1990. The peak harvest in 1990 was attributed to market conditions that encouraged targeting rockfish. In the Outside District, harvest ranged from 2,762 lb in 1991 to 313,489 lb in 1988. The majority of the record Outside District harvest in 1988 was taken by trawl gear (228,417 lb) 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 but probably would have increased in recent years 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 fishery guideline harvest levels (GHL) since 2012.

Species composition of rockfish harvest varies between districts and by gear type. In the Outside District, the main gear type was longline, and pelagic shelf species have dominated the harvest from 1993 to 1997. Since 1998, the harvest was dominated by yelloweye and quillback, both demersal shelf species. In the Inside District, longline was also the main gear type, but in some years trawl gear harvested a significant portion of rockfish. Longline harvest in the Inside District was composed mainly of slope species (shortraker, rougheye, and thornyhead) and demersal shelf species (yelloweye and quillback), whereas trawl harvest was composed primarily of slope species (shortraker and rougheye).

MANAGEMENT AND REGULATIONS

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 emergency order 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 lb 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 lb 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 longitude. Additionally, in 1998, the State of Alaska accepted management authority for black and blue rockfish in adjacent federal (EEZ) waters when NPMC passed Amendment 46 to the Gulf of Alaska (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. While 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 significant in some years. 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 setting a 150,000 lb GHL. Following this, ADF&G managed the fishery by identifying a harvest level at which the directed fishing season closed with the balance of the GHL allocated to a subsequent 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, the ADF&G used emergency orders to set rockfish bycatch at 10% of the gross round weight of all delivered groundfish species. Subsequently, ADF&G increased the rockfish bycatch level to 20% for the 1998 and 1999 PWS sablefish fisheries to accommodate demonstrated bycatch levels.

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 lb 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 the state-waters Pacific cod fishery, 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 AND RESEARCH

Consistent dockside sampling of rockfish species harvested from PWS began in 1993. ADF&G dockside sampling staff conduct 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 with no directed rockfish fishery in PWS since 2000. All 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, in 2013 the highest number of annual rockfish samples were collected (n = 1,942) and sampling goals of 550 specimens for both yelloweye and quillback rockfish were attained (Table 4). Historically, slope rockfish species made up the bulk of samples in most years. For 1993–2013 combined, slope rockfish (primarily shortraker) made up 61% of rockfish samples collected and demersal shelf rockfish (primarily yelloweye) consisted of 36% of total rockfish, with the remaining 3% composed of pelagic shelf rockfish (primarily black). Since implementation of longline as a legal gear type during the state-waters Pacific cod season in 2009, higher numbers of DSR have been harvested as bycatch and more landings have occurred in Seward and Whittier in winter and early spring, providing additional sampling opportunities.

In 2013, DSR composed 63% of total rockfish samples, well above the average total percentage (36%), and slope rockfish dropped to 34% of total samples, which was below the total percentage (61%) (Table 4). The highest number of total rockfish samples were collected in 2013, also the highest annual number of total slope and DSR samples. In 2013, the highest number of shortraker rockfish and quillback rockfish samples were collected, comparable to the highest yelloweye rockfish samples. Rockfish biological sampling data, including age determination results, will be summarized in a future report.

ADF&G has used 3 fishery independent surveys to capture or count rockfish in the PWS Management Area: (1) the 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 single ROV survey was conducted in 2012.

The multi-species large-mesh trawl survey uses a 400 eastern bottom trawl net. The survey occurs mainly in the eastern and south central portions of PWS from Valdez Arm south to Orca Bay. This survey provides data on numerous commercially important species (flathead sole, rex sole, butter sole, yellowfin sole, English sole, starry flounder, and Alaska plaice) that 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. In the history of the survey, over 99% of the rockfish caught were slope species with rougheye rockfish making up more than 95% of the total (Table 5). 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 that were surveyed each year has ranged from 23.6 lb/nmi to 72.3 lb/nmi. In 2013, CPUE was 36.2 lb/nmi, which was slightly below the survey average (Table 6).

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 (50.2%). with rougheye rockfish making up 23.5% and shortspine thornyhead rockfish 8.9% (Table 7). CPUE was low for both species, with a high level of variation in most years (Table 8).

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^2 to 400 km^2 with 5 sites in the Central Region, 4 in North Gulf Coast, and 1 in PWS. ADF&G research has surveyed 1 to 2 sites per year. After all sites are sampled once, the rotation will start 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^2 (cv = 30%). This density estimate was not significantly different from that in other areas surveyed in the Cook Inlet Management Area.

PACIFIC COD

BACKGROUND

Pacific cod (*Gadus macrocephalus*), 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 live near the ocean floor in habitats of mud, sand, and clay. They school together and move seasonally from deep (100 m to more than 250 m deep) continental shelf spawning grounds in the winter to shallow (less than 100 m deep) continental shelf feeding grounds in the summer.

HARVEST AND EFFORT

In 2013, total harvest for the PWS Pacific cod parallel season was 806,463 lb from 92 landings by 32 vessels, primarily fishing with longline gear (Table 9). The 2013 PWS Pacific cod state-waters fishery GHL was 1,781,335 lb, and total harvest was 1,275,245 lb from 77 landings by 25 vessels, all fishing with longline gear (Table 10). The total harvest of Pacific cod from both parallel and state-waters fisheries in 2013 was 2,081,708 lb, the largest overall harvest since 1992.

Prior to 1996, all Pacific cod harvest occurred in parallel seasons managed concurrently with seasons set by NMFS in the CGOA. Peak parallel season harvests occurred during 1990–1995

and averaged 1.7 million lb annually. Annual parallel season harvest and effort has ranged from 11,294 lb from 38 landings by 24 vessels in 2005, to 2.2 million lb from 234 landings by 88 vessels in 1991 (Table 9). From 1996 to 2000, harvests declined to less than 1.0 million lb in all years, except 1999, when the harvest surpassed 1.3 million lb. In 2001, harvest declined to approximately 170,000 lb, and from 2002 to 2006 it averaged just over 15,000 lb. Harvests began to increase again from 2007 through 2013 with a harvest at just over 800,000 lb 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 81% to 100%. The decline in parallel season catch 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 1996; total harvest between 1996 and 2008, when pot and jig gear were the only legal gear types, ranged from 0 to 418,994 lb, and effort ranged from 0 to 12 vessels (Table 10). The highest GHLs between 2000 and 2003 coincided with a period of steady decline in harvest that continued with small harvest levels through 2006; most of the data are confidential due to low participation. The disparity between harvest and GHL was the result of a decline in Pacific cod fishing effort and an increase in Pacific cod acceptable biological catch (ABC) in the federal Eastern Gulf of Alaska Area (EGOA). Pot gear harvested up to 45% of the GHL in the early years of the state-waters season, peaking at 385,817 lb in 1998 and declining to 0 in 2001. Jig harvest peaked in 1999 at 79,147 lb before declining to 0 in 2002. Since 2002, fewer than 3 vessels fishing with either pot or jig gear have participated, making harvests by those gear types confidential in the years it was greater than 0. In 2007, total harvest increased to 345,684 lb, or 38% of the GHL, before again declining to 7,557 lb in 2008. In 2009, longline became a legal gear type and the GHL was achieved in 13 days, exclusively by vessels fishing with longline gear, marking the first time the GHL was achieved since the state-waters season began. Short seasons and a fully utilized GHL continued through 2011, when harvest peaked at 1,594,590 lb.

The 2012 PWS Pacific cod seasons were the first prosecuted after implementation of federal gear sector splits. Total harvest for the 2012 parallel seasons was 422,507 lb from 82 landings by 32 vessels (bycatch and directed, Table 9). The majority of the harvest was caught by vessels fishing with longline gear. The 2012 state-waters season GHL was 1,448,437 lb, and vessels fishing with longline gear harvested 1,395,483 lb or 96% of the GHL (Table 10).

MANAGEMENT AND REGULATIONS

Historically, commercial Pacific cod seasons in PWS were managed by emergency order (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 total allowable catch (TAC) set by NMFS for the EGOA. Vessel registration for parallel seasons is nonexclusive, meaning a vessel can register with ADF&G to fish 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 the GHL has been reached and a federal season is ongoing in adjacent federal waters, or if ADF&G determines it is necessary to adapt to unanticipated openings or closures of the federal season, maintain sustained yield management, or provide for orderly fisheries. This allows flexibility, and ADF&G has been able to open 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, which opened 7 days following 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 that had low halibut bycatch. Vessel registration for state-waters seasons is exclusive, which restricts 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) requires 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 PWS state-waters Pacific cod percent allocation 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. Significant changes included the following:

- 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 the PWS Area, except those waters of the Outside District east of 146°15.12′W longitude (Figure 2).
- A separate 20% bycatch allowance of Pacific cod may be established by EO, in addition to any other bycatch allowance.
- Registration is nonexclusive for the parallel season and exclusive for the state-waters season.
- A vessel may not participate in a state-waters season and any other Pacific cod season at the same time.

HARVEST SAMPLING AND RESEARCH

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. However, there were years when few or no samples were collected due to low participation in the state-waters season and few sampling opportunities (Table 11). Dockside samplers conducted interviews with fisheries participants for information on fishing location and effort, and also collected biological samples for fish length, weight, sex, and maturity stage. Age structures (otoliths) were also collected for archiving and future analysis.

In 2013, 1,673 Pacific cod were sampled from 34 landings by vessels using longline gear in PWS directed Pacific cod fisheries. This was the highest number of samples collected in any given year and was mainly 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 been increasing in winter through early spring providing

additional potential sampling opportunities. An additional ADF&G dockside sampler was hired and stationed in Seward beginning in 2013 during the Pacific cod parallel "A" season through the peak of the season, resulting in the increased sampling coverage.

The majority of sampled fish in 2013 came from the Cape Puget vicinity followed by the area around Knight Island. Pacific cod averaged 65.6 cm in fork length and 3.6 kg in weight in 2013 (Table 11). Pacific cod sampled in 2008 from PWS had an average length of 70.3 cm and decreased in size through 2012, until fish sampled in 2013 increased in both average length and weight.

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 Gulf of Alaska (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 that 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 quality assessment work for this species.

Stock assessment trawl surveys have been conducted by the National Marine Fisheries Service/Alaska Fisheries Science Center (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 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. Since 1994, the primary analytical tool that has been used to assess GOA Pacific cod has been a Stock Synthesis 1 assessment program (Methot 2000). In 2013, the trawl survey biomass estimate increased by 1% from the 2011 value. The GOA ABC are apportioned as follows: 37% in the Western GOA, 60% in the Central GOA, and 3% in the Eastern GOA. For 2014, the ABC in the Eastern GOA was 2,436 tons and the total for the GOA was 88,500 tons. This resulted in a state-waters GHL that was 1,463,318 lb; a small decrease from 2013 but similar to 2012.

SABLEFISH

BACKGROUND

Sablefish, *Anoplopoma fimbria*, also known as black cod, are a commercially important species throughout their range, and are typically harvested using longline or pot gear. They are a relatively long-lived species (maximum age 94; Munk 2001), and the 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 $3.33/pound over the most recent 5 years (2009–2013). 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

Total sablefish harvest in 2014 was 96,726 lb by 27 vessels in 72 landings, the lowest harvest ever recorded in PWS. Annual sablefish harvest and effort between 1988 and 1995, when the fishery was open access, ranged from 188,788 lb by 25 vessels in 1989 to 577,315 lb 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 fishery ranged from 196,370 lb by 51 vessels in 1997 to 342,854 lb by 32 vessels in 2000, with a maximum effort of 69 vessels in 1996.

Since implementation of the shared quota fishery in 2003, harvest and effort has averaged 196,725 lb by 31 vessels and has ranged from a high of 225,003 lb by 38 vessels in 2004 to a low of 96,726 lb by 27 vessels in 2014.

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

Early sablefish management included a commissioner's permit requirement and a 242,000 lb GHL, approximately equal to the midpoint of a 97,000–385,900 lb guideline harvest range (GHR) derived from a yield-per-habitat model (Bechtol and Morrison 1997). Prior to 1993, PWS sablefish seasons opened concurrently with sablefish seasons in federal waters of the CGOA and closed by emergency order when the state-waters GHL 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 hr in 1993 to 48 hr in 1995. A season opening date of May 1 was first effective in 1997.

To facilitate fishery enforcement, emergency orders adjusted fishing periods for daylight openings and closures. Also, fishing with groundfish gear before and after the sablefish fishery was not permitted. Closures prior to and after the fishery were 120 hr and 24 hr in 1995, 72 hr and 48 hr in 1997, and 48 hr and 24 hr in the following years. ADF&G monitored the fishery on the grounds aboard the *R/V Montague*. Working with the Department of Public Safety, Division of Fish and Wildlife Protection (DPS/DFWP) staff, vessels were boarded prior to the fishery to verify the permit holder was aboard with all necessary licenses and permits. To the extent practical, fish holds were also inspected.

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. Another source of "lost" gear was from ground lines that were cut when vessels set more gear than could be effectively retrieved in the fishing period. Estimated minimum gear lost during this period peaked at 43,745 conventional and 1,620 snap hooks during the 2002 season (Table 13). Sablefish and other bycatch mortality attributable to the lost gear are unknown. 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 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 p.m. 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 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 Prince William Sound 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 15 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 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 AND RESEARCH

Dockside sampling of sablefish from PWS was conducted in the ports of Cordova and Seward in 2013. 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 14). Logbook data and dockside interviews provide information on fishing location and effort.

ADF&G staff sampled 664 sablefish from 16 dockside deliveries in 2013, from vessels using longline or pot gear. Sablefish had an average fork length of 60.3 cm and an average weight of 2.6 kg (5.7 lb). The average length was slightly smaller than in 2012 while average weight was slightly larger. Similarly, the 2013 average length was over 1 cm shorter than the historical average, although average weight was the same. 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 2012 or 2013. The average age of sablefish for 1995–2011 ranged from 5 years to 8 years, with an average age of 7 years.

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). The objective was to use survey data to model the PWS sablefish population and provide data to set and adjust annual GHLs. This survey was conducted as a test fishery, where fish caught in the survey were sold to offset survey costs. The initial design of the survey did not allow the data gathered to meet the project objectives. Even though the survey design was adjusted for 2005 and 2006, too few fish were caught to pay for the overall cost of the survey and therefore discontinued in 2006. Sampling effort varied spatially throughout PWS among the years, but the northwestern portion of PWS was sampled every year. Data from this section, therefore, has a higher potential for detecting trends in population abundance. Survey CPUE increased through 2001 and trended down toward 2006, the last year of the survey (Table 15). There was no trend in average fish weight or sex ratio during the survey.

A tagging project was initiated in March 2011 with the goals of 1) determining how well mixed the PWS portion of the population is with the total Gulf of Alaska sablefish population, and 2) tagging recapture data analysis from modeling to assist in determining harvest limits in the future (potentially mixed with an age structured model). The first goal is the immediate focus; if the population is well mixed, then the GHL for PWS harvest can be tied to the Total Allowable Catch (TAC) from the NOAA/NMFS assessment that is conducted in the Gulf of Alaska (GOA). However, if the PWS portion is poorly mixed with the GOA, then ADF&G would need to conduct further assessment research to monitor that portion of the population and set harvest limits for the PWS sablefish fishery.

To date, 1,521 sablefish have been tagged, with 1,203 tagged in 2011 and 318 tagged in 2013. Of those tagged in 2011, 260 have been recaptured, and 32 have been recaptured from the 2013 marked releases (Table 16). Recapture rate in the first year for fish tagged in 2011 was 13.5% and 7.2% for fish tagged in 2013. In the first year, 95% and 87% of recaptures came from inside PWS in 2011 and 2013, respectively (Figure 3). 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. Of fish that were recaptured outside PWS, more moved south to Southeast Alaska and beyond than moved west (Figure 4).

POLLOCK

BACKGROUND

Walleye pollock *Gadus chalcogrammus* (formerly *Theragra chalcogramma),* 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. They can achieve a maximum age of 22–28 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). Since its inception, it has been the highest-volume groundfish fishery in PWS, and in 2012 and 2013 it had the highest fishery value in PWS (Appendix A).

HARVEST AND EFFORT

The total 2014 harvest in the directed PWS pollock trawl fishery was 5,220,121 lb harvested by 19 vessels in 7 days (Table 17). Prior to the beginning of the directed pollock trawl fishery, an average of 4,551 lb of pollock was harvested annually between 1988 and 1994 (Table 18). Interest and participation in the PWS directed pollock fishery has varied since 1995 with a maximum of 33 vessels registered during the 1999 season and a minimum of 6 vessels registered during the 2003 season. An average of 37% of registered vessels participated, although the participation rate has been rising in recent years. In 2013, 52% of registered vessels (14) participated, and in 2014, 68% of registered vessels (19) participated; these were the highest levels in the history of the fishery. Harvest ranged from 1.40 million lb in 2008 (39% of the GHL) to 6.33 million lb in 1995 (144% of the GHL). Average harvest between 2000 and 2014 was 3.21 million lb (80% of the GHL; Table 17).

The length of the season has also varied. In the earliest years of the fishery, the season lasted approximately 1 week. Between 1999 and 2010, season length varied between 36 days and 84 days, and in recent seasons (2011–2013) the season shortened to 14 days to 24 days. The 2014 season was only 7 days long. Because of section harvest caps instituted in 2000, individual sections often close in advance of season closures. These section closures show similar trends with lengths between 20 days and 84 days during 2000 to 2010, and between 2 days and 13 days in recent years (2011–2014).

MANAGEMENT AND REGULATIONS

The directed pollock trawl fishery GHL is deducted from the combined federal Western, Central, and West Yakutat Gulf of Alaska Regulatory Areas (W/C/WYAK) ABCs, and has ranged from 2.0 million lb in 2004 and 2005 to 8.6 million lb in 2014 (Table 17). ADF&G has 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 Gulf of Alaska, 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 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 2006, 2008, 2012, and 2014, 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 1 of these sections (Figure 5). In 2002, when there was a dramatic increase in bycatch rates for all species, committee meetings at the Alaska Board of Fisheries 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 state-waters pollock fishery is intensive, with close contact between the fleet and the manager and close attention to the 60% section harvest limit and bycatch limits. 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 logbooks. The majority of the fleet transits from Kodiak, which increases the lead time necessary to make management decisions. Trip limits of 300,000 lb are established in regulation (5 AAC 28.073) and are an important management tool helping control the rate of harvest in the fishery. Vessels frequently achieve this harvest trip limit in less than 10 hours of fishing time, making this a fast-paced fishery.

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. Although it is feasible to close the fishery when a bycatch cap is approached or has been met, full accounting of bycatch may not be available until after the closure when all fish ticket data are reviewed. Inseason estimates are often different than the actual bycatch reported on the fish tickets. Rockfish caught as bycatch during this fishery are accrued to the rockfish GHL of that bycatch only fishery. Because

rockfish bycatch levels are a percentage of the directed harvest, as pollock GHL levels increase, rockfish bycatch in this fishery can be a significant proportion of the rockfish GHL (Table 19).

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

- In 2008, 38% of the 2008 GHL 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 GHL 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 GHL was harvested.
- In 2014, the fishery closed before the GHL was achieved when the rockfish bycatch cap was exceeded; all sections were closed on January 27, and 61% of the GHL was harvested.

HARVEST SAMPLING AND RESEARCH

Dockside sampling of walleye pollock from the PWS trawl fleet was conducted in the ports of Seward and Kodiak in 2013, and sampling operations have been conducted since 1995. Biological samples were collected on fish length, weight, sex, gonad maturity, and age. Logbook data provided information on fishing location and effort. An onboard observer from ADF&G was deployed during the test fishery to collect additional samples, as well as obtaining information on fishing activity, gear deployment, and bycatch.

In 2013, ADF&G staff sampled 2,184 pollock for length and, of those, approximately 1,100 fish were sampled for all parameters. Samples were collected from 13 trawl vessel landings, including 2 trips from the test fishery. Pollock had an average fork length of 50.0 cm and an average weight of 1.3 kg in 2013 (Table 20). The 2013 pollock had the same average length as 2012. However, the average weight in 2013 was the largest since 2008, and size was above the historical average for both these parameters. The sex composition from sampled pollock in 2013 was 34% female, similar to the historical average. The age structures collected from pollock are otoliths and age reading occurs at the laboratory in Homer. Processing of age data is not complete for 2013. The average age of walleye pollock from 1996 to 2012 ranged from 4 years to 8 years and averaged 5 years from 2009 to 2012.

There is no directed 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 a survey in the summer of 2013 and produced a gulf-wide pollock biomass estimate of 1,014,846 tons, the highest biomass in the time series. This estimate resulted in the highest historical GHL in the PWS pollock pelagic trawl fishery, 8.6 million pounds in 2014. AFSC has plans to conduct a winter acoustic pollock survey in 2015 inside PWS.

LINGCOD

BACKGROUND

Lingcod, *Ophidion elongatus*, is a member of 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, and 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

Total harvest of lingcod in 2013 was 30,331 lb by 26 vessels in 35 landings (Table 21). Outside District harvest was composed of 17,405 lb directed harvest and 11,399 lb bycatch harvest, whereas the Inside District harvest of 1,527 lb was entirely bycatch (Table 22). In the history of the fishery, since 1988, lingcod harvest and effort has varied between 9,344 lb by 16 vessels in 18 landings in 1999 to 72,472 lb by 42 vessels in 89 landings in 2009, and averaged 34,862 lb by 28 vessels. In the Inside District waters of PWS, harvest of lingcod peaked in 1997 at 22,890 lb, but in most years was less than 7,000 lb. In the state waters of the Outside District, harvest peaked at 18,796 lb in 2001 but in most years was also less than 7,000 lb. The majority of the harvest in most years was caught in adjacent federal waters of the EEZ; harvest in these waters peaked at 66,202 lb in 1995 and has been highly variable between years. For the last 5 years (2009–2013) an average of 77% of the total lingcod harvest has come from federal waters.

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. In recent years (2006–2013), an average of 49% of all harvested lingcod was landed as bycatch to other fisheries such as halibut and sablefish, and 51% was landed as part of the directed lingcod fishery. The average percentage of lingcod landed as bycatch for the Inside District and Outside District including federal waters was 32% and 54%, respectively (Table 22). Longline has been the dominant gear type harvesting lingcod in recent years, although some landings were made by jig, hand troll, and trawl gear.

MANAGEMENT AND REGULATIONS

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 lb GHL for the Inside District and a 19,000 lb GHL for the Outside District and adjacent federal waters. Since 2008, the GHL has been set at 7,300 lb for the Inside District and 25,300 lb 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 (72,472 lb), although harvest 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 regulation in 2003 (5 AAC 28.270 (c)) that provides ADF&G with emergency order authority to require that all lingcod be delivered with the head attached and a 1-inch area of the vent intact as proof of gender. An emergency order has been issued each season since 2003 to allow ADF&G greater opportunity to achieve necessary sample sizes.

HARVEST SAMPLING AND RESEARCH

Dockside sampling of lingcod from PWS was conducted in the port of Cordova in 2013. Although there has been some limited and sporadic sampling of lingcod dating back to 1993, sampling operations have been conducted consistently since 2003 on PWS lingcod. Sampling efforts have improved dramatically 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 281 lingcod from 5 dockside deliveries in 2013, which were harvested by vessels using longline gear. Lingcod had an average fork length of 110.1 cm and an average whole weight of 13.9 kg (30.6 lb, Table 23). The average length of lingcod in 2013 was well above the historical average of 106.7 cm and the largest since sampling began. The average weight of lingcod in 2013 was also well above the historical average of 12.8 kg, although it was the second largest since sampling began (maximum of 14.2 kg in 2005). The larger size of lingcod in 2013 could be due to the high proportion of females sampled (98%). Since 2003, the proportion of females in the samples has been at least 79%, with a historical average of 87%. This was due in part to the 35 inches (89 cm) in total length requirement for lingcod to be retained, and the fact that female lingcod grow to a larger size than males (Jagielo 1990 and Gordon 1994).

Otoliths are the current age structures collected from lingcod to determine age. Prior to 2006, fin rays were the age structure utilized. An experiment comparing ages estimated from otoliths and fin ray sections was conducted during 2001–2005, and analysis produced comparable results. Due to significantly less labor being required to process otoliths versus fin rays, the decision was made in 2006 to switch to otoliths as the preferred age structure for all commercial lingcod age determination in the Central Region (PWS and Cook Inlet Areas). Age structures from lingcod were sent to the ADU laboratory for processing, and age data was not yet available for 2012 or

2013. The average age of lingcod for 2003–2011, where data was available, ranged from 14 to 17 years, with an average age for all years combined of 15 years.

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^2. 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. 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: one 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 the PWS management area. There is a latitudinal trend of increasing size at maturity from southern Canada to south central Alaska.

MISCELLANEOUS GROUNDFISH

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. These 2 are the most frequently landed skate species in the PWS management area. 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, bycatch in the directed skate fishery, other skate harvest opportunities, and cost of management.

Harvest and Effort

Total skate harvest as bycatch in 2013 was 237,656 lb (not including discards). Skates were open to directed fishing until 1998, although harvest levels remained low. As a market for skates was recently developed and with the advent of the PWS state-waters Pacific cod longline gear fishery in 2009, harvest of skates as bycatch within PWS has increased significantly (Table 24).

In the directed fishery in 2009, 9 vessels harvested 258,389 lb in 17 landings. Landings of big skate ranged from 1,067 lb to 26,718 lb in the Inside District, and from 604 lb to 20,903 lb in the Outside District. The largest landing of big skate in the Inside District exceeded the Inside

District GHL (20,000 lb), and several big skate landings of approximately 19,000 lb in the Outside District caused the harvest to exceed the Outside District GHL (30,000 lb). 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 lb to 15,274 lb, and the season within both the Inside and Outside Districts remained open through April 30.

In the 2010 directed fishery, 6 vessels harvested 104,509 lb in 16 landings. Landings of big skate were restricted by a 2,500 lb 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 lb to 15,793 lb, and the season in the Inside and Outside Districts remained open through April 30. Effort and harvest in the 2010 skate declined as a result of the 2,500 lb big skate trip limit and other skate harvest opportunities; vessels targeting Pacific cod in the federal Eastern Gulf of Alaska were allowed to retain a skate 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 emergency order 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 permit requirement for targeting 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 regulation addition, ADF&G issued no PWS skate permits. In 2000, the BOF adopted into regulation a Miscellaneous Groundfish Permit requirement (5 AAC 28.220(c)). This was a commissioner's permit that provided a mechanism for developing fisheries while providing 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 fishery for skate 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, logbooks, 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 lb 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. Since 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 GHLs of 20,000 lb for big skate and 100,000 lb (110,000 lb in 2010) for longnose skate. Resulting GHLs in the Outside District were 30,000 lb for big skate and 150,000 lb (155,000 lb 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. Current management allows for landing of skate species only as bycatch and limits retention to 15% by weight of the directed groundfish species onboard a vessel. However, in 2013 and 2014, NMFS issued closures to retention of big skate within CGOA waters when total allowable catches were achieved, and ADF&G mirrored these actions within PWS in order to provide consistency with federal regulations.

The North Pacific Fisheries Management Council is considering management measures that would reduce the maximum retainable amounts (MRA) for skates in directed fisheries for groundfish in the Gulf of Alaska (GOA).The Council is proposing this reduction in the skate MRA because the catch of big and longnose skates in the GOA groundfish and halibut fisheries has exceeded area-specific acceptable biological catch (ABC) for several years.

Harvest Sampling and Research

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 lb), average length of 123.6 cm, and average age of 7 years, and the sex ratio was 74% female (Table 25). Female percentage increased significantly between 2009 and 2010. Longnose skate had an average weight of 10.0 kg (22.0 lb), average length of 116.9 cm, and average age of 11 years, and the sex ratio was 44% female. Measurements of longnose skate were similar for both years.

Dockside interviews, logbooks, and onboard observer deployment provided data on fishing location, effort, and discarded catch. Because big skate GHLs in 2009 and trip limits in 2010 were quickly attained, there were high discards of big skate while trying to target longnose skate. Although skate discard mortality rates are unknown, there were observations of skate and halibut jaws being cut to release fish. Among observed longline sets in both years, halibut bycatch abundance exceeded the catch of either skate species, and the catch ratio of halibut to both skate species combined was 0.7.

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.

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 Gulf of Alaska.

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 24). 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. Additionally, some 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, exceptions emerge from observer coverage in the pollock trawl and shrimp trawl fisheries as well as other agency stock assessment survey data (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 23). 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.

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 groundfish species or halibut on board a vessel. Prior to 2014, bycatch limits in PWS were managed under a 20% aggregate allowance 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 issued a bycatch EO at the beginning of the year that set individual species or aggregate bycatch allowances; miscellaneous groundfish species bycatch limits were set at 15% for shark species in aggregate, and 20% for all other species in aggregate.

ADF&G manages octopus under *Registration Area E Octopus Management Plan* as bycatch only (5 AAC 38.217). This plan, adopted by the BOF in 2012, specifies a GHR of 0–35,000 lb 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. It is anticipated that octopus samples may be collected in future years.

All of the species listed under miscellaneous groundfish (flatfish, sharks, skates, octopus, and squid) are captured in various PWS surveys; the survey gear and design does not lend itself to quality abundance estimates for sharks, octopus, and squid (Appendix B1). Other information is collected about flatfishes captured in multispecies trawl surveys; they are separated by species, counted, and weighed as part of standard survey procedures.

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TABLES AND FIGURES

Table 1.–Groundfish emergency orders issued for the PWS Management Area E, 2009–2014.

Fishery	Emergency Order	Effective Date	Explanation
			2014 Calendar Year (through 9/27/14)
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, and provides for 20% Pacific cod bycatch allowance.
Pollock	2-GF-E-03-14	1/24/2014	Closes directed season in the Hinchinbrook Section effective 7:00 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 vessel fishing with pot gear 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 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.
			2013 Calendar Year
Pacific cod	2-GF-E-01-13	1/1/2013	Opens parallel season concurrent with federal Central Gulf of Alaska Area, and provides for 20% Pacific cod bycatch allowance.
Pollock	2-GF-E-02-13	1/22/2013	Closes directed season in the Hinchinbrook Section.
Pollock	2-GF-E-03-13	2/3/2013	Closes directed season in the Port Bainbridge and Knight Island Sections.
Pacific cod	2-GF-E-04-13	2/10/2013	Closes parallel season to vessel fishing with pot gear and opens state-waters season to vessels fishing with pot gear effective 12:00 noon February 11.
Pacific cod	2-GF-E-05-13	3/21/2013	Closes parallel season to vessel fishing with longline gear and opens state-waters season to vessels fishing with longline gear effective 12:00 noon March 28.
Skate	2-GF-E-06-13	5/9/2013	Closes the PWS Area to retention of big skate as bycatch.
Lingcod	2-GF-E-07-13	7/1/2013	Requires lingcod to be landed with the head on and evidence of gender intact.
Pacific cod	2-GF-E-08-13	9/1/2013	Closes the state-waters season to vessels fishing with pot or longline gear and opens the parallel season to vessels fishing with pot or longline gear.
Lingcod	2-GF-E-09-13	8/31/2013	Closes the fishing season in the Outside District and maintains 20% bycatch allowance in other directed fisheries.

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Table 1.–Page 2 of 3.

Fishery	Emergency Order	Effective Date	Explanation
			2012 Calendar Year
Pacific cod	2-GF-E-01-12	1/1/2012	Opens parallel season concurrent with federal Central Gulf of Alaska Area, and provides for 20% Pacific cod bycatch allowance.
Pollock	2-GF-E-02-12	2/2/2012	Closes directed season in the Hinchinbrook Section.
Pacific cod	2-GF-E-03-12	2/10/2012	Closes parallel season to vessel fishing with pot gear and opens state-waters season to vessels fishing with pot gear February 11.
Pollock	2-GF-E-04-12	2/13/2012	Closes directed season in the Port Bainbridge and Knight Island Sections.
Pacific cod	2-GF-E-05-12	3/4/2012	Closes parallel season to vessel fishing with longline gear and opens state-waters season to vessels fishing with longline gear March 17.
Pacific cod	2-GF-E-06-12	3/6/2012	Closes parallel season to vessel fishing with jig gear and opens state-waters season to vessels fishing with jig March 7.
Pacific cod	2-GF-E-07-12	3/23/2012	Closes the state-waters season to vessels fishing with longline gear.
Pacific cod	2-GF-E-08-12	3/26/2012	Closes the state-waters season to vessels fishing with pot gear.
Pacific cod	2-GF-E-09-12	6/10/2012	Closes state-waters season to vessel fishing with jig gear and opens parallel season to vessels fishing with jig gear June 10.
Lingcod	2-GF-E-10-12	7/1/2012	Requires lingcod to be landed with the head on and evidence of gender intact.
Pacific cod	2-GF-E-11-12	6/29/2012	Closes parallel season to vessel fishing with jig gear and opens state-waters season to vessels fishing with jig gear effective 12:00 noon June 29.
Lingcod	2-GF-E-12-12	8/16/2012	Closes the fishing season in the Outside District and maintains 20% bycatch allowance in other directed fisheries.
Pacific cod	2-GF-E-13-12	9/1/2011	Opens the parallel season to vessels fishing with pot or longline gear.
Pacific cod	2-GF-E-14-12	10/12/2012	Closes the parallel season to vessels fishing with pot gear.
Pacific cod	2-GF-E-15-12	10/29/2012	Opens the parallel season to vessels fishing with pot gear.
Pacific cod	2-GF-E-16-12	10/31/2012	Lifts the limits on the number of jigging lines that may be operated from a vessel and designates the PWS area as a nonexclusive registration area for the state-waters season.
			2011 Calendar Year
Pacific cod	2-GF-E-01-11	1/1/2011	Opens parallel season concurrent with federal Central Gulf of Alaska Area.
Pacific cod	2-GF-E-02-11	1/29/2011	Closes parallel season and opens state-waters season effective 12:00 noon February 5, and provides for 20% Pacific cod bycatch allowance..
Pollock	2-GF-E-03-11	2/1/2011	Closes directed season in the Hinchinbrook Section.
Pollock	2-GF-E-04-11	2/6/2011	Closes directed season in the Port Bainbridge and Knight Island Sections.
Pacific cod	2-GF-E-05-11	2/23/2011	Closes the state-waters season and provides for 20% bycatch allowance.
Lingcod	2-GF-E-06-11	7/1/2011	Requires lingcod to be landed with the head on and evidence of gender intact.
Lingcod	2-GF-E-07-11	8/14/2011	Closes the fishing season in the Outside District and maintains 20% bycatch allowance in other directed fisheries.
Pacific cod	2-GF-E-08-11	9/1/2011	Opens the parallel season in the PWS Area.
Lingcod	2-GF-E-09-11	10/6/2011	Closes the fishing season in the Inside District and maintains 20% bycatch allowance in other directed fisheries.
Pacific cod	2-GF-E-10-11	10/9/2011	Closes the parallel season in the PWS Area.
Pacific cod	2-GF-E-11-11	12/27/2011	Opens the parallel season in the PWS Area.

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Table 1.–Page 3 of 3.

Fishery	Emergency Order	Effective Date	Explanation
			2010 Calendar Year
Pacific cod	2-GF-E-01-10	1/1/2010	Opens parallel season concurrent with federal Central Gulf of Alaska Area.
Pacific cod	2-GF-E-02-10	2/7/2010	Closes parallel season and opens state-waters season effective 12:00 noon February 7, and provides for 20% Pacific cod bycatch allowance.
Skate	2-GF-E-03-10	2/7/2010	Provided for a 20% bycatch allowance of skate.
Pacific cod	2-GF-E-04-10	2/23/2010	Closes the state-waters season and provides for 20% bycatch allowance.
Pollock	2-GF-E-05-10	2/25/2010	Closes directed season in the Hinchinbrook Section.
Pollock	2-GF-E-06-10	3/3/2010	Closes directed season in the Port Bainbridge and Knight Island Sections.
Skate	2-GF-E-07-10	3/6/2010	Opens directed season for big and longnose skate effective 12:00 noon and provides for a 20%bycatch allowance in other fisheries.
Skate	2-GF-E-08-10	3/21/2010	Closes directed season for big skate east of a line from Bear Cape to Goose Island to Bidarka Point and maintains 20% bycatch allowance in other directed fisheries.
Lingcod	2-GF-E-09-10	7/1/2010	Requires lingcod to be landed with the head on and evidence of gender intact.
Pacific cod	2-GF-E-10-10	9/1/2010	Opens the parallel season in the PWS Area.
Pacific cod	2-GF-E-11-10	9/13/2010	Closes the parallel season in the PWS Area.
Lingcod	2-GF-E-12-10	9/20/2010	Closes the fishing season in the Outside District and maintains 20% bycatch allowance in other directed fisheries.
			2009 Calendar Year
Pacific cod	2-GF-E-01-09	1/1/2009	Opens parallel season concurrent with federal Central Gulf of Alaska Area.
Pacific cod	2-GF-E-02-09	2/27/2009	Closes parallel season and opens state-waters season effective 12:00 noon February 3.
Pollock	2-GF-E-03-09	2/11/2009	Closes directed season in the Hinchinbrook Section.
Skate	2-GF-E-04-09	3/21/2009	Opens directed season for big and longnose skate.
Pollock	2-GF-E-05-09	3/21/2009	Closes directed season in the Port Bainbridge and Knight Island Sections.
Pacific cod	2-GF-E-06-09	3/27/2009	Closes the state-waters season and provides for 20% bycatch allowance.
Skate	2-GF-E-07-09	3/29/2009	Closes directed season for big skate east of a line from Bear Cape to Goose Island to Bidarka Point and maintains 20% bycatch allowance in other directed fisheries.
Skate	2-GF-E-08-09	4/2/2009	Closes directed season for big skate in waters of the Outside District and maintains 20% bycatch allowance in other directed fisheries.
Lingcod	2-GF-E-09-09	7/1/2009	Requires lingcod to be landed with the head on and evidence of gender intact.
Lingcod	2-GF-E-10-09	8/13/2009	Closes the fishing season in the Outside District and maintains 20% bycatch allowance in other directed fisheries.
Lingcod	2-GF-E-11-09	8/17/2009	Closes the fishing season in the Inside District and maintains 20% bycatch allowance in other directed fisheries.
Pacific cod	2-GF-E-12-09	9/1/2009	Opens the parallel season in the PWS Area.
Pacific cod	2-GF-E-13-09	10/1/2009	Closes the parallel season in the PWS Area.

Table 2.–Prince William Sound Area commercial harvest and effort of all rockfish from the Inside and Outside Districts and black rockfish from federal waters, 1988–2013.

	Inside District			Outside District			Total
Year	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)	Harvest (lb)
1988	64	170	113,253	18	25	313,489	426,742
1989	35	95	93,307	7	8	25,124	118,431
1990	93	391	489,154	10	11	17,314	506,468
1991	88	239	153,889	6	6	2,762	156,650
1992	106	275	178,621	16	24	12,882	191,503
1993	67	183	81,095	20	33	27,478	108,573
1994	65	160	97,710	31	51	104,670	202,380
1995	122	211	153,107	35	60	156,839	309,946
1996	86	208	108,372	31	51	76,315	184,686
1997	90	234	136,593	26	36	29,245	165,838
1998	80	198	100,120	13	23	8,914	109,034
1999	81	214	60,539	21	31	11,447	71,987
2000	97	260	111,171	18	31	10,749	121,919
2001	94	205	60,597	17	37	13,485	74,082
2002	81	161	67,242	13	26	7,369	74,612
2003	72	168	35,240	30	58	12,751	47,990
2004	61	149	40,582	23	47	12,219	52,801
2005	72	166	47,528	17	47	13,322	60,850
2006	91	167	61,095	22	51	15,176	76,271
2007	59	165	66,322	25	57	15,282	81,604
2008	60	162	92,166	18	47	14,019	106,585
2009	70	200	96,538	37	68	21,657	118,196
2010	71	212	89,962	32	55	14,939	104,900
2011	66	188	96,511	36	53	22,244	118,755
2012	73	191	90,721	28	60	23,155	113,877
2013	76	232	134,988	22	49	14,586	149,161
Average 2004–2013	70	183	81,641	26	53	16,660	98,300
Percent of Total			83%			17%	

Table 3.–Prince William Sound annual rockfish harvest by gear type, including black rockfish from federal waters, 1988–2013.

			Harvest (lb)				
Year	Vessels	Landings[a]	Troll/Jig	Trawl	Longline	Pots	Total
1988	80	195	54,097	228,417	144,228	0	426,742
1989	39	103	[b]	997	104,633	[b]	118,431
1990	96	402	[b]	20,238	455,789	[b]	506,468
1991	89	247	15,624	11,162	129,864	0	156,650
1992	114	299	[b]	28,510	152,945	[b]	191,503
1993	80	209	13,905	[b]	81,978	[b]	108,573
1994	92	211	94,588	[b]	104,811	[b]	202,380
1995	134	269	182,031	[b]	127,616	[b]	309,946
1996	99	257	57,103	3,507	124,076	0	184,686
1997	106	266	34,047	[b]	130,141	[b]	165,838
1998	88	220	2,903	[b]	104,888	[b]	109,034
1999	92	244	1,130	1,951	68,905	0	71,987
2000	100	284	2,401	2,061	117,210	247	121,919
2001	101	233	[b]	4,495	68,400	[b]	74,082
2002	87	190	0	30,553	44,059	0	74,612
2003	89	243	256	4,752	42,983	0	47,990
2004	71	197	283	3,735	48,783	0	52,801
2005	80	206	[b]	8,863	51,542	[b]	60,850
2006	72	226	1,008	12,391	62,866	6	76,271
2007	73	213	1,215	10,970	69,419	0	81,604
2008	69	203	149	21,323	85,131	0	106,585
2009	88	256	[b]	22,359	95,664	0	118,023
2010	87	262	[b]	6,500	98,116	0	104,616
2011	81	232	0	8,113	110,497	[b]	118,610
2012	94	245	881	18,054	94,587	[b]	113,523
2013	85	270	0	29,477	119,562	[b]	149,161
Average	90	236	26,410	19,536	112,395	148	157,093

[a] Total landings may be less total combined district tallies due to vessels fishing multiple districts in a single trip.

[b] Confidential data due to fewer than 3 participants.

Table 4.–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, 1993–2013.

	Slope Rockfish						Demersal Shelf Rockfish (DSR)						Pelagic Shelf Rockfish (PSR) [c]		
	Rougheye		Shortraker		Total Slope [a]		Yelloweye		Quillback		Total DSR [b]				
Year	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Total Samples
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%	1232	63%	58	3%	1,942
Total	1,716	17%	3,086	31%	6,123	61%	2,363	23%	1,191	12%	3,679	36%	310	3%	10,113

[a] Total slope rockfish includes rougheye, shortraker thornyhead, redbanded, silvergray, darkblotched, redstripe, sharpchin, Pacific ocean perch, and unidentified slope rockfish species.

[b] Total demersal shelf rockfish (DSR) also includes yelloweye, quillback, canary, china, copper, and tiger rockfish.

[c] Pelagic shelf rockfish (PSR) includes black (primarily), dusky, dark, and yellowtail rockfish.

Table 5.–Prince William Sound area multi-species large-mesh trawl survey species composition of rockfish, grouped by rockfish assemblage, 1991–2013.

Group	Rockfish species	%
Demersal shelf	Canary	0.01%
	Quillback	0.33%
	Tiger	0.01%
	Yelloweye	0.12%
	Total	0.47%
Pelagic shelf	Dark	0.01%
	Dusky	0.09%
	Total	0.10%
Slope	Bocaccio	0.05%
	Darkblotched	0.01%
	Harlequin	> 0.00%
	Unspecified slope	0.16%
	Redbanded	0.09%
	Redstripe	0.19%
	Rougheye	95.40%
	Sharpchin	0.05%
	Shortraker	2.39%
	Silvergray	0.22%
	Shortspine thornyhead	0.76%
	Total	99.34%
Unspecified	Unspecified	0.09%
	Total	0.09%

Table 6.–Prince William Sound area multi-species large-mesh trawl survey rougheye rockfish catch per unit effort (CPUE), standard error, and coefficient of variation for the core stations, 1991–2013.

Year	*n*	CPUE (lbs/nmi)	SE	CV
1991	29	34.9	6.5	0.19
1992	37	53.3	9.7	0.18
1993	38	72.3	14.9	0.21
1994	38	56.9	14.0	0.25
1995	32	45.9	14.5	0.32
1997	39	32.5	6.9	0.21
1999	44	23.6	4.9	0.21
2001	44	33.2	8.9	0.27
2003	41	43.4	8.8	0.20
2005	44	29.7	8.1	0.27
2007	43	25.1	8.5	0.34
2009	50	33.4	12.3	0.37
2011	48	34.4	6.5	0.19
2013	43	36.2	7.5	0.21

Table 7.–Prince William Sound area sablefish longline survey species composition of rockfish in the northwest section, grouped by rockfish assemblage, 1996–2006.

Group	Rockfish species	%
Demersal shelf	Yelloweye	0.13%
	Total	0.13%
Slope	Redbanded	0.66%
	Rougheye	23.51%
	Shortraker	50.20%
	Shortspine thornyhead	8.85%
	Unspecified slope	16.64%
	Total	99.87%

Table 8.–Prince William Sound area sablefish longline survey rougheye and shortraker rockfish catch per unit effort (CPUE) and catch statistics for the northwest section, 1997–2005.

Year	Number of sets	Number of sets with fish	Number of fish captured	CPUE (num / skate)	SD
Rougheye					
1997	20	3	20	0.47	0.39
1998	26	8	13	0.11	0.04
1999	21	7	10	0.10	0.05
2000	24	9	26	0.20	0.22
2001	24	5	52	0.71	1.02
2002	27	8	21	0.18	0.12
2003	31	8	20	0.17	0.15
2004	30	7	15	0.15	0.16
2005	20	1	1	0.07	
Shortraker					
1997	20	16	35	0.16	0.11
1998	26	14	57	0.29	0.42
1999	21	9	26	0.21	0.26
2000	24	13	28	0.15	0.10
2001	24	6	25	0.29	0.34
2002	27	18	40	0.16	0.14
2003	31	19	56	0.21	0.29
2004	30	12	23	0.14	0.15
2005	20	18	91	0.35	0.58

Table 9.–Prince William Sound Pacific cod parallel fisheries annual harvest and effort by gear type, 1988–2013.

			Harvest (lb)[a]				
Year	Vessels	Landings	Other[b]	Longline	Pot	Jig[c]	Total
1988	39	87		330,718			330,718
1989	23	45	[d]	71,845		[d]	73,600
1990	84	307	[d]	1,203,118	[d]	[d]	1,219,979
1991	88	234	17,074	1,248,217	961,912	[d]	2,227,204[e]
1992	140	524	[d]	1,359,176	594,741	[d]	1,972,969
1993	57	205	[d]	810,831	466,202	[d]	1,304,977
1994	46	197		316,550	1,584,722	[d]	1,901,272[e]
1995	75	205	24,539	359,765	1,204,451	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	582,325	4,333	922,249
1998	50	150	5,879	534,553	138,243		678,675
1999	54	196	1,909	687,169	641,523	[d]	1,330,601[e]
2000	58	175	[d]	403,230	332,310		735,540[e]
2001	23	63	[d]	143,641	[d]		170,445
2002	22	51	[d]	17,700			17,700[e]
2003	26	45	234	14,051		[d]	14,285[e]
2004	17	45	[d]	13,247			13,247[e]
2005	24	38	221	11,073			11,294
2006	30	59	587	18,407			18,988
2007	31	82	[d]	64,807	[d]	[d]	80,417
2008	35	78		66,563			66,563
2009	41	90	[d]	166,190			166,190[e]
2010	40	93	326	88,700			89,026
2011	39	93	345	359,402	720		360,468
2012	32	82	1,963	420,544	[d]		422,507[e]
2013	32	92	182	806,281	[d]	[d]	806,463[e]

[a] Harvest is reported in round pounds.
[b] "Other" includes trawl and gillnet gear.
[c] Includes mechanical jig and hand troll.
[d] Confidential data due to limited number of participants.
[e] Total harvest does not include confidential data.

Table 10.–Prince William Sound state-waters Pacific cod annual harvest, effort, and guideline harvest level (GHL), by gear type of from the season, 1997–2013.

				Harvest (lb)			
Year	Vessels	Landings	GHL (lb)	Longline	Pot	Jig[a]	Total
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	[b]	4	750,000		[b]	0	[b]
2004	[b]	6	970,000		[b]	0	[b]
2005	[b]	3	897,000		[b]	0	[b]
2006	[b]	7	911,000		[b]	[b]	[b]
2007	3	20	911,000		[b]	[b]	345,684
2008	4	6	586,000		[b]	[b]	7,557
2009[c]	19	37	487,746	704,866	0	0	704,866
2010	24	45	784,735	822,747	[b]	[b]	825,226
2011	25	63	1,435,195	1,594,590	0	0	1,594,590
2012[d]	38	70	1,448,437	1,395,483	0	[b]	1,395,483[e]
2013	25	77	1,781,335	1,275,245	0	0	1,275,245

[a] Includes mechanical jig and hand troll.
[b] Confidential data due to limited number of participants.
[c] Longline became an allowable gear type for the Prince William Sound state waters season.
[d] Regulatory change implemented to close season to longline gear when 85% of GHL attained.
[e] Total harvest does not include confidential data.

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, 1994–2013.

Year	Average length (cm)	*n*	Average weight (kg)	*n*	Percent female	*n*
1994	71.3	102	4.1	102	56	102
1995	70.0	145	4.3	145	63	145
1996-1997 [a]						
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 [b]						
2003	71.1	135	4.2	50	60	50
2004-2006 [a]						
2007	67.5	419	3.8	205	3	
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
Average	67.7		3.9		60	

[a] No Pacific cod samples were collected 1996–1997 or 2004–2006.

[b] Sample sizes in 2001 and 2002 insufficient for biological data analysis.

Table 12.–Prince William Sound area annual sablefish harvest and effort, including test fish, from the Inside and Outside Districts, 1988–2013.

			Annual harvest (lb)			
Year	Vessels	Landings	Inside	Outside	Test Fishery[a]	Total
1988	54	145	219,416	27,958		247,374
1989	25	95	188,042	746		188,788
1990	71	251	211,486	4,929		216,414
1991	78	157	326,235	24,398		350,633
1992	63	126	432,172	33,684		465,856
1993	60	92	316,602	74,943		391,546
1994	66	102	280,700	60,359		341,059
1995	126	134	565,547	11,767		577,315
		Limited entry program implemented				
1996	69	77	247,545	33,475	10,376	291,396
1997	51	81	196,370	2,689	9,311	208,370
1998	59	60	233,004	14	11,676	244,695
1999	42	45	206,142	0	7,765	213,907
2000	32	32	342,854	77	13,582	356,513
2001	47	49	310,217	0	13,692	323,908
2002	49	51	320,694	0	7,924	328,618
		Shared quota fishery implemented				
2003	39	67	213,932	0	9,914	223,757
2004	38	67	225,003	0	9,994	234,996
2005	34	70	220,392	0	6,687	227,079
2006	27	73	185,494	0	10,068	195,562
2007	28	61	199,213	0	0	199,213
2008	31	70	206,888	41	0	206,929
2009	32	104	219,438	0	0	219,438
2010	30	112	212,229	0	0	212,229
2011	29	94	222,099	0	0	222,099
2012	26	87	203,824	0	0	203,824
2013	30	93	155,463	0	0	155,463
2014	27	72	96,726	0	0	96,726
Average 2003-2014	31	81	196,725	3	3.055	199,776

[a] Fish landed and sold under the the ADF&G's program receipts authority are listed as "test fishery" and not included in vessels or landings.

Table 13.–Annual number of vessels and estimated number of hooks set and lost by gear type, and reported whale interactions in the Prince William Sound sablefish fishery from logbook data, 1998–2013.

	Type and number of hooks set				Hooks lost		Whale
Year	Vessels	Snap	Vessels	Conventional	Snap	Conventional	interactions
1998	28	140,770	27	423,525			
1999	16	56,704	23	300,605	0	6,570	
2000	11	50,412	16	484,875	0	12,600	1
2001	21	99,390	25	534,770	1,320	28,120	0
2002	23	100,646	24	375,715	1,620	43,745	0
2003	21	140,226	16	252,313	517	1,255	10
2004	20	156,756	16	239,482	775	1,020	12
2005	19	244,048	11	250,513	2,350	0	35
2006	15	249,829	11	304,788	400	612	30
2007	24	384,845	4	97,245	0	0	10
2008	25	436,715	4	88,127	250	0	15
2009	23	528,810	6	162,926	900	2,200	32
2010	22	542,700	6	195,798	2,780	0	8
2011	20	463,953	5	214,916	2,090	2,200	17
2012	19	428,483	4	180,420	200	0	31
2013	21	480,795	5	180,306	0	400	2

Table 14.–Average length, weight, and age; sex ratio (percent female); and number sampled (*n*) of commercially harvested sablefish sampled from the Prince William Sound area, 1995–2013.

Year	Average length (cm)	*n*	Average weight (kg)	*n*	Average age (years)	*n*	Percent female	*n*
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	[a]	
2000	59.3	471	2.3	471	5	442	[a]	
2001	61.7	464	2.2	464	7	461	[a]	
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	[b]		59	688
2013	60.3	664	2.6	664	[b]		60	662
Average	61.6		2.6		7		63	

[a] 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.

[b] Age structures submitted to Age Determination Unit; data for 2012 and 2013 have not been analyzed.

Table 15.–Prince William Sound area sablefish longline survey annual average catch per unit effort (CPUE) and catch statistics for the northwest section, 1997–2006.

Year	Number of sets	Number of sets with fish	Number captured	CPUE	SD	Average weight (kg)	% female
1997	20	19	1,255	4.81	3.48	2.64	ND
1998	26	24	1,473	4.39	3.03	1.90	0.55
1999	21	21	1,585	5.39	3.22	1.75	0.59
2000	24	24	2,057	6.12	3.51	2.06	0.55
2001	24	24	2,112	6.35	3.54	2.22	0.58
2002	27	27	1,227	3.23	2.26	2.58	0.56
2003	31	30	1,973	4.73	3.65	2.19	0.56
2004	30	28	1,617	4.65	4.49	2.58	0.60
2005	20	18	657	2.56	1.72	2.45	0.60
2006	16	15	846	4.00	2.56	2.16	0.56

Table 16.–Prince William Sound area sablefish tagging project numbers of fish tagged and recaptured, and recapture location 2011–2014.

Releases		Recaptures				
Year	Number	Year	Inside	Outside	Unknown	Total
2011	1,203	Unknown		1	1	2
		2011	154	8	1	163
		2012	32	23	1	56
		2013	6	21	2	29
		2014		10		10
		Total	192	63	5	260
2013	318	2013	20	2	1	23
		2014	7	2		9
		Total	27	4	1	32

Table 17.–Prince William Sound directed pollock trawl fishery annual harvest, effort, guideline harvest level (GHL), and season length, 1995–2014.

Year	GHL (million lb)	Season days	Vessels	Harvest (lb)	Harvest % of GHL	Test fish (lb)
1995	2.1-4.4	26	9	6,325,575	144%	215,025
1996	3.1	5	11	3,265,740	105%	421,137
1997	3.9	8	10	4,319,707	111%	539,123
1998	3.9	7	11	4,031,725	103%	631,751
1999	4.6	36	6	4,673,074	102%	490,761
2000[a]	3.1	70	4	2,256,504	73%	366,724
2001	3.1	64	[b]	[b]	[b]	381,502
2002	3.8	70	3	2,364,143	62%	177,071
2003	3.8	84	3	2,421,773	64%	54,224
2004	2.0	68	3	1,928,458	96%	400,677
2005	2.0	48	6	1,677,157	84%	317,183
2006	3.6	58	8	3,486,449	97%	590
2007	3.6	69	5	2,339,978	65%	259,155
2008	3.6	56	5	1,395,933	39%	0
2009	3.6	60	8	3,249,441	90%	300,806
2010	3.6	42	11	3,662,919	102%	311,853
2011	3.6	17	7	3,377,325	94%	339,683
2012	6.1	24	9	5,785,295	95%	0
2013	5.8	14	14	5,770,151	99%	496,856
2014	8.6	7	19	5,220,121	61%	0
Average 2000–2014	4.0	50	7	3,209,689	80%	227,088

[a] Pollock harvest sections were created in 2000.

[b] Confidential information.

Table 18.–Prince William Sound annual pollock harvest and effort by gear type, 1988–2013.

			Harvest (lb)			
Year	Vessels	Landings	Other gear[a]	Trawl gear [b]	Test fishery[c]	Total
1988	[d]	[d]	1,548	[d]		1,548
1989	6	9	639	919		1,558
1990	8	14	1,514	6,588		8,102
1991	5	7	272			272
1992	15	23	2,591	6,341		8,932
1993	3	7	191	5,442		5,633
1994	5	7	5,811			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	[d]	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	[d]	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
Average	14	34	4,070	3,445,128	316,896	3,748,344

[a] Includes jig, pot, and longline harvest from the Inside and Outside Districts

[b] Includes pollock bycatch in PWS shrimp trawl fishery

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

[d] Confidential data due to the low number of participants.

Table 19.–Prince William Sound directed pollock fishery harvest and bycatch by species or species group, 1995–2014.

		Reported bycatch [a,b]											
		Rockfish		Salmon		Shark		Squid		Misc.		Total bycatch	
Year	Pollock harvest	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	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	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	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%

[a] Includes discards at sea.

[b] Test fish not included.

Table 20.–Prince William Sound area commercially harvested trawl fishery pollock average length, weight, and age; sex ratio (percent female); and number sampled (*n*), 1995–2013.

Year	Average length (cm)	*n*	Average weight (kg)	*n*	Average age (years)	*n*	Percent female	*n*
1995	53.4	500	1.3	500	n/a		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	[a]	280	42	1,005
2001	50.9	1,492	1.1	1,492	[a]	994	42	1,487
2002	51.9	628	1.3	623	[a]	552	39	626
2003	43.1	697	0.8	557	[a]	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	[b]	1,150	34	1,099
Average	50.0		1.1		6		38	

[a] Age data produced 2000–2003 using criteria inconsistent with remaining years; age data scheduled to be reproduced.

[b] Age data is in process of being analyzed at the ADF&G lab in Homer.

Table 21.–Annual effort and harvest in the commercial lingcod fishery from the Prince William Sound area, and adjacent federal waters, 1988–2013.

		Harvest (lb)				
Year	Vessels	Landings	Inside	Outside	Federal	Total
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	6,627	4,115	43,088	53,829
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
Average	28	45	5,883	5,377	23,532	34,862

Table 22.–Prince William Sound commercial lingcod harvest landed as bycatch or in the directed fishery.

			Harvest (lb)		
Year	GHL	District	Directed	Bycatch	Total
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	-	1,527	1,527
	25,300	Outside District	17,405	11,399	28,804
		Inside District	68%	32%	100%
Average %		Outside District	46%	54%	100%

Table 23.–Average length, weight, and age; sex ratio (percent female); and number sampled (*n*) of commercially harvested lingcod sampled from the Prince William Sound area, 2003–2013.

Year	Average length (cm)	*n*	Average weight (kg)	*n*	Average age (years)	*n*	Percent female	*n*
2003	105.9	243	13.1	191	17	124	79	236
2004	107.4	453	13.1	403	[a]		92	453
2005	108.0	257	14.2	177	[a]		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	[b]		95	314
2013	110.1	281	13.9	281	[b]		98	280
Average	106.7		12.8		15		87	

[a] Age data is incomplete for 2004 and unavailable for 2005.

[b] Age structures submitted to Age Determination Unit; age data for 2012 and 2013 have not yet been analyzed.

Table 24.–Prince William Sound annual reported harvest (lb) of miscellaneous groundfish species including discards at sea, 1988–2013.

Year	Vessels	Landings	Flatfish[a]	Salmon	Sharks[b]	Skates	Other[c]	Octopus	Squid	Totals
1988	9	15	15,457		34	11,770	315			27,576
1989	5	8	56			614	644		1,467	2,781
1990	19	77	72,973				454		2,166	75,593
1991	27	53	5,742		175	11,022	2,124	15		19,077
1992	33	76	8,942		1,338	19,192	17,008	1,230	399	48,109
1993	18	69	664		1,080	1,565	2,781	5,625	317	12,031
1994	21	69	1,216		2,465	4,435	19,203	5,798		33,117
1995	34	99	10,421	79	1,368	9,668	5,534	3,814	1,367	32,250
1996	33	76	76,346	0	32,052	26,700	3,603	994	468	140,163
1997	25	79	320	72	4,840	37,256	1,326	3,547	18,316	65,678
1998	24	66	4,182	371	8,692	44,790	6	2,928	23,577	84,546
1999	10	62	462	2,148	14,233	868	1,240		6,162	25,113
2000	12	43	7,637	545	2,044	999	129		5,951	17,304
2001	9	45	1,235	372	7,149	4,158	457		31,101	44,472
2002	10	42	4,214	1,274	188,256	6,402	776	20	180,250	381,192
2003	10	47	3,893	189	47,939	8,938	5,718	2,697	20,547	89,922
2004	11	31	4,515	156	36,757	7,758	1,850	380	11,175	62,590
2005	21	55	5,562	775	70,177	85,971	5,486	5	7,117	175,075
2006	16	31	6,826	635	159,462	10,845	11,240	90	31,813	220,911
2007	9	22	2,449	872	11,169	2,587	460		11,805	29,342
2008	16	30	515	48	19,613	13,741	911		31,359	66,187
2009[d]	38	82	10,551	142	31,572	333,777	4,989	0	16,022	397,054
2010[e]	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	56	121	6,739	1,431	28,291	152,586	6,328	0	8,123	203,498
2013	49	149	1,232	61	76,231	244,770	2,163	1,095	88,155	413,707

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

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

[c] Other includes general groundfish, miscellaneous unidentified fish, eel, greenling, and sculpin.

[d] 2009 skate harvest includes 258,389 lb harvested by 9 vessels in 17 landings in the directed fishery.

[e] 2010 skate harvest includes 104,509 lb harvested by 6 vessels in 16 landings in the directed fishery.

Table 25.–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)	*n*	Average weight (kg)	*n*	Average age (years)	*n*	Percent female	*n*
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)	*n*	Average weight (kg)	*n*	Average age (years)	*n*	Percent female	*n*
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	

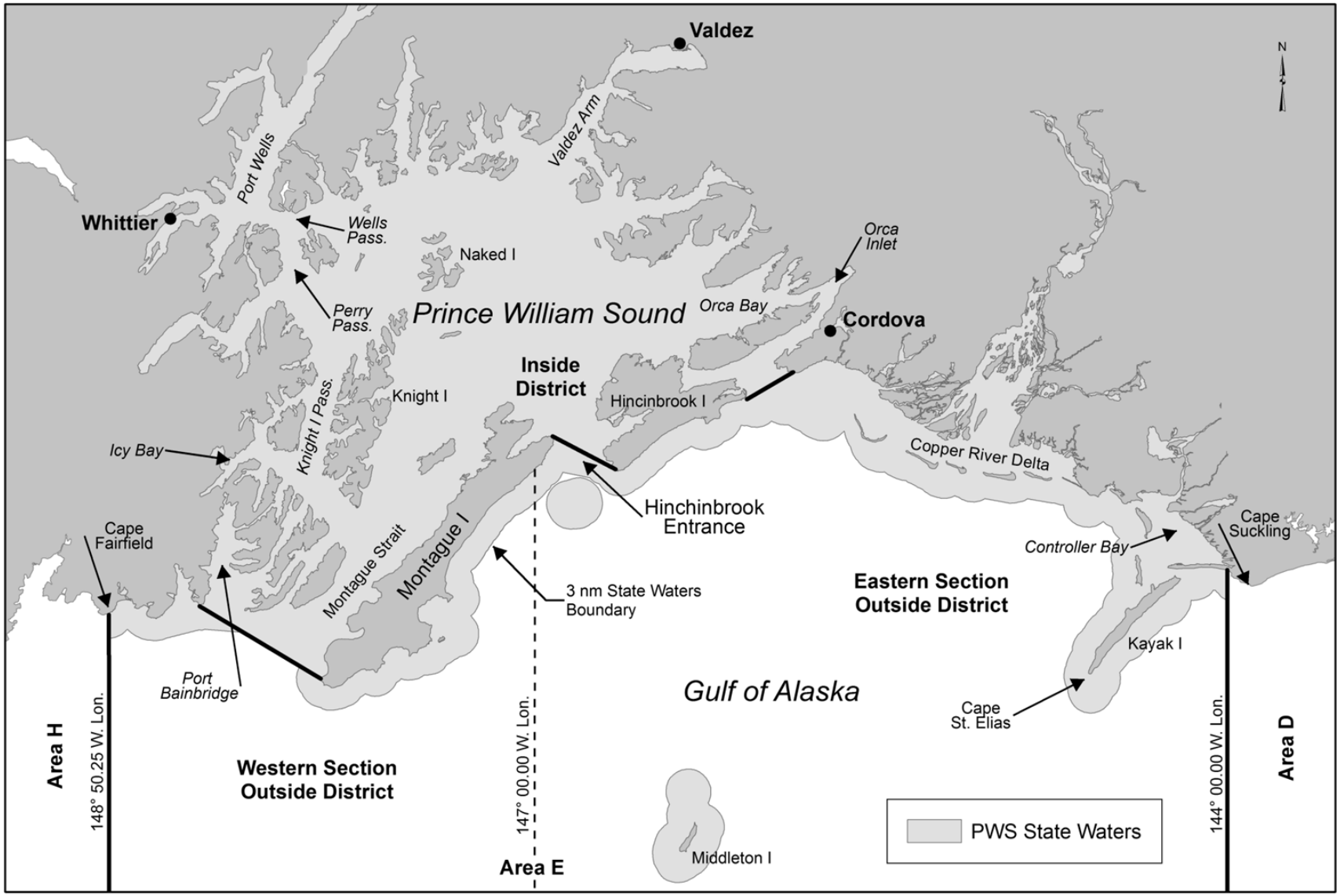


Figure 1.–Prince William Sound Management area groundfish fishing districts and areas of note.

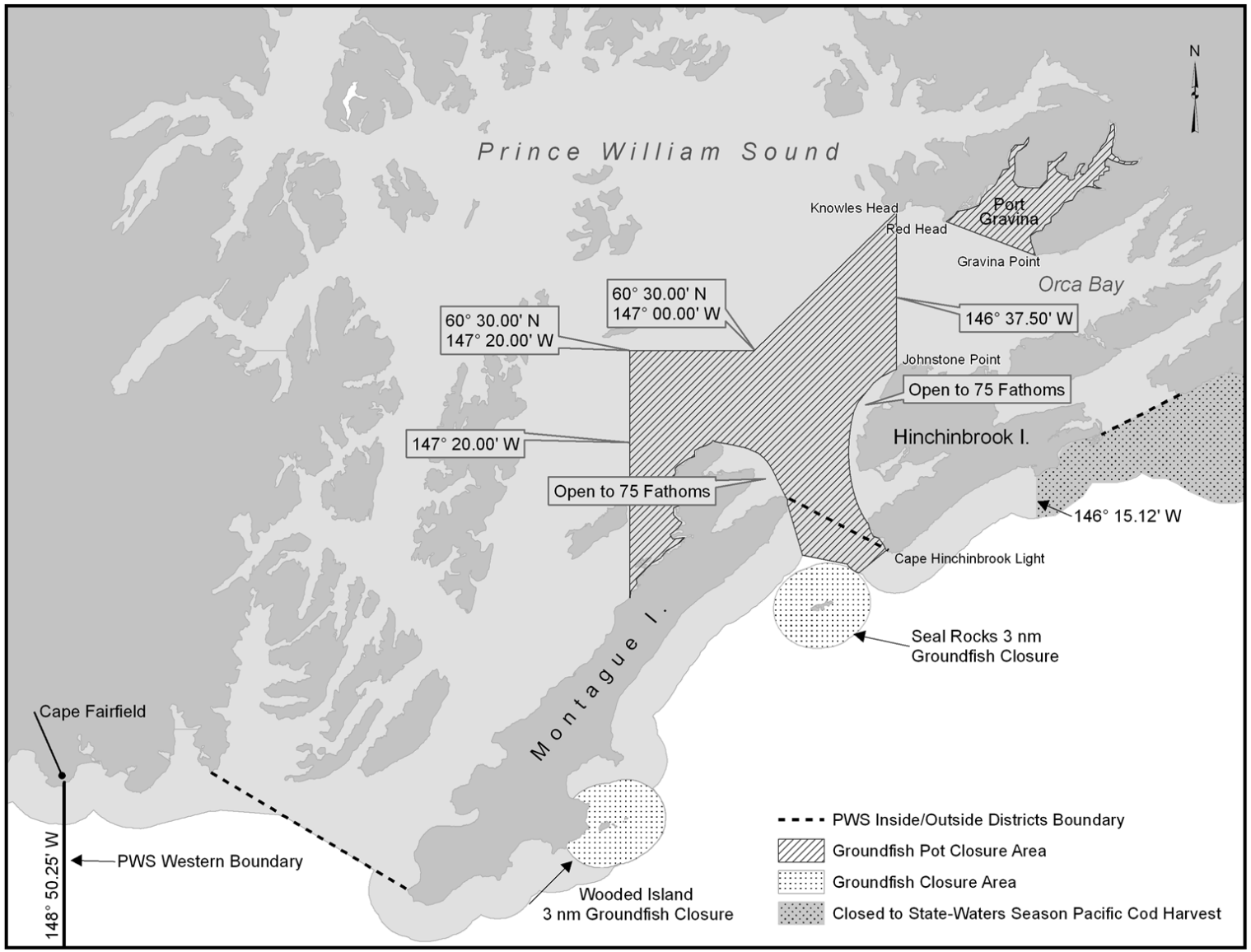


Figure 2.–Prince William Sound groundfish fishing closures implemented for Stellar sea lion and Tanner crab protection.

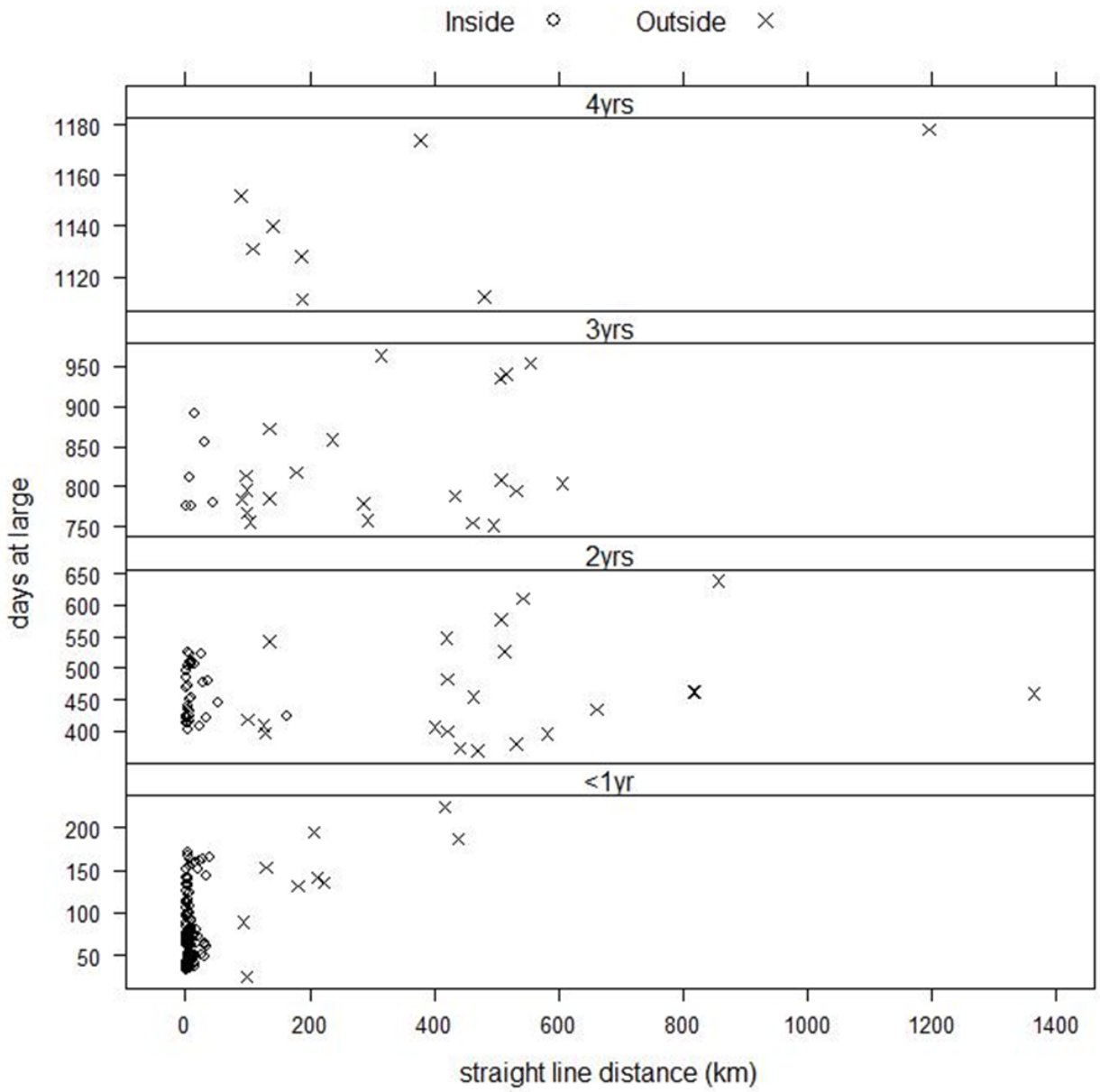


Figure 3.–Prince William Sound area sablefish tagging project recapture distance and timing 2011–2014.

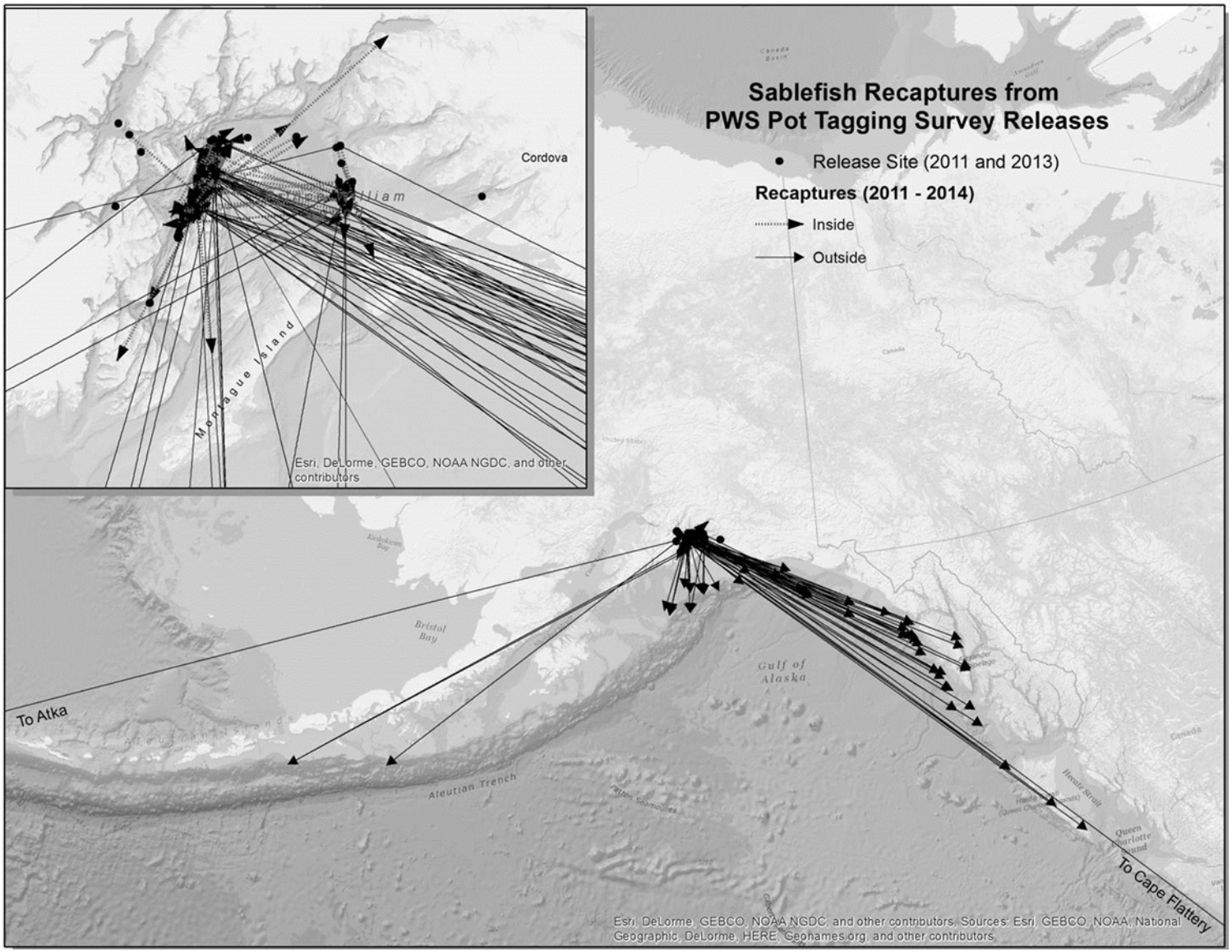


Figure 4.–Prince William Sound area sablefish tagging project recapture sites.

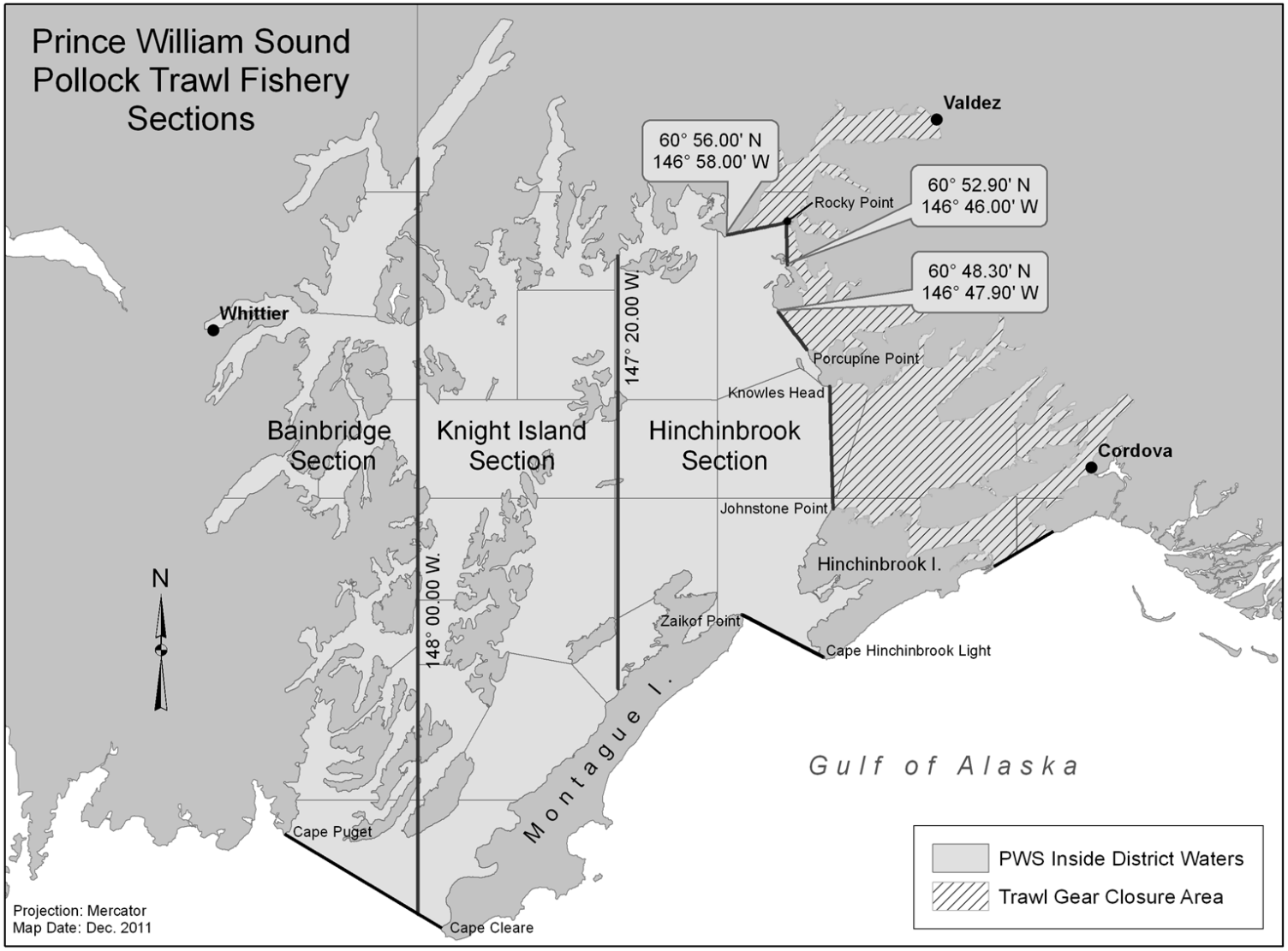


Figure 5.–Prince William Sound area Inside District pollock management sections established in 2000.

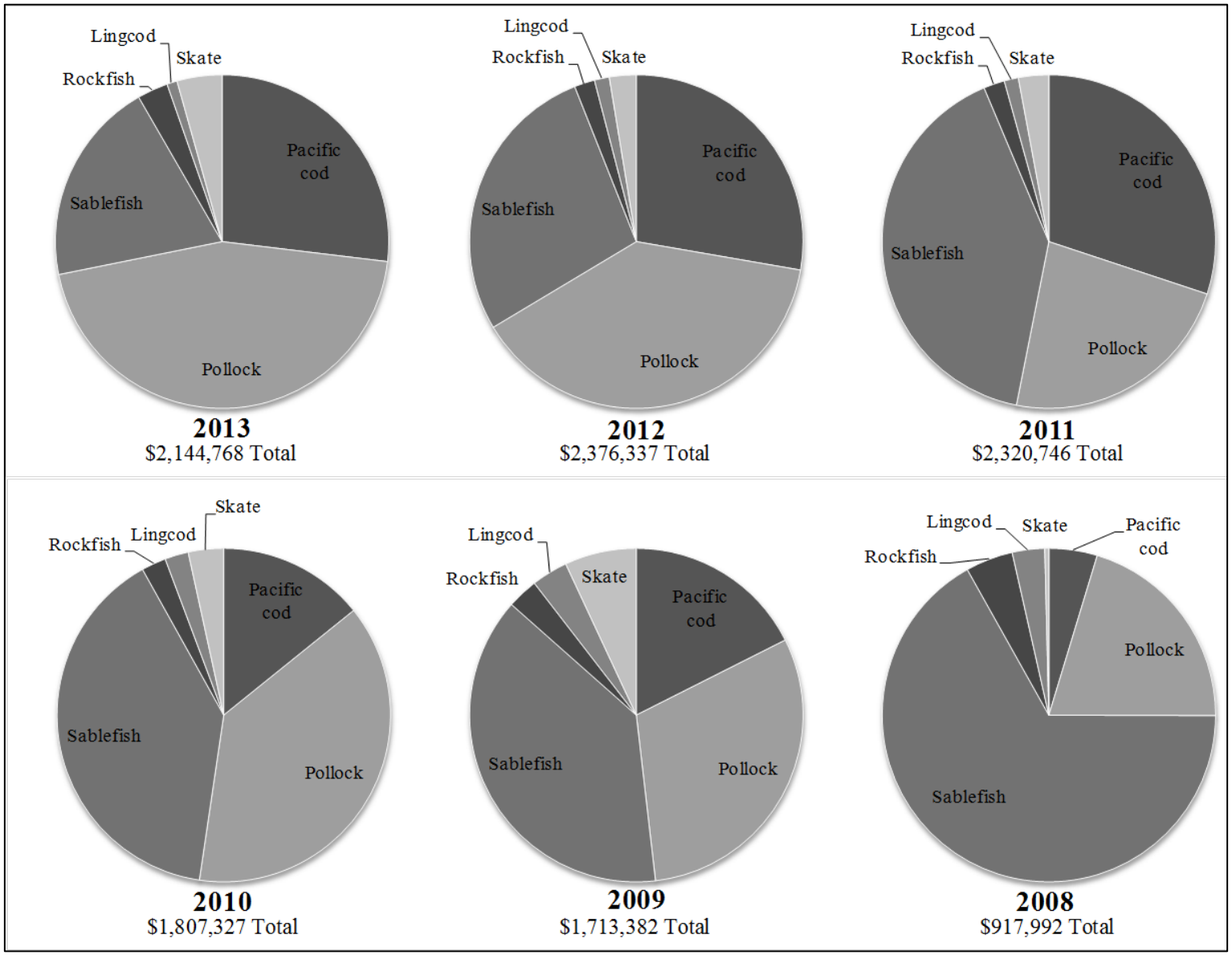
APPENDIX A: PRINCE WILLIAM SOUND STATE MANAGED GROUNDFISH HARVEST VALUES

Appendix A1.–Prince William Sound state-managed groundfish harvest whole pounds sold and exvessel values.

	Lingcod		Pacific cod		Pollock		Rockfish		Sablefish		Skate		Total
Year	Lb Sold	Value	Lb Sold	Value	Lb Sold	Value	Lb Sold	Value	Lb Sold	Value	Lb Sold	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
10 Year Avg.	36,857	$30,619	860,827	$297,176	3,423,508	$493,851	87,382	$40,856	206,705	$594,380	121,882	$41,822	$1,498,703

[a] 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.

Appendix A2.–Prince William Sound state-managed groundfish percent of fishery contribution to total exvessel value 2008–2013.



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) for the core stations of the multi-species large-mesh trawl survey, 2009–2013.

		Year		
Group	Species	2009	2011	2013
cod	Pacific cod	21.622	23.334	12.075
	walleye pollock	83.392	70.445	58.184
eelpout	Alaska eelpout	0.009	0.104	0.016
	black eelpout	0.080	0	0
	blackmouth eelpout	0	0	0
	eelpout unident	0	0.126	0
	shortfin eelpout	1.093	0.577	0.881
	wattled eelpout	2.470	0.063	0.697
flatfish	arrowtooth flounder	220.533	224.280	312.521
	Pacific halibut	37.858	18.766	29.052
	slender sole	0.109	0.180	0
	dover sole	36.529	16.452	12.114
	English sole	2.101	0.191	0.321
	flathead sole	126.018	139.172	97.464
	rex sole	35.485	24.924	13.315
	rock sole	0	0	0
greenling	lingcod	0.143	0	0
herring	Pacific herring	0.068	0.016	0
poacher	blackfin poacher	0.206	0.039	0
	starsnout poacher unident	0	0	0.022
	sturgeon poacher	0	0	0.088
prickleback	longsnout prickleback	0.050	0.097	0.125
	whitebarred prickleback	0.062	0	0
rockfish	Pacific ocean perch	0	0	0.940
	dusky	0	0.050	0
	unspecified slope	0	0.727	0
	redbanded	0.229	0	0.024
	redstripe	0.461	0	0
	rougheye	33.401	34.390	36.211
	sharpchin	0.007	0	0.233
	shortraker	1.017	0	0.155
	silvergray	0.060	0.248	0
	shortspine thornyhead	0.188	0.177	0.677
	unspecified	0.443	0.001	0
	yelloweye	0.276	0	0
sablefish	sablefish	3.596	0.863	0.219
sculpin	bigmouth sculpin	4.123	6.045	7.195
	blackfin sculpin	0	0.041	0
	darkfin sculpin	0.694	0.673	0.566
	northern sculpin	0	0.037	0
	roughspine sculpin	0.062	0.024	0
	spinyhead sculpin	2.193	1.749	2.923
	tadpole sculpin	0	0	0
	thorny sculpin	0	0.002	0
shark	Pacific sleeper shark	0	0	0
	shark, spiny dogfish	0.299	3.368	0.106

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Group	Species	Year 2009	2011	2013
skate	Aleutian skate	5.054	9.071	5.401
	sandpaper skate	21.513	30.345	27.031
	unidentified	0.001	0	0
	Bathyraja sp.	0	0	0
	big skate	15.938	16.370	10.397
	longnose skate	56.526	66.459	77.977
smelt	capelin	0.004	0.003	0
	eulachon	2.879	2.940	0.730
snailfish	salmon snailfish	0.110	0	0
	smalldisk snailfish	0.002	0.084	0.001
	snailfish unident	0.542	0.386	0.001
wrymouth	giant wrymouth	0	1.274	2.847
	wrymouth unident	2.342	0	0