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# **Cook Inlet Area Groundfish Report 2004**

by

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and

**William R. Bechtol**

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November 2004

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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<b>Weights and measures (metric)</b>		<b>General</b>		<b>Measures (fisheries)</b>	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.		
meter	m	at	@	<b>Mathematics, statistics</b>	
milliliter	mL	compass directions:		<i>all standard mathematical</i>	
millimeter	mm	east	E	<i>signs, symbols and</i>	
		north	N	<i>abbreviations</i>	
		south	S	alternate hypothesis	H <sub>A</sub>
		west	W	base of natural logarithm	<i>e</i>
		copyright	©	catch per unit effort	CPUE
		corporate suffixes:		coefficient of variation	CV
		Company	Co.	common test statistics	(F, t, $\chi^2$ , etc.)
		Corporation	Corp.	confidence interval	CI
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(multiple)	R
		District of Columbia	D.C.	correlation coefficient	
		et alii (and others)	et al.	(simple)	r
		et cetera (and so forth)	etc.	covariance	cov
		exempli gratia		degree (angular)	°
		(for example)	e.g.	degrees of freedom	df
		Federal Information		expected value	<i>E</i>
		Code	FIC	greater than	>
		id est (that is)	i.e.	greater than or equal to	≥
		latitude or longitude	lat. or long.	harvest per unit effort	HPUE
		monetary symbols		less than	<
		(U.S.)	\$, ¢	less than or equal to	≤
		months (tables and		logarithm (natural)	ln
		figures): first three		logarithm (base 10)	log
		letters	Jan, ..., Dec	logarithm (specify base)	log <sub>2</sub> , etc.
		registered trademark	®	minute (angular)	'
		trademark	™	not significant	NS
		United States		null hypothesis	H <sub>0</sub>
		(adjective)	U.S.	percent	%
		United States of		probability	P
		America (noun)	USA	probability of a type I error	
		U.S.C.	United States	(rejection of the null	
			Code	hypothesis when true)	α
			use two-letter	probability of a type II error	
			abbreviations	(acceptance of the null	
			(e.g., AK, WA)	hypothesis when false)	β
				second (angular)	"
				standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var

### Weights and measures (English)

cubic feet per second	ft <sup>3</sup> /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	pH
(negative log of)	
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

***SPECIAL PUBLICATION NO. 04-11***

**COOK INLET GROUND FISH REPORT 2004**

by

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## ABSTRACT

The Alaska Department of Fish and Game (ADF&G) manages all commercial groundfish fisheries within the Cook Inlet Area, defined as territorial waters from the shoreline to 3 nautical miles offshore located west of Cape Fairfield and north of the latitude of Cape Douglas. The Cook Inlet Area is divided into the Cook Inlet District, defined as Cook Inlet waters north of a line from Cape Douglas to Point, and North Gulf District, which comprises the remaining management area waters. In addition, ADF&G has management authority for lingcod and black rockfish in waters of the exclusive economic zone (EEZ) located adjacent to the Cook Inlet Area and from 3–200 nautical miles offshore. Commercial groundfish fisheries, including harvests, effort, and regulations, are described for the Cook Inlet Area during the years 1988 to 2004. Through August 20, the 2004 harvest among all groundfish totaled 2.7 million lb, generating an estimated exvessel value of \$0.9 million. These fisheries were largely prosecuted by longline, jig, and pot gears. Although several fisheries remain open, the total 2004 harvest and value are likely to be the greatest in the past three years but well below fishery yields in the mid- to late-1990s. Pacific cod has annually comprised the greatest economic yield from Cook Inlet Area commercial groundfish harvests since 1990. Sablefish has generated the second highest annual exvessel value since 2000, based primarily on a high dockside price (\$1.70/lb, round weight, in 2004). Rockfish and lingcod landings declined in 2004, although these fisheries remain open. Walleye pollock harvests totaled 342,000 lb in 2004, the largest landings since extensive directed fishing occurred in the Cook Inlet Area during 1996 to 1999. Several recent regulatory management changes are described for Cook Inlet Area commercial groundfish fisheries.

Key words: assessment, Board of Fisheries, Cook Inlet, exvessel value, groundfish, harvest, management.

## INTRODUCTION

The Cook Inlet Area (Figure 1), which includes territorial waters west of Cape Fairfield (148° 50.25' W. long.) and north of the latitude of Cape Douglas (58° 51.10' N. lat.), is divided into the Cook Inlet and North Gulf Districts. The Cook Inlet District includes waters of Cook Inlet north of a line from Cape Douglas to Point Adam (59° 15.27' N. lat.) and the North Gulf District comprises the remaining waters of the management area, primarily the Gulf waters along the outer Kenai Peninsula.

The Alaska Department of Fish and Game (ADF&G) manages all commercial groundfish fisheries within the territorial waters of Cook Inlet, those waters from the shoreline to 3 nautical miles offshore. For territorial waters, the Alaska Board of Fisheries (BOF) establishes management regulations with inseason adjustments to time and area by ADF&G emergency orders. The National Marine Fisheries Service (NMFS) manages waters of the exclusive economic zone (EEZ), located from 3–200 nautical miles offshore, under management plans developed by the North Pacific Fishery Management Council (NPFMC).

Under state regulation, groundfish are defined as all marine finfish except halibut, osmerids, herring, and salmonids. Directed fisheries occur for several commercially important groundfish including (Table 1): sablefish, Pacific cod, walleye pollock, lingcod, and numerous rockfishes. State groundfish regulations also accommodate incidental groundfish bycatch from other directed groundfish, halibut, and salmon and herring gillnet fisheries. Some additional species landed as bycatch to directed groundfish fisheries include: spiny dogfish, Pacific sleeper shark, Pacific salmon shark, majestic squid, giant Pacific octopus, and skates. Statewide regulations prohibit directed commercial fishing for sharks (5 AAC 28.084) and allow skate fishing only under a commissioner's permit (5 AAC 28.083). Few flatfish landings have occurred, although numerous species of flatfish comprise a significant portion of the groundfish biomass within Cook Inlet waters (Bechtol 2001; Gustafson and Bechtol 2001). Unlike other fisheries, ADF&G management of both directed and incidental harvests of lingcod and black rockfish extends

throughout adjacent federal waters of the Gulf of Alaska EEZ. Commercial groundfish harvests are monitored inseason through ADF&G fish tickets (regulation 5 AAC 39.130) and processor reports. In Cook Inlet, reporting requirements specify that all groundfish retained but not delivered for sale, such as catch that is retained for personal use or used as bait at sea, must be reported on an ADF&G fish ticket. One of the most reliable means of improving fisheries management is through complete and accurate documentation of fisheries mortality, particularly reporting of all harvest removals.

Legal gear types for groundfish fishing in the Cook Inlet Area are longline, pelagic trawl, hand troll, mechanical jig, and pots. In most area fisheries, if more than one gear type is legal, only one gear type may be aboard at a time. Fishermen operating groundfish gear or groundfish tenders in Cook Inlet Area waters must have an area registration prior to fishing or tendering. Another area regulation is a 24-hour delivery period following the closure of a directed fishery. Some open groundfish seasons are established in regulation 5 AAC 28.310. For many species, season openings are specified in regulation as calendar dates with season closures set by emergency order (Table 2). For Pacific cod, the parallel and state waters seasons established in regulation 5 AAC 28.367 are opened by emergency order contingent upon management actions for the Pacific cod fishery in the adjacent federal Central Gulf of Alaska (CGOA). For a miscellaneous groundfish species that is not otherwise identified in regulation, the fishing season is established as a provision of the miscellaneous groundfish permit (regulation 5 AAC 28.379).

This report summarizes annual harvests, in pounds (lb) converted to round weight equivalents, and exvessel values for commercial groundfish fisheries during 1988-2004 (Trowbridge et al. 2001; Table 3). Some of the more important groundfish fisheries are discussed in specific sections of this report.

## **SABLEFISH**

**Proposal 9.** Adopt a management plan for sablefish.

### **HISTORICAL BACKGROUND**

Cook Inlet sablefish harvests since 1988 have ranged from 2,996 lb in 1989 to 136,260 lb in 1988; effort ranged from 4 to 79 vessels (Table 4). During 2000-2003 catch and effort averaged 117,040 lb and 18 vessels. The North Gulf District yielded the majority of sablefish harvests with annual harvests from the Cook Inlet District rarely exceeding 2,000 lb. No sablefish have been landed from the Cook Inlet District since 1995.

The Cook Inlet Area sablefish fishery historically opened and closed on dates concurrent with the sablefish season in adjacent federal waters (Bechtol 1995b). Following implementation of the federal Individual Fishing Quota (IFQ) program in 1995 (Sigler et al. 2003), the Cook Inlet sablefish fishery became one of only two open-access sablefish fisheries in the state. Beginning in 1995, the Cook Inlet fishery opened concurrently with the IFQ fishery on March 15 and closed by emergency order when the guideline harvest level (GHL) was achieved. In 1997, the GHL was set as the recent 5-year average harvest of 104,000 lb based on North Gulf District boundaries as defined prior to 1996. The fishery GHL has subsequently been adjusted in proportion to the percentage annual change in sablefish total allowable catch (TAC) set by NPFMC for federal waters of the CGOA. The TAC is based on biomass estimates generated from annual surveys conducted by NMFS in the Gulf of Alaska. These biomass estimates, and the corresponding TACs for the CGOA, declined annually from 1994 to 1999 (Sigler et al. 2003) and increased from 2000 to the present. Because sablefish in the Cook Inlet Area are believed to

be part of the Gulf of Alaska stock, adjusting the state GHL proportional to changes in the CGOA TAC provides a conservative approach to this historical nearshore fishery.

In response to complaints of harvest being misreported from adjacent federal waters, and testimony suggesting improved sablefish catch rates in nearshore waters later in the year, a public proposal to change the sablefish season opening date to July 15 was adopted by the BOF in 1998 and first implemented in 2000. Harvest data from 1988 to 1999 indicated the majority of the harvest occurred during May and June, supporting the increased catch rate claims (November 1998 Alaska Board of Fisheries Meeting, RC15).

Sablefish catch rates in the North Gulf District have varied annually (Table 4). Despite declines in biomass and the corresponding decrease in the state fishery GHL, catch rates in the Cook Inlet Area sablefish fishery increased after 1995. Although the department attempted to adjust to the increase with shorter seasons, inseason data were not adequate to allow a timely response and the GHL has been exceeded annually since 1999 (Table 4). Season durations for 1996 to 1998 were 169 days, 134 days, and 35 days, respectively. Following the open season date change in 2000, season duration declined to 11 days in 2000, 6 days in 2001, 3 days in 2002, and 2 days in 2003.

Federal and state regulations allow a sablefish IFQ holder to participate in the state managed sablefish fishery, provided the vessel catch does not exceed IFQ shares and the permit holders comply with both federal IFQ and state regulations. Similarly, individuals with halibut IFQ may participate in the state managed sablefish fishery or retain sablefish as bycatch during the open sablefish season. Sablefish may not be retained from Cook Inlet state waters when the state managed fishery is closed.

A fishery-independent longline survey to assess sablefish stock status in the North Gulf District was conducted by the department in Resurrection Bay and Aialik Bay in 1999, Nuka Bay in 2000, and Day Harbor in 2002 (Table 5). The survey, which also provided insights into longline bycatch, has been discontinued due to a lack of dedicated funding.

## **2004 SEASON SUMMARY AND OUTLOOK**

The 2004 Cook Inlet Area sablefish fishery opened for a 24-hour period July 15 with an 87,000-lb fishery GHL. Catch was monitored via fish tickets and frequent contacts with fish buyers. The catch totaled 82,836 lb from 17 landings by 17 vessels (Table 4). The average landing was approximately 4,873 lb; less than the 2003 average of 8,721 lb, but greater than any other year on record. Greater catch rates may reflect the above-average recruitment of the 1997 and 1998 year classes in the Gulf of Alaska (Sigler et al. 2003). In contrast to earlier years, most vessels delivered whole sablefish, which facilitated biological sampling. The department sampled sablefish landings in Seward and collected 500 biological samples for length, weight, sex, maturity, and age.

The 2005 Cook Inlet Area sablefish fishery will open July 15 with a GHL to be determined following an announcement of the federal TAC. Effort in the fishery is expected to remain stable and the department will likely set a 24-hour fishing period in order to manage for the GHL. Similar to recent years, the department will work to achieve sablefish sampling goals.

## **ROCKFISH**

**Proposal 7.** Restrict the directed rockfish fishery to black rockfish and require logbooks.

**Proposal 8.** Require full retention of all rockfish bycatch with the state receiving proceeds from overages.

## **HISTORICAL BACKGROUND**

Within the Cook Inlet Area, the North Gulf District has historically yielded greater than 95% of the commercial rockfish catch during any year and also supported active sport and personal use rockfish fisheries. The rocky, high-relief habitat typical of the North Gulf District is more suitable to nearshore rockfish than the glacial-mud substrate of the Cook Inlet District. Since 1988, area catch ranged from 30,579 lb by 31 vessels in 1990 to 502,045 lb by 120 vessels in 1995 (Table 6). Pelagic shelf rockfish, particularly black rockfish taken primarily by jig gear, have comprised over 50% of the total harvest in most years (Bechtol 1998; Figure 2). Demersal shelf rockfish, predominantly yelloweye rockfish harvested by longline gear, has been the second most dominant species and averaged 28% of the total annual catch since 1996. Since 2000, yelloweye harvest by jig gear has exceeded the longline harvest of yelloweye and increased annually from 3,700 lb in 2000 to 32,000 lb in 2003.

Rockfish are managed via the Cook Inlet Rockfish Management Plan (5 AAC 28.365), first implemented in 1993. From 1993 to 1996, rockfish opened to directed fishing January 1, closed when the 150,000-lb GHLL was attained, and reopened as a bycatch-only fishery for the balance of the year. In 1996, due to bycatch harvests that approached directed fishery removals in some years, coupled with a lack of stock abundance information, the BOF adopted a more conservative approach by making the 150,000-lb GHLL a harvest cap rather than a trigger for opening the bycatch fishery. Management under the harvest cap approach, begun in 1997, proved problematic, as it required the department to anticipate the rockfish bycatch needed for other directed fisheries such as halibut and Pacific cod. In 1998, the NPFMC amended the pelagic rockfish assemblage, as defined in the federal Gulf of Alaska Fishery Management Plan, by removing black and blue rockfishes (DiCosimo et al. 1997). This action, requested by the state to address misreporting problems associated with the fishery, effectively transferred management responsibility for these species in federal waters, to the State of Alaska. Although blue rockfish has not been reported in the Cook Inlet Area, black rockfish is a pelagic species commonly found in the North Gulf District. Also in 1998, the BOF established a directed rockfish season opening date of July 1, and restricted gear for rockfish to mechanical jig or hand troll. These measures were adopted to focus the directed fishery on black rockfish, rather than yelloweye rockfish that are more susceptible to overfishing. Individual landings dominated by yelloweye rockfish raise questions regarding the use of legal gear. In addition, changes in the commercial fishery species composition heightens concern about stock sustainability because demersal shelf rockfish, such as yelloweye, require a much longer rebuilding period than pelagic shelf rockfish in the event of overharvest (Figure 2).

The July 1 season opening date also facilitates management by deferring the directed rockfish fishery until some of the non-rockfish fisheries are closed for the year and is concurrent with the directed lingcod fishing season opening date. Because the directed rockfish and lingcod fisheries are both restricted to jig gears and both fisheries can have a substantial bycatch of the other species, bycatch and discards are somewhat reduced. Other regulatory components of the rockfish management plan include:

- a five-day trip limit of 1,000 lb for Cook Inlet District, and 4,000 lb for the North Gulf District;
- a 150,000-lb annual harvest level for all the fishery removals; and
- a 20% bycatch limit after the directed fishery closes, providing the above trip limits are not exceeded.

## **2004 SEASON SUMMARY AND OUTLOOK**

The 2004 rockfish harvest from the Cook Inlet Area through August was 92,349 lb from 94 landings by 51 vessels (Table 6). The directed season opened July 1 and remains open. Black rockfish, taken primarily by jig gears, comprised 80% (74,048 lb) of the harvest, followed by yelloweye rockfish at 18% (16,746 lb) of the total. In contrast to recent years, most yelloweye rockfish were taken by longline gear as bycatch to directed Pacific cod, sablefish, and halibut longline fisheries. Other species comprising the balance of the rockfish harvest included rougheye, shortraker, thornyhead, quillback, yellowtail, silvergray, and dusky rockfishes.

To date in 2004, the department has sampled a total of 672 rockfish at the ports of Homer and Seward. Fish were sampled for length, weight, sex, maturity, and age composition. Species composition was 79% black rockfish, 7% dusky rockfish, 1% quillback rockfish, and 13% yelloweye rockfish. The directed jig fishery accounted for 587 (87%) of the total samples. Other species sampled included dusky rockfish, thornyhead, silvergray, shortraker, quillback, and yellowtail rockfishes.

Since 2001, the department has continued a series of research projects to assess black rockfish populations at selected locations within the North Gulf District (Byerly and Bechtol 2003, 2004). The goal of these studies is to develop a standardized approach to either estimate absolute abundance or establish an abundance index for black rockfish and associated species in nearshore waters. Field seasons to date involved surveys of approximately 12 days duration along the Outer Kenai Peninsula, particularly Harris Bay and Nuka Island. Survey methods have included: (1) use of sonar to locate fish aggregations; (2) tagging of jig-caught rockfish; (3) rockfish counts along underwater scuba transects; (4) using scuba to conduct maximum counts at a series of replicate study sites; and (5) using a commercial jig vessel to collect standardized CPUE data. Habitat data, as well as tagged fish counts, were collected during scuba work. Preliminary results indicated wave exposure, primary substrate, and depth to be the primary predictors of rockfish observations by divers. Work in 2005 will incorporate acoustic estimates of rockfish biomass.

The 2005 rockfish fishery will open January 1 to bycatch-only, with limits ranging from 5% to 20%, depending on the target species. The directed rockfish fishery will open by regulation on July 1 and close when the total catch is around 130,000 lb. The balance of the 150,000-lb harvest cap will provide for anticipated rockfish bycatch from other directed fisheries.

## **LINGCOD**

**Proposal 10.** Provide emergency order authority to require lingcod be delivered with the head on and vent intact.

### **HISTORICAL BACKGROUND**

Since 1988, Cook Inlet Area commercial lingcod harvests ranged from 2,894 lb in 1989 to 87,370 lb in 1993 (Table 7). Effort ranged from 10 vessels in 1989 to 84 vessels in 1992. The North Gulf District, which supports active commercial and recreational lingcod fisheries, has historically accounted for virtually all of the harvest. Lingcod harvest from the Cook Inlet District has been negligible, totaling only 1,295 lb since 1988. Harvest differences between districts likely reflect the relative amounts of suitable lingcod habitat.

In directed and bycatch fisheries during 1988 to 2003, jig gear yielded 76% of the lingcod harvest, longline gear 22%, and trawl and pot gears less than 2% (Table 7). Although harvest distribution prior to 1997 varied between state and federal waters, the majority of harvests since

then have come from state waters (Table 8). Similar to rockfish, the state assumed management authority for lingcod in the EEZ in 1998. It is unknown whether the changes in harvest distribution indicated shifts in relative abundance, harvest areas, or harvest reporting.

Directed fishing for lingcod has been restricted to jig gears since 1998. Regulatory season dates are July 1 to December 31; the closure during the first half of the year protects spawning and nest-guarding lingcod at a time when they are particularly vulnerable to capture (Vincent-Lang and Bechtol 1992). Current lingcod regulations also include a minimum size requirement of 35 inches overall or 28 inches measured from the front of the dorsal fin to the tip of the tail. The minimum legal size is intended to allow sexually mature lingcod to spawn in at least two successive years prior to being subjected to harvest removal. Lingcod may be retained at a 20% bycatch level during the open season. However, because survival of released fish is relatively high, lingcod may not be retained as bycatch during closed seasons.

Since 1993, Resurrection Bay has been closed to lingcod fishing, initially by emergency order and later by regulation, to protect depressed lingcod resources. The most recent surveys indicated little recruitment had occurred in this area (Bethe and Meyer 2002). Interest in the directed lingcod fishery has been sporadic in recent years. For example, the fishery was open through the entire July 1 – December 31 regulatory season during 1999, 2002, and 2003, but closed on August 30 in 2000, and October 22 in 2001.

Area closures, season opening dates, and size restrictions are similar for commercial and recreational lingcod fisheries. Recreational lingcod harvests in Cook Inlet Area waters have ranged from 73,300 lb in 1995 to 162,300 lb in 1992 (Table 8). A guideline harvest level has not been established for the recreational lingcod fishery.

Until 2002, the commercial lingcod fishery was managed for a 35,000-lb GHL that was established in 1997 as 50% of the recent 5-year harvest. The department adopted this conservative approach due to a lack of lingcod abundance and biomass estimates, and due to evidence of localized recruitment failures, particularly in Resurrection Bay, during the early 1990s (Vincent-Lang and Bechtol 1992). In 2002, the department increased the allowable harvest to 52,500 lb, or 75% of the average harvest during 1992-1996. This increase in the GHL is consistent with the approach applied by groundfish plan teams and the NPFMC for groundfish stocks in federal waters. Under Amendment 56 adopted by the NPFMC for the Bering Sea/Aleutian Groundfish Fishery Management Plan, a fishery is classified as a Tier 6 fishery if the only reliable assessment data is catch history. For a Tier 6 fishery, allowable biological catch (ABC) is defined as 75% of the historical annual average harvest.

## **2004 SEASON SUMMARY AND OUTLOOK**

The 2004 directed and bycatch lingcod fisheries opened July 1 with a 52,500-lb GHL. Lingcod harvest from the Cook Inlet Area currently totals 10,584 lb from 47 landings by 22 vessels (Table 7). Jig gear has produced 65%, and longline gear has yielded the balance of the 2004 harvest. Effort is low and the fishery is anticipated to remain open through December 31.

To date, ADF&G staff has sampled 75 lingcod from 8 commercial landings to the ports of Seward and Homer. Although most lingcod were delivered in a head-on condition, removal of the head prevents collection of otoliths used to develop size-at-age and age-at-maturity. External determination of sex was possible on some fish. However, most lingcod were delivered gutted and with the vent area removed, prohibiting collection of total weight, sex, and maturity data.

The 2005 fishery will open July 1 with a GHL of 52,500 lb. It is difficult to predict performance in the coming season given the inconsistent fishing effort in recent years. The department continues to actively pursue sampling of lingcod landings.

## **PACIFIC COD**

**Proposal 1.** Increase the GHL for Cook Inlet Pacific cod fishery to 6% of the federal Central Gulf of Alaska TAC.

**Proposal 2.** Establish a 58-foot vessel size limit for the state waters Pacific cod fishery.

**Proposal 3.** Allow unbaited pots to remain in the water indefinitely following a pot closure.

**Proposal 4.** Change the pot/jig gear allocations in the state waters Pacific cod fishery.

### **HISTORICAL BACKGROUND**

The Cook Inlet Pacific Cod Management Plan (5 AAC 28.367) defines two seasons, a “parallel season” and a “state waters season.” The parallel season is set by emergency order to coincide with the federal fishery for Pacific cod in the CGOA with respect to: (1) the opening date of the initial federal season; and (2) allowable gears, provided those gears are also legal in state waters. Subsequent parallel seasons may open if the GHL for the state waters season has been achieved. The state waters season, first implemented in April 1997, was designed to provide additional Pacific cod fishing opportunities for local vessels fishing with pot or jig gear.

Elements of the state waters season include:

- season opens by emergency order 24-hours following the closure of the initial federal season in the Central Gulf of Alaska area by NMFS;
- exclusive area registration; stipulates a vessel may not validly register for more than one exclusive Pacific cod registration area during a state managed season;
- GHL calculated as 2.25% of the Central Gulf of Alaska allowable biological catch (Thompson et al. 2003) and allocated equally between pot and jig gear;
- GHL increases to tiers of 3%, and then 3.75%, upon attainment of the previous GHL in any year;
- pot gear closure from May 1 to June 15;
- gear limits of 5 jigs or 60 pots, with a pot buoy tag requirement;
- allow full retention of pollock even when directed fishing is closed;
- when the directed rockfish fishery is closed, rockfish bycatch is reduced to 5% for vessels registered for the state Pacific cod season;
- if the jig allocation is not achieved before September 1, the balance of the allocation becomes available to pot gear; and
- gear limits and the exclusive area registration requirement may be relaxed after October 30 if it appears the GHL will not be achieved.

Statewide regulations for groundfish pots specify a tunnel eye perimeter of 36 inches or less and a biodegradable escape panel in the pot wall. Area regulations specify localized closures to groundfish pots in portions of Kamishak and Kachemak Bays to protect depressed king crab stocks and rebuilding Tanner crab stocks (Figures 3 and 4; Bechtol et al. 2002). Limited onboard

observer coverage of vessels using pot gear suggests the closure areas achieve the goal of protecting critical crab habitat.

Since 1988, annual catch in the Cook Inlet Area parallel Pacific cod fishery ranged from 36,846 lb taken by 9 vessels in 1989 to 5.4 million lb taken by 190 vessels in 1992 (Table 9). The parallel season harvest first exceeded 1.0 million lb in 1991 and averaged 3.3 million lb annually during 1991-2000 (Figure 5). After 2000, parallel fishery harvests totaled less than 1.0 million lb annually, primarily due to a shift to the Kodiak Area by the local longline fleet. Historically the majority of the catch was harvested from the North Gulf District by longline gear. However, the 1990s expansion of the pot fishery shifted the largest component of Pacific cod harvests to the Cook Inlet District where pot gear has taken 20-70% of the parallel season harvest in recent years (Bechtol 1995a; Trowbridge et al. 2001). The 2003 harvest of 420,798 lb was the lowest since 1991.

Harvests from the state waters season for Pacific cod ranged from 730,469 lb in 1998 to 1.5 million lb in 1999, with most of the harvest in all years coming from the Cook Inlet District (Table 10). Performance between jig and pot gears has varied among years (Figure 5). For example, jig gear harvested 67% of the 1997 season harvest total, a year in which pot gear was allowed to fish only four days before the spring pot closure went into effect. In contrast, jig catch fell to 26% of the 1998 harvest, and to less than 2% of the 2000 total harvest. In 1998, the BOF amended the start of the pot closure period from April 7 to May 1. This provided an additional three weeks to fish pot gear in the spring, provided the pot allocation was not taken. The original April 7 closure date was based on product quality concerns that were subsequently unrealized. After the department enacted the new regulation by emergency order in 1999, the fishery harvested 1.5 million lb of a 2.6 million-lb GHL. Despite such regulatory adjustments, supplemented by annual relief of the pot limits and exclusive area registration, the Cook Inlet state waters Pacific cod GHL was only achieved in 2003 (Figure 5).

Since 1997, total Pacific cod removals between parallel and state waters seasons have ranged from 2.7 million lb in 2000 to 4.7 million lb in 1999 (Table 10). While fishing with both jig and pot gears can be productive from late winter through late spring, the most effective period for jig gear has been March to May period. Although the department has only limited data on spring Pacific cod distributions in the Cook Inlet Area (Bechtol 2001), studies from other areas suggest that cod aggregate in major spawning areas during January through March, then migrate to shallower, nearshore waters as part of a spring postspawning migration (Shimada and Kimura 1994).

## **2004 SEASON SUMMARY AND OUTLOOK**

The 2004 Cook Inlet Area parallel Pacific cod season was open January 1 through 12:00 noon January 31 with catch and effort totaling 385,667 lb from 59 vessels, the lowest harvest since 1990 (Table 8). Similar to recent years, pot gear dominated the catch at 385,663 lb, 94% of the total harvest, a greater proportion than previous years due to a low level of longline effort.

Beginning in 2004, the state waters Pacific cod allocation increased to 3% of the federal CGOA TAC due to attainment of the 2003 GHL. The 2004 fishery opened February 1 with a 2.37 million-lb GHL, divided equally between pot and jig gear. The harvest through August was 1.8 million lb. Pot gear catch and effort totaled 1.46 million lb from 98 landings by 11 vessels and exceeded the pot allocation by approximately 277,000 lb (Figure 5); the pot season closed February 23 (Table 2). Subsequently, many participants shifted to jig gear. Jig catch and effort totaled 326,298 lb from 120 landings by 18 vessels. Although no Pacific cod harvest has been

reported since June, pot gear reopened by emergency order on September 1, as directed in the management plan, and pot effort is expected to develop in late October or early November. Approximately 580,000 lb of the GHLL remain to be harvested.

To date, ADF&G staff sampled 2,464 Pacific cod at Seward and Homer; samples came from both the Cook Inlet and North Gulf Districts. Length and weight data were collected from all fish. However, sex and maturity determination, as well as otolith removal for age and growth determination, was not possible for all deliveries because whole-fish marketing precluded cutting of some fish for sampling. Ancillary information on Pacific cod age, sex, size, and distribution is also collected during the annual trawl surveys in Kachemak and Kamishak Bays; survey results are reported under separate titles (Bechtol 2001).

The 2005 Cook Inlet Area parallel season for Pacific cod will open January 1 and coincide with inseason adjustments by NMFS for adjacent federal waters. The state managed season will begin 24 hours after NMFS closes directed fishing for Pacific cod in the CGOA. When the ABC for the CGOA has been determined, the department will issue a news release outlining the upcoming season. The department plans to continue commercial catch sampling of Pacific cod.

## **POLLOCK**

Walleye pollock seasons in the Cook Inlet Area were historically managed as parallel fisheries with state seasons set to coincide with NMFS actions in the adjacent waters of the federal EEZ. The cumulative pollock harvest from area state waters between 1987 and 1995 was 459,843 lb (Table 11). Directed pollock fishing with midwater trawls occurred in the North Gulf District during 1996-1999. Annual pollock harvest during these years ranged from 1.9 million lb in 1996 to 9.7 million lb in 1998, with midwater trawls yielding over 99% of the harvest. Since mid 1999, directed fishing for pollock has required a Miscellaneous Groundfish Permit (5 AAC 28.379). Due to lack of interest, no permits were issued through 2003. Limited deliveries of pollock also occur under regulation 5 AAC 28.075, which was intended to encourage improved retention and utilization of pollock and Pacific cod, although regulatory compliance is believed poor. Temporal and geographical fishing restrictions associated with Steller sea lion protective measures complicated pollock harvesting opportunities beginning in 2000; these measures are anticipated to continue in the future.

In 2004, the department issued a single commissioner's permit to allow the pelagic trawl harvest of pollock. That vessel, in combination with deliveries of incidentally caught pollock by 3 other vessels, resulted in a total 2004 pollock harvest of 342,305 lb through August.

## **OTHER GROUND FISH**

**Proposal 5.** Allow a directed commercial shark fishery and liberalize bag limits.

**Proposal 11.** Allow a directed commercial longline fishery for spiny dogfish.

### **HISTORICAL BACKGROUND**

Assorted species of flatfish, skates, sharks, and other groundfish have been harvested in both directed and bycatch fisheries in the Cook Inlet Area (Table 12). Historically, for any groundfish species that lacked specific regulatory management measures, state waters fishing seasons were set by emergency order to coincide with NMFS fishing seasons in adjacent federal waters. However, due to the potential for rapidly expanding and uncontrolled fisheries on species for which there is little biological data, the BOF adopted a variety of regulatory measures allowing

the department and the BOF to take a precautionary approach toward new or rapidly developing fisheries.

Among the more pertinent measures adopted by the BOF are:

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

Annual shark harvests from the Cook Inlet Area have ranged from no reported landings to 6,594 lb in 1999. In 1997, the BOF closed directed shark fishing, permitted retention of shark bycatch, and defined that a directed fishery for skates may only occur under the conditions of a commissioner's permit. Directed shark fishing remains open in the EEZ. Little new biological information has become available since the 1997 BOF actions. Data that might be used to develop a state management plan, such as stock structure, biomass and abundance levels, existing fishing mortality, and ecological linkages, are still lacking. High annual variability of sharks in department surveys is consistent with current literature and research data, which confirms most shark species are highly migratory (Table 5; Berceli et al. 2002). Because few sharks are currently retained as allowed under current commercial regulations, the recent interest in shark fisheries does not appear related to increased market demand, but instead to reducing hook competition with target species.

Incidental captures of shark and skate species can approach nuisance levels. Catch and discard mortality are poorly documented, but reportedly high among the fishing fleet in some areas. Cook Inlet Area shark bycatch, comprised primarily of spiny dogfish as evidenced by reported at-sea discards, has increased over the past decade. In contrast, declines in reported skate at-sea discards over the same term may suggest an overall decrease in skate abundance.

Octopus, which is defined in regulation as a miscellaneous shellfish in state regulation, is considered a groundfish species in federal regulation. While directed fishing for octopus never developed in the Cook Inlet Area, the bycatch of octopus, particularly from the pot fishery for Pacific cod, is significant. Octopus harvests ranged from no reported landings during 1988-1990 to 38,518 lb landed in 2002 (Table 12). An octopus management plan (5 AAC 38.360), implemented in 2000, established a bycatch-only fishery with a bycatch limit of 20% and a GHL of 35,000 lb. Squid, taken as bycatch to the pollock trawl fishery and also defined in regulation as a miscellaneous shellfish under state regulation, is reported here as a bycatch component of pelagic trawl fisheries. Squid landings peaked at 26,980 lb in 1998; no landings were reported after 1999.

## **2004 SEASON SUMMARY AND OUTLOOK**

Reported harvest of other groundfish in 2004 in the Cook Inlet Area was 38,591 lb from 88 landings by 19 vessels (Table 12). Octopus (51%) and skates (48%) comprised 99% of the total other groundfish harvest. Despite the interest expressed in directed shark fishery development, no shark landings were reported in 2004, although discussions with the fishing fleet suggest incidental catch of sharks remains common in some areas.

The NPFMC is currently reviewing a number of options concerning fishing mortality of miscellaneous groundfish species in federal waters. A Groundfish Plan amendment is being considered that would adopt shark-fishing restrictions for federal waters similar to those adopted by the BOF for state waters. In addition, the NPFMC is considering a Groundfish Plan Team proposal to reapportion the “other species” category into more discrete species groups, and providing each group with a given ABC and TAC as with longnose and big skates. Currently, miscellaneous species are lumped into the “other species” category and managed under an aggregate TAC that is set as a fixed percentage of the aggregate harvest biomass of all species for which TACs have been established. The current risk-prone approach could potentially allow a single species to be harvested up to the TAC established for the “other species” group in aggregate.

## **AT-SEA DISCARDS**

At-sea discards reported by vessels fishing in Cook Inlet Area waters ranged from 0 lb in 1988 to 138,236 lb in 1996 (Table 13). Sharks comprised the largest component, 90%, with sablefish and skates comprising the next largest components, 3% each, of all discards reported during 2004. Most reported discards come from NFMS and International Pacific Halibut Commission survey cruises with a smaller proportion coming from vessels carrying observers. Higher value species, such as sablefish, rockfish, and lingcod, typically have lower reported discards. Reporting of at-sea discards is somewhat dependent upon factors such as location and timing of fishery, changes to fishing technology, market conditions, requirements of vessel operator, etc. However, based on relative catch abundances observed in department surveys, actual discard rates are much higher than reported (Tables 5 and 13; Bechtol 2001; Gustafson and Bechtol 2001).

## **CONCLUSIONS**

Groundfish resources in the Cook Inlet Area represent a wide array of species targeted by commercial, recreational, and subsistence users. Formal management plans or strategies have been adopted for some of the more commercially important species. However, limited data are available on which to base management decisions for many species with limited or poorly documented historical harvests. In addition, we typically have a poor understanding of the ecological linkages for such species. Thus, management strategies often involve actions that deliberately operate in concert with federal management strategies in adjacent federal waters, particularly when transboundary species are being considered. In this way, the department can take advantage of biological information derived from NMFS stock assessments for adjacent federal waters.

While providing for directed fishing opportunities, it is also important to minimize resource waste by providing for retention of incidentally captured species, particularly when incidental captures are unavoidable. However, bycatch allowances must be sufficiently restrictive to serve as a disincentive to increasing the incidental capture.

Development of new fisheries, or increased harvests for existing species, can be accommodated through existing management plan development guidelines, including miscellaneous fisheries permits. These permits allow exploratory approaches to determine the economic and management viability of resource development without establishing exclusive fishing rights. However, it must be stressed that exploratory approaches place increased demands upon department staff for oversight and management and, in many cases; staff may be unable to commit the necessary resources for development of new fisheries. Furthermore, industry may be

called upon to shoulder some of the expenses of project development. Above all, development of new fisheries will be contingent upon adequate biological information. New or expanding harvests that are significantly detrimental to the stock status of target or incidentally caught species will not be approved. For this reason, it is critical that the industry participate as fully as possible in the information gathering process. One important part of this process is the complete and accurate documentation of fishery removals and fishery discards. A common misconception is that a particular removal, such as personal use, is insignificant. However, the cumulative impact of incremental removals can have biological significance on sustained yield management. In addition, accurate at-sea discard information provides data on relative encounter rates for many species that, while not retained at this time, may become economically important for future fisheries. Although some species of concern, such as sharks, have been discarded at sea by the industry for many years, the lack of documentation on relative encounter rates has impeded development of management strategies to provide for sustained yield. Resource management will continue to rely heavily on input from all user groups, and an increasing understanding and awareness of ecosystem impacts as a component of resource removal.

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## **TABLES AND FIGURES**

**Table 1.**—Some species encountered in Central Region groundfish management.

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

**Table 2.**—Emergency orders issued for commercial groundfish fisheries in the Cook Inlet Area during 2004.

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Emergency Order Number <sup>a/</sup>	Effective Date	Explanation
2-GF-H-01-04	1/1/04	Opened the parallel Pacific cod fishery at 12:00 noon.
2-GF-H-02-04	1/31/04	Closed the parallel Pacific cod fishery and opened the state waters season for Pacific cod at 12:00 noon February 1.
2-GF-H-03-04	2/23/04	Closed the state waters Pacific cod season to pot gear.
2-GF-H-04-04	7/15/04	Opened the sablefish season for 24-hours at 12:00 noon July 15.
2-GF-H-05-04	9/1/04	Reopened pot gear in the state waters Pacific cod season.

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<sup>a/</sup> Through September 2004.

**Table 3.**—Landings and estimated exvessel values of Cook Inlet Area groundfish harvests, 1988-2004.

Year	Sablefish	Rockfish	Lingcod	Pacific Cod	Pollock	Other Species	Total
<b><u>1988 Harvest</u></b>							
Round Wt (lb)	136,252	213,242	24,948	517,372	2,380	2,819	897,013
Price (\$/lb)	\$1.02	\$0.12	\$0.22	\$0.21	\$0.08	\$0.21	
Value	\$139,421	\$26,307	\$5,487	\$107,970	\$193	\$587	\$279,965
<b><u>1989 Harvest</u></b>							
Round Wt (lb)	2,996	81,042	2,894	36,846	250	234	124,262
Price (\$/lb)	\$0.71	\$0.07	\$0.37	\$0.07	\$0.00	\$0.15	
Value	\$2,116	\$5,662	\$1,058	\$2,587	\$0	\$34	\$11,457
<b><u>1990 Harvest</u></b>							
Round Wt (lb)	8,480	30,580	6,769	378,799	61,817	2,309	488,754
Price (\$/lb)	\$0.55	\$0.29	\$0.36	\$0.13	\$0.07	\$0.03	
Value	\$4,631	\$8,930	\$2,432	\$49,851	\$4,441	\$65	\$70,350
<b><u>1991 Harvest</u></b>							
Round Wt (lb)	103,597	223,795	62,183	1,916,636	5,698	34,649	2,346,558
Price (\$/lb)	\$0.48	\$0.20	\$0.24	\$0.27	\$0.09	\$0.33	
Value	\$49,533	\$44,971	\$15,134	\$513,991	\$534	\$11,556	\$635,719
<b><u>1992 Harvest</u></b>							
Round Wt (lb)	126,852	357,626	42,218	5,435,932	949	8,799	5,972,376
Price (\$/lb)	\$0.69	\$0.25	\$0.22	\$0.23	\$0.05	\$0.20	
Value	\$87,269	\$89,927	\$9,434	\$1,250,924	\$45	\$1,732	\$1,439,331
<b><u>1993 Harvest</u></b>							
Round Wt (lb)	95,016	189,396	87,370	3,654,838	149,875	14,489	4,190,984
Price (\$/lb)	\$0.87	\$0.32	\$0.43	\$0.24	\$0.09	\$0.46	
Value	\$83,002	\$59,947	\$37,498	\$880,826	\$13,007	\$6,636	\$1,080,916
<b><u>1994 Harvest</u></b>							
Round Wt (lb)	45,008	401,964	56,836	2,685,389	237,429	18,201	3,444,827
Price (\$/lb)	\$1.38	\$0.42	\$0.38	\$0.19	\$0.00	\$0.31	
Value	\$62,097	\$168,348	\$21,690	\$511,595	\$0	\$5,585	\$769,315

continued

**Table 3.**—Page 2 of 3.

Year	Sablefish	Rockfish	Lingcod	Pacific Cod	Pollock	Other Species	Total
<b><u>1995 Harvest</u></b>							
Round Wt (lb)	22,551	501,680	77,176	4,403,644	1,445	7,854	5,014,350
Price (\$/lb)	\$2.06	\$0.58	\$0.46	\$0.24	\$0.00	\$0.72	
Value	\$46,489	\$291,247	\$35,865	\$1,045,991	\$3	\$5,683	\$1,425,278
<b><u>1996 Harvest</u></b>							
Round Wt (lb)	81,067	191,087	59,296	4,630,742	1,940,506	204,735	7,107,433
Price (\$/lb)	\$1.94	\$0.58	\$0.52	\$0.24	\$0.09	\$0.07	
Value	\$157,502	\$111,450	\$30,951	\$1,105,026	\$171,700	\$14,298	\$1,590,927
<b><u>1997 Harvest</u></b>							
Round Wt (lb)	125,349	217,364	32,147	4,112,154	3,870,099	104,010	8,461,123
Price (\$/lb)	\$2.33	\$0.59	\$0.47	\$0.27	\$0.09	\$0.21	
Value	\$292,635	\$128,461	\$15,135	\$1,105,001	\$344,807	\$21,958	\$1,907,997
<b><u>1998 Harvest</u></b>							
Round Wt (lb)	69,689	76,649	41,239	3,413,622	9,682,978	150,417	13,434,633
Price (\$/lb)	\$1.43	\$0.53	\$0.47	\$0.24	\$0.08	\$0.10	
Value	\$99,800	\$40,816	\$19,368	\$810,160	\$744,006	\$15,254	\$1,729,404
<b><u>1999 Harvest</u></b>							
Round Wt (lb)	76,741	87,652	28,162	4,681,310	2,983,234	140,897	7,997,995
Price (\$/lb)	\$1.52	\$0.58	\$0.50	\$0.37	\$0.09	\$0.07	
Value	\$116,481	\$50,499	\$13,981	\$1,724,949	\$262,032	\$9,662	\$2,177,604
<b><u>2000 Harvest</u></b>							
Round Wt (lb)	103,662	158,572	33,517	2,719,984	448	25,488	3,041,631
Price (\$/lb)	\$2.04	\$0.49	\$0.58	\$0.41	\$0.08	\$0.49	
Value	\$211,022	\$77,010	\$19,395	\$1,105,020	\$37	\$12,479	\$1,424,963
<b><u>2001 Harvest</u></b>							
Round Wt (lb)	133,435	116,323	40,793	1,511,103	3,129	24,630	1,829,413
Price (\$/lb)	\$1.77	\$0.40	\$0.51	\$0.39	\$0.07	\$0.49	
Value	\$235,581	\$46,741	\$20,782	\$586,390	\$206	\$11,989	\$901,689
<b><u>2002 Harvest</u></b>							
Round Wt (lb)	108,966	111,508	20,177	2,220,817	1,381	38,934	2,401,783
Price (\$/lb)	\$1.98	\$0.55	\$0.58	\$0.33	\$0.07	\$0.42	
Value	\$215,613	\$60,878	\$11,621	\$732,505	\$102	\$16,267	\$1,036,986

continued

**Table 3.**—Page 3 of 3.

Year	Sablefish	Rockfish	Lingcod	Pacific Cod	Pollock	Other Species	Total
<b><u>2003 Harvest</u></b>							
Round Wt (lb)	122,098	142,729	27,154	1,870,889	21	29,528	2,192,419
Price (\$/lb)	\$2.21	\$0.53	\$0.60	\$0.37	\$0.00	\$0.39	
Value	\$269,355	\$75,816	\$16,306	\$686,979	\$00	\$11,468	\$1,059,924
<b><u>2004 Harvest <sup>a/</sup></u></b>							
Round Wt (lb)	82,836	92,349	10,584	2,173,631	342,305	39,131	2,740,836
Price (\$/lb)	\$1.70	\$0.41	\$0.46	\$0.32	\$0.07	\$0.12	
Value	\$140,580	\$37,821	\$4,849	\$689,877	\$23,739	\$4,698	\$901,564

<sup>a/</sup> Preliminary data reported through August 2004.

**Table 4.**—Effort and harvest from the Cook Inlet Area commercial sablefish fishery 1988-2004.

Year <sup>a/</sup>	Vessels	Landings	Commercial	ADF&G	Total	GHL <sup>c/</sup>	CPUE
			Harvest	Survey <sup>b/</sup>	Harvest		
			Round Weight (lb)			(lb/landing)	
1988	37	86	136,260		136,260		1,566
1989	4	5	2,996		2,996		599
1990	22	24	8,480		8,480		339
1991	25	33	103,597		103,597		3,139
1992	79	103	126,852		126,852		1,208
1993	36	52	95,016		95,016		1,827
1994	39	56	45,008		45,008		790
1995	33	45	22,551		22,551		501
1996	25	79	81,067		81,067	32,000- 172,000	1,013
1997	39	97	125,349		125,349	72,000	1,279
1998	29	57	69,689		69,689	72,000	1,223
1999	23	40	73,695	3,046	76,741	63,400	1,842
2000	16	31	102,639	1,023	103,662	67,000	3,207
2001	21	32	133,435		133,435	67,000	4,170
2002	23	26	108,117	849	108,966	67,000	4,158
2003	14	14	122,098		122,098	75,000	8,721
2004 <sup>d/</sup>	17	17	82,836		82,836	87,000	4,873

<sup>a/</sup> Preliminary data through August 2004.

<sup>b/</sup> Sablefish caught during the longline assessment survey and sold to defray survey costs.

<sup>c/</sup> Prior to the implementation of the federal IFQ program, sablefish seasons were set to coincide with federal sablefish seasons and an annual state water GHL was not established.

<sup>d/</sup> Table has been updated from original publication to include preliminary 2004 data.

**Table 5.**—Unweighted catch abundance during longline surveys in the North Gulf District, 1999-2002.

	Pacific Cod	Arrowtooth Flounder	Flathead Sole	Dover Sole	Thornyhead Rockfish	Rougheye Rockfish	Pacific Halibut	Wrymouth	Walleye Pollock	Spiny Dogfish	Pacific Sleeper Shark	Longnose Skate	Bathyrja Skate	Sablefish	Tanner Crab	Starfish	Defective Hooks	Unbaited Hooks	Baited Hooks
1999 Resurrection and Aialik Bays (n=9 stations)																			
Abundance	379	19	4	0	2	2	110	3	13	19	4	35	42	611	2	1	191	153	4,485
% of Catch	30.4%	1.5%	0.3%	0.0%	0.2%	0.2%	8.8%	0.2%	1.0%	1.5%	0.3%	2.8%	3.4%	49.0%	0.2%	0.1%	15.3%	12.3%	
Number/Set	42.1	2.1	0.4	0.0	0.2	0.2	12.2	0.3	1.4	2.1	0.4	3.9	4.7	67.9	0.2	0.1	21.2	17.0	498.3
Variance	1,089.1	3.1	0.5	0.0	0.2	0.2	99.2	0.5	1.3	10.6	0.5	10.1	6.5	1314.1	0.4	0.1	228.9	116.8	1727.3
2000 Nuka Bay (n=12 stations)																			
Abundance	466	169	2	1	0	36	58	1	48	17	7	33	48	199	2	8	287	350	6,368
% of Catch	42.6%	15.4%	0.2%	0.1%	0.0%	3.3%	5.3%	0.1%	4.4%	1.6%	0.6%	3.0%	4.4%	18.2%	0.2%	0.7%	26.2%	32.0%	
Number/Set	38.8	14.1	0.2	0.1	0.0	3.0	4.8	0.1	4.0	1.4	0.6	2.8	4.0	16.6	0.2	0.7	23.9	29.2	530.7
Variance	2,604.5	65.4	0.2	0.1	0.0	13.1	14.3	0.1	10.4	2.1	1.0	23.3	33.3	320.4	0.2	0.8	601.2	2,860.9	3,764.6
2002 Day Harbor (n=6 stations)																			
Abundance	204	30	0	4	0	12	14	0	75	59	0	25	127	286	0	11	108	285	2,810
% Catch	24.1%	3.5%	0.0%	0.5%	0.0%	1.4%	1.7%	0.0%	8.9%	7.0%	0.0%	3.0%	15.0%	33.8%	0.0%	1.3%			
Number/Set	34.0	5.0	0.0	0.7	0.0	2.0	2.3	0.0	12.5	9.8	0.0	4.2	21.2	47.7	0.0	1.8	18.0	47.5	468.3
Variance	2046.0	3.2	0.0	0.3	0.0	16.0	3.1	0.0	248.7	19.0	0.0	8.5	122.2	338.3	0.0	4.7	124.8	3393.9	10986.7

**Table 6.**—Effort and harvest by district from Cook Inlet Area commercial rockfish fisheries, including black rockfish from federal waters, 1988-2004.

Year <sup>a/</sup>	Vessels	Landings	Cook Inlet	North Gulf	Federal	Total
			District	District	Waters	Harvest <sup>b/</sup>
			Round Weight (lb)			
1988	44	102	2,859	148,227	62,213	213,298
1989	12	31	0	22,762	58,298	81,060
1990	31	41	401	29,807	371	30,579
1991	62	161	272	222,993	557	223,822
1992	121	408	1,029	334,149	23,699	358,877
1993	86	292	2,641	68,176	118,579	189,396
1994	74	277	110	205,451	196,480	402,040
1995	120	406	4,190	270,351	227,504	502,045
1996	124	343	700	120,776	75,101	196,577
1997	130	369	3,269	179,763	34,332	217,364
1998	110	303	10	72,888	7,423	80,321
1999	95	285	0	86,007	1,645	87,652
2000	96	243	0	133,431	25,978	159,409
2001	76	166	38	109,175	7,110	116,323
2002	71	158	7	106,637	4,864	111,508
2003	64	135	117	142,208	404	142,729
2004	51	94	246	92,103	0	92,349

<sup>a/</sup> Preliminary data through August 2004.

<sup>b/</sup> Includes reported at-sea discards.

**Table 7.**—Commercial lingcod effort and harvest by gear type from the Cook Inlet area and adjacent federal waters, 1988-2004.

Year <sup>a/</sup>	Vessels	Landings	Jig/Troll	Longline	Other <sup>b/</sup>	Commercial
			Round weight (lb)			harvest
1988	16	37	6,512	16,172	2,264	24,948
1989	10	20	399	2,495	0	2,894
1990	22	22	1,306	5,227	236	6,769
1991	31	96	57,691	1,666	2,827	62,184
1992	84	192	6,998	34,071	1,149	42,218
1993	18	64	86,724	646	0	87,370
1994	14	30	56,505	331	0	56,836
1995	43	72	72,489	4,101	586	77,176
1996	39	58	47,986	11,307	3	59,296
1997	34	49	17,572	14,375	200	32,147
1998	23	41	27,284	13,602	353	41,239
1999	41	66	10,741	15,809	1,612	28,162
2000	41	72	29,488	4,029	0	33,517
2001	33	73	29,472	11,264	57	40,793
2002	33	64	16,383	3,714	80	20,177
2003	29	64	23,124	4,030	0	27,154
2004	22	47	6,873	3,711	0	10,584

<sup>a/</sup> Preliminary data through August 2004.

<sup>b/</sup> “Other” includes gear such as pot, trawl, or gillnet.

**Table 8.**—Commercial lingcod harvest from state and federal waters, sport harvest, and total harvest 1988-2004.

Year <sup>a</sup>	Commercial Harvest			Sport Harvest	Area Total
	State Waters	Federal Waters	Total Commercial		
	Round weight (lb)				
1988	18,362	6,586	24,948	NA	24,948
1989	1,833	1,060	2,894	NA	2,894
1990	2,496	4,272	6,769	124,200	130,969
1991	59,196	2,987	62,184	144,100	206,284
1992	24,460	17,558	42,218	162,300	204,518
1993	7,627	79,743	87,370	85,600	172,970
1994	21,782	35,054	56,836	84,600	141,436
1995	44,314	32,862	77,176	73,300	150,476
1996	29,461	29,835	59,296	120,200	179,496
1997	30,948	1,199	32,147	105,700	137,847
1998	39,781	1,458	41,239	89,600	130,839
1999	19,841	8,320	28,162	100,700	128,862
2000	26,524	6,992	33,517	160,100	193,617
2001	30,184	10,609	40,793	117,900	158,693
2002	18,664	1,513	20,177	138,100	158,277
2003	24,864	2,290	27,154	123,800	150,954
2004	10,003	581	10,584	NA	10,584

<sup>a/</sup> Preliminary data through August 2004.

**Table 9.**—Effort and harvest in the commercial Pacific cod parallel season in the North Gulf and Cook Inlet Districts, 1988-2004.

Year <sup>a/</sup>	<u>North Gulf District</u>			<u>Cook Inlet District</u>			<u>Pooled Districts</u>		
	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)
1988	28	79	303,778	38	135	213,719	59	213	517,497
1989	7	18	29,256	4	4	7,590	9	21	36,846
1990	19	26	158,654	34	101	220,145	52	127	378,799
1991	79	158	980,178	77	331	936,458	122	489	1,916,636
1992	155	611	4,656,230	50	257	785,191	190	868	5,441,421
1993	89	265	2,752,450	29	162	909,294	109	427	3,661,744
1994	52	160	1,482,618	30	226	1,202,944	74	386	2,685,562
1995	112	255	3,014,296	50	415	1,394,355	140	669	4,408,651
1996	94	300	3,807,762	24	271	837,183	106	567	4,644,945
1997	109	290	2,050,031	39	286	1,223,209	137	576	3,273,240
1998	93	295	2,122,576	27	224	561,013	116	519	2,683,589
1999	88	255	2,103,344	33	202	1,079,834	112	457	3,183,178
2000	80	224	1,057,657	31	195	529,733	101	417	1,587,390
2001	68	120	269,982	27	125	345,770	86	243	615,752
2002	49	96	577,726	19	126	314,244	66	222	891,970
2003	29	42	162,757	19	101	258,041	45	142	420,798
2004	36	50	111,066	29	70	274,601	59	120	385,667

<sup>a/</sup> Preliminary data through August 2004; all harvest totals include reported at-sea discards.

**Table 10.**—Commercial harvest and effort for (A) the state waters Pacific cod fisheries and (B) pooled between parallel and state waters seasons of the North Gulf and Cook Inlet Districts, 1988-2004.

**A. State-Waters Season**

Year <sup>a/</sup>	North Gulf District			Cook Inlet District			Pooled Districts
	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)	Harvest (lb)
1997	29	81	291,565	35	288	547,348	838,913
1998	28	92	164,540	20	214	565,929	730,469
1999	20	56	359,511	23	274	1,158,396	1,517,907
2000	7	11	19,817	19	320	1,129,971	1,149,788
2001	5	15	60,310	9	194	835,041	895,351
2002	5	7	170,239	12	315	1,158,608	1,328,847
2003	15	41	616,306	14	260	837,232	1,453,538
2004	15	62	921,499	19	157	866,465	1,787,964

**B. Pooled Between Parallel and State Waters Seasons**

Year <sup>a/</sup>	North Gulf District			Cook Inlet District			Pooled Districts
	Vessels	Landings	Harvest (lb)	Vessels	Landings	Harvest (lb)	Harvest (lb)
1988	28	79	303,778	38	135	213,719	517,497
1989	7	18	29,256	4	4	7,590	36,846
1990	19	26	158,654	34	101	220,145	378,799
1991	79	158	980,178	77	331	936,458	1,916,636
1992	155	611	4,656,230	50	257	785,191	5,441,421
1993	89	265	2,752,450	29	162	909,294	3,661,744
1994	52	160	1,482,618	30	226	1,202,944	2,685,562
1995	112	255	3,014,296	50	415	1,394,355	4,408,651
1996	94	300	3,807,762	24	271	837,183	4,644,945
1997	123	371	2,341,596	66	574	1,770,558	4,112,154
1998	116	387	2,287,116	40	428	1,126,942	3,414,058
1999	104	311	2,462,855	51	476	2,238,230	4,701,085
2000	85	235	1,077,475	39	515	1,659,703	2,737,178
2001	73	135	330,292	30	319	1,180,811	1,511,103
2002	51	103	747,964	24	441	1,472,853	2,220,817
2003	42	83	779,063	28	361	1,095,273	1,874,336
2004	49	111	1,032,565	41	227	1,141,066	2,173,631

<sup>a/</sup> Preliminary data through August 2004; all harvest totals include reported at-sea discards.

**Table 11.**—Commercial pollock effort and harvest in the Cook Inlet Area, 1988-2004.

Year <sup>a/</sup>	Vessels	Landings	Harvest (lb) <sup>b/</sup>	CPUE <sup>c/</sup> (lb/landing)
1988	6	14	2,380	170
1989	1	3	confidential	n/a
1990	18	35	61,817	1,766
1991	3	3	5,698	1,899
1992	34	43	949	22
1993	33	47	149,875	3,189
1994	24	39	237,429	6,088
1995	22	33	1,445	44
1996	16	33	1,940,506	58,803
1997	25	59	3,870,099	65,595
1998	18	74	9,682,978	130,851
1999	12	24	2,983,234	124,301
2000	4	4	448	112
2001	7	12	3,129	241
2002	7	9	1,381	153
2003	1	2	confidential	n/a
2004	4	7	342,305	48,901

<sup>a/</sup> Preliminary data through August 2004.

<sup>b/</sup> Includes reported at-sea discards.

<sup>c/</sup> CPUE is catch per unit effort.

**Table 12.**—Commercial effort and harvest of other groundfish species from the Cook Inlet Area, 1988-2004.

Year <sup>a/</sup>	Vessels	Landings	Flatfish <sup>b/</sup>	Sharks <sup>c/</sup>	Skates	Other <sup>d/</sup>	Octopus	Squid	Total
Round Weight (lb)									
1988	6	6	2,418	101	275	24			2,818
1989	3	3		234					234
1990	15	23	1,353	20		936			2,309
1991	10	12	31,866		2,321	40	422		34,649
1992	25	35	1,056	1,009	6,004	30	700		8,799
1993	20	51	4,560		2,967	501	6,461		14,489
1994	18	78	4,471	112	68		13,550		18,201
1995	13	39	283	100	180	6	7,285		7,854
1996	48	129	150,651	408	48,405	31	5,205	35	204,735
1997	42	190	51,929	394	22,006	561	25,148	3,972	104,010
1998	46	187	47,874	268	62,381		12,914	26,980	150,417
1999	22	129	86,410	6,594	2,679	89	22,052	23,073	140,897
2000	16	138	274		66	4	25,104		25,448
2001	10	106	31		2,709	193	24,406		27,339
2002	11	166	416				38,518		38,934
2003	13	138	333		270	3	28,922		29,528
2004	19	88	248		18,728		19,820	confidential	38,591

<sup>a/</sup> Preliminary data reported through August 2004.

<sup>b/</sup> Flatfish includes general flatfishes, flounders, and soles.

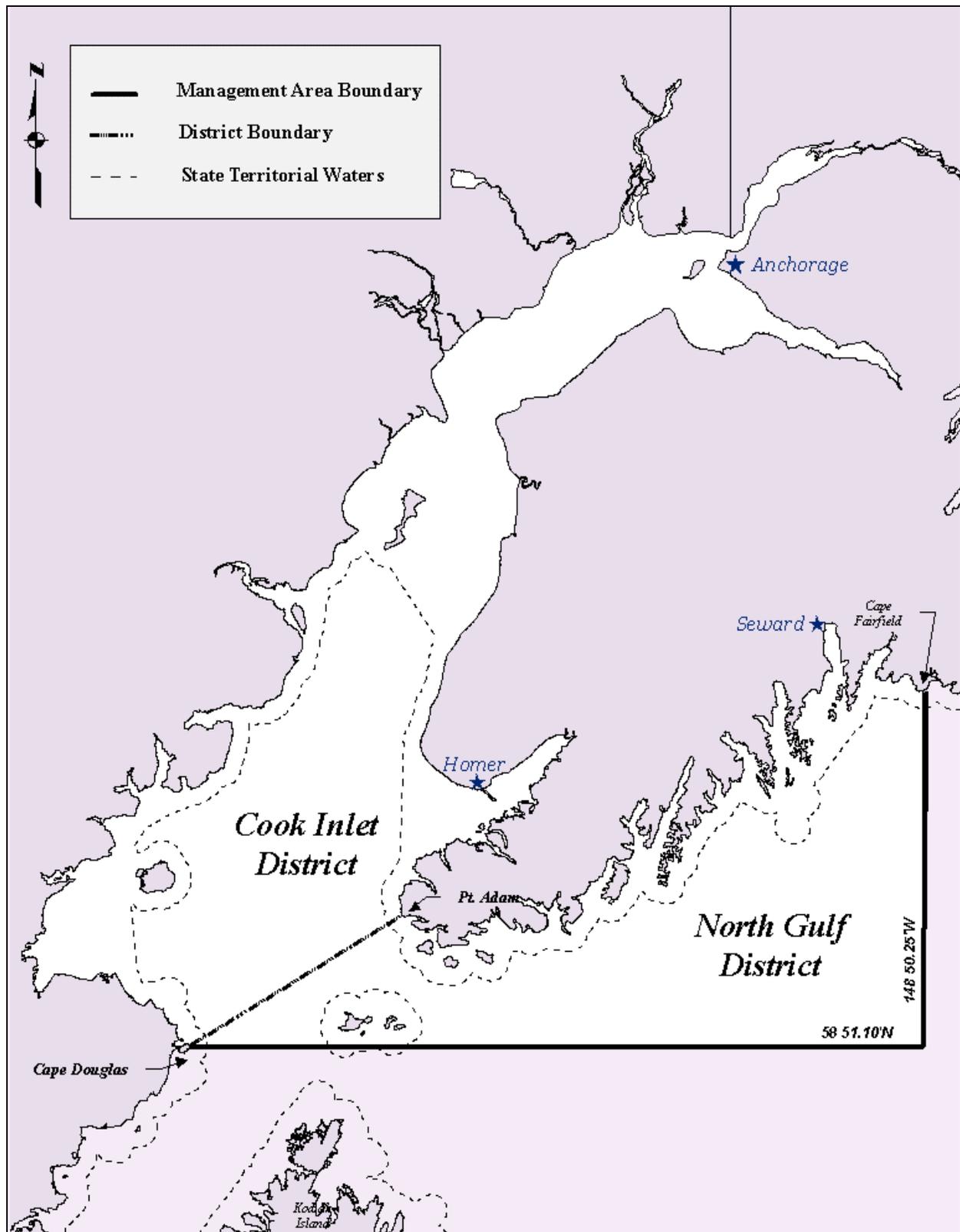
<sup>c/</sup> Sharks include spiny dogfish, salmon, Pacific sleeper, and unspecified sharks.

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

**Table 13.**—Reported at-sea discards from Cook Inlet Area groundfish fisheries, 1988-2004.

Year <sup>a/</sup>	Round weight (lb)											Total
	Sablefish	Rockfish	Lingcod	Pacific Cod	Pollock	Flatfish	Sharks	Skates	Other	Octopus	Squid	
1988												0
1989		18										18
1990	10		1,500			2,899						4,409
1991		27	1,528	200	3,830	60		400	1,610			7,655
1992	57	1,251	4,235	5,489	2,926	19,125	7,948	64,997	570	27		106,625
1993	13		1,180	6,906	4,470	13,396	10,704	43,607	1,900	329	2	82,507
1994	54	76	1,835	173	832	4,284	1,825	34,850	205			44,134
1995	1,000	366	2,950	5,007	1,550	4,387	19,531	34,486				69,277
1996	8,010	5,490	1	14,203	3,153	88,357		12,369	3,759	2,894		138,236
1997					25,000		500	300		10		25,810
1998	4,895	3,672		396	10,451	89,224	4,994	6,090	4,350		1,828	125,900
1999			68		137	241	864	959	1,168		690	4,127
2000	2,448	836	4,746	17,194	167	1,701	17,700	5,454	78			50,324
2001	1,510		7,549	1,253	1	734	23,651	2,709	111	113		37,631
2002	2,147	5	5,688	457	4	428	9,095	1,875	12	4		19,715
2003	3,445	30	3,277	645		206	23,206	2,892	47	1,400		35,148
2004	1,674	60	434	1,008	3	439	49,568	1,898	26			55,110
<b>Among Years 1989-2004</b>												
Total	25,263	11,831	34,991	52,931	52,524	225,481	169,586	212,886	13,836	4,777	2,520	806,626
Mean	1,579	739	2,187	3,308	3,283	14,093	10,599	13,305	865	299	158	50,414
% of Total	3%	1%	4%	7%	7%	28%	21%	26%	2%	1%	0%	100%

<sup>a/</sup> Preliminary data through August 2004.



**Figure 1.**—Commercial groundfish districts of the Cook Inlet Area.

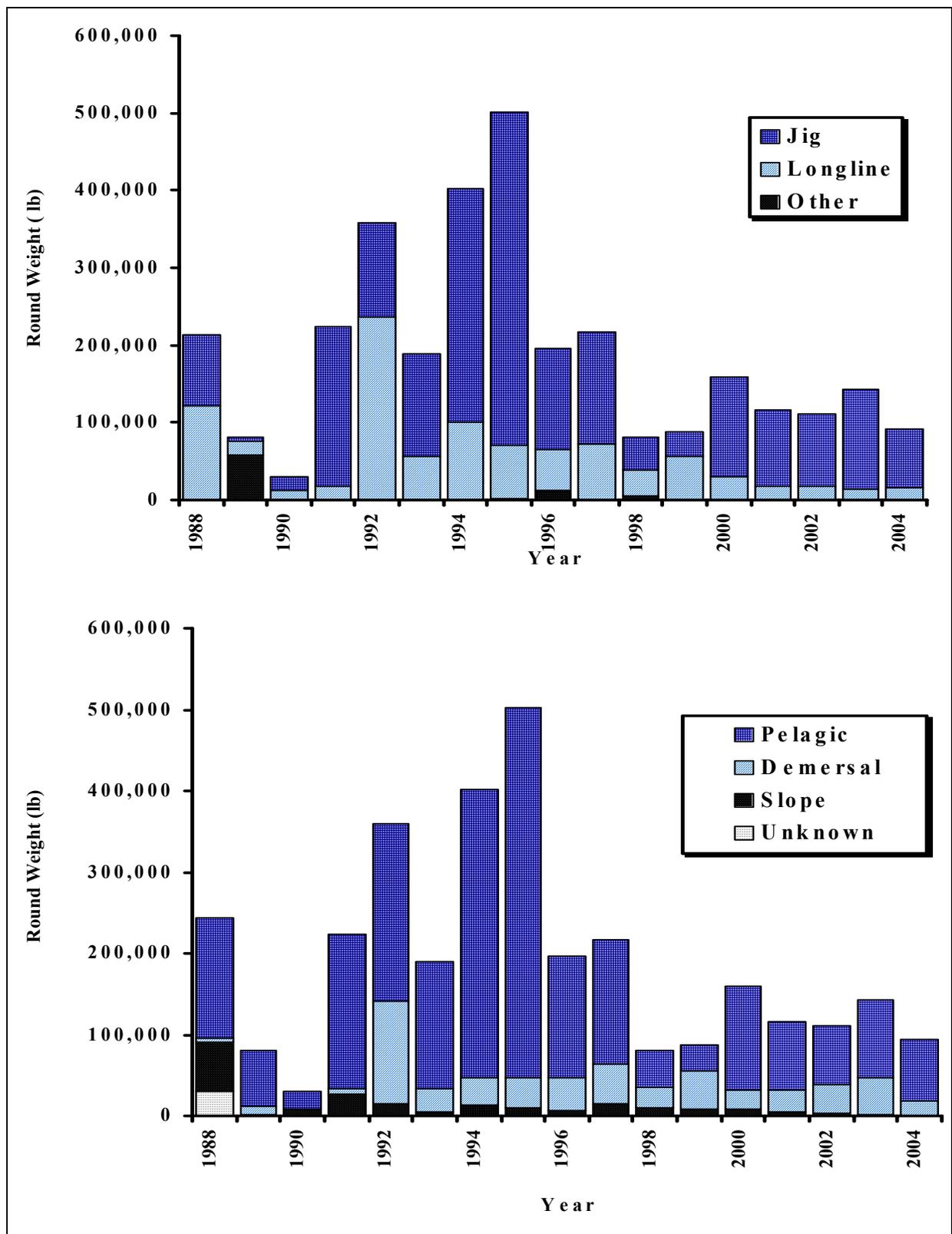


Figure 2.—Commercial rockfish harvest contribution by gear type and rockfish species assemblage, 1988-2004.

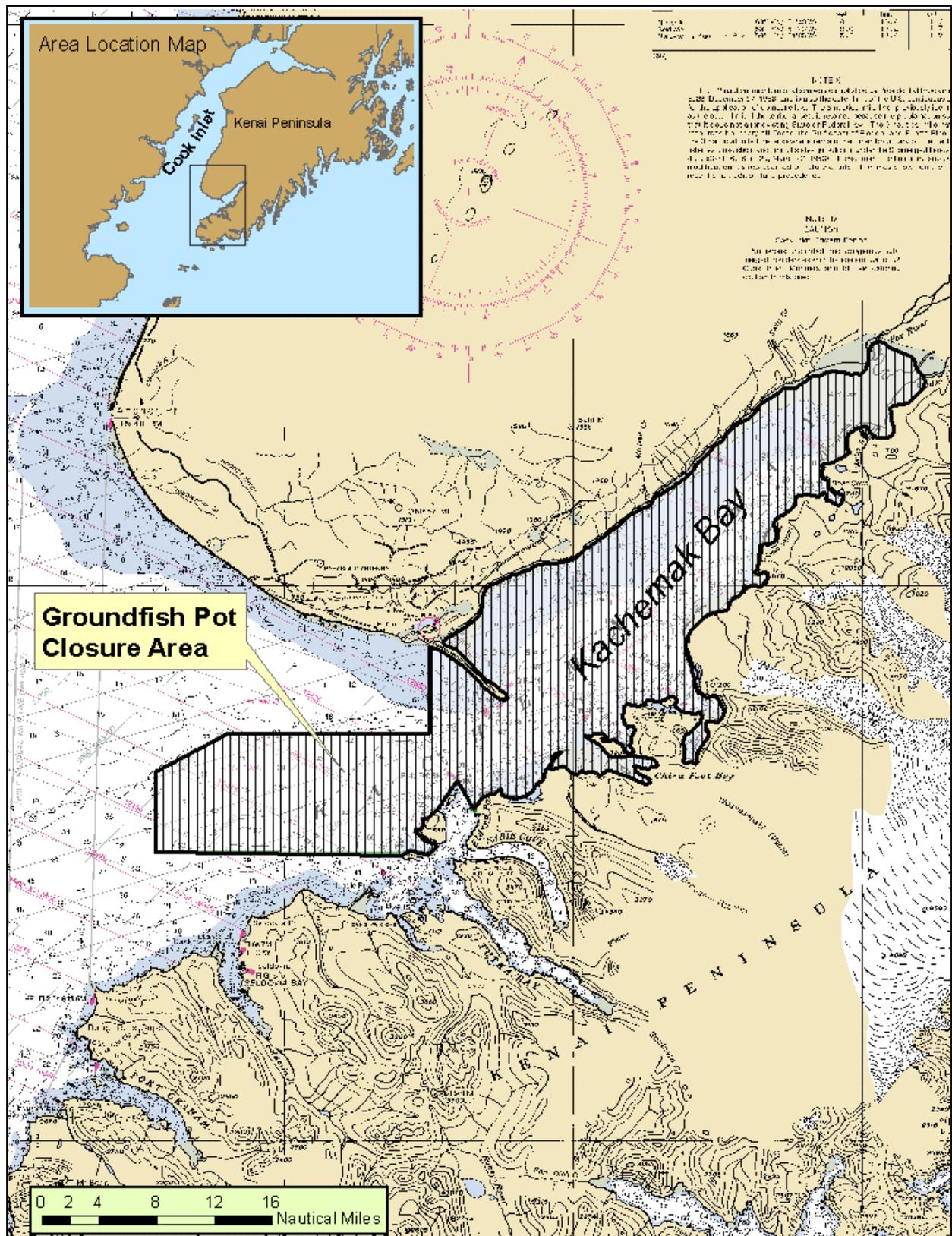


Figure 3.—Kachemak Bay commercial groundfish pot closure area.

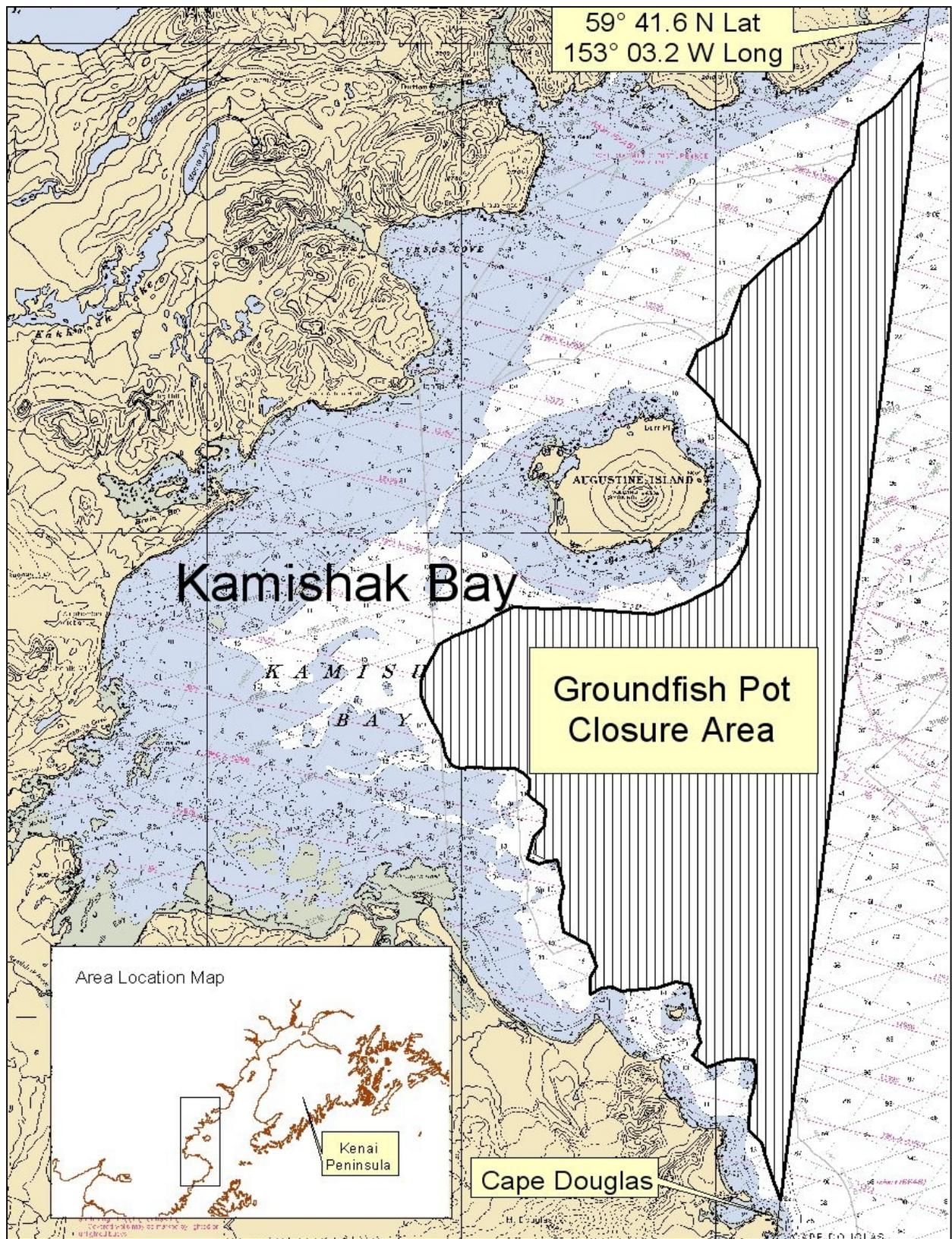
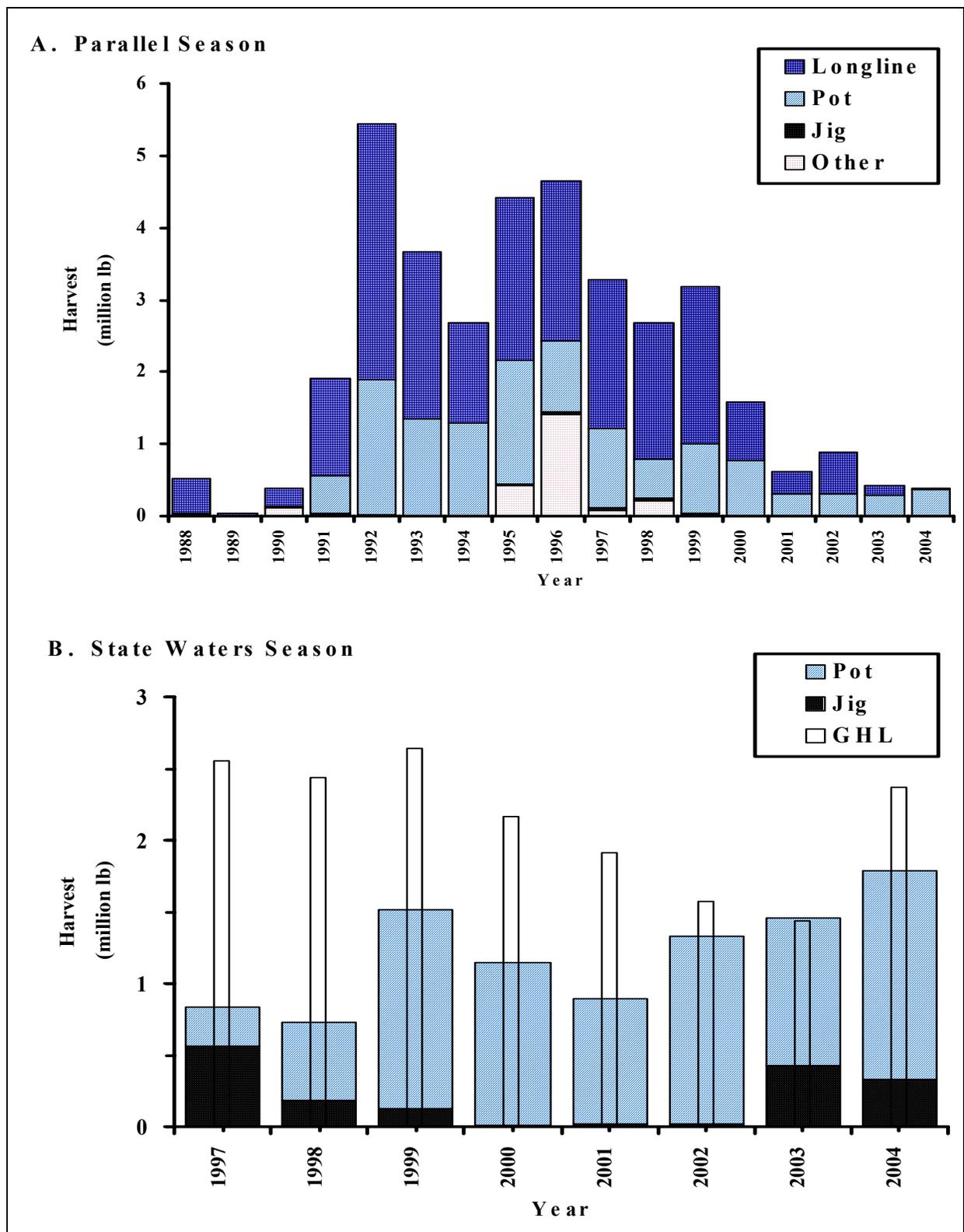


Figure 4.—Kamishak Bay commercial groundfish pot closure area.



**Figure 5.**—Pacific cod catch by gear type in the Cook Inlet Area parallel (A) and state waters (B) seasons, 1988-2004.