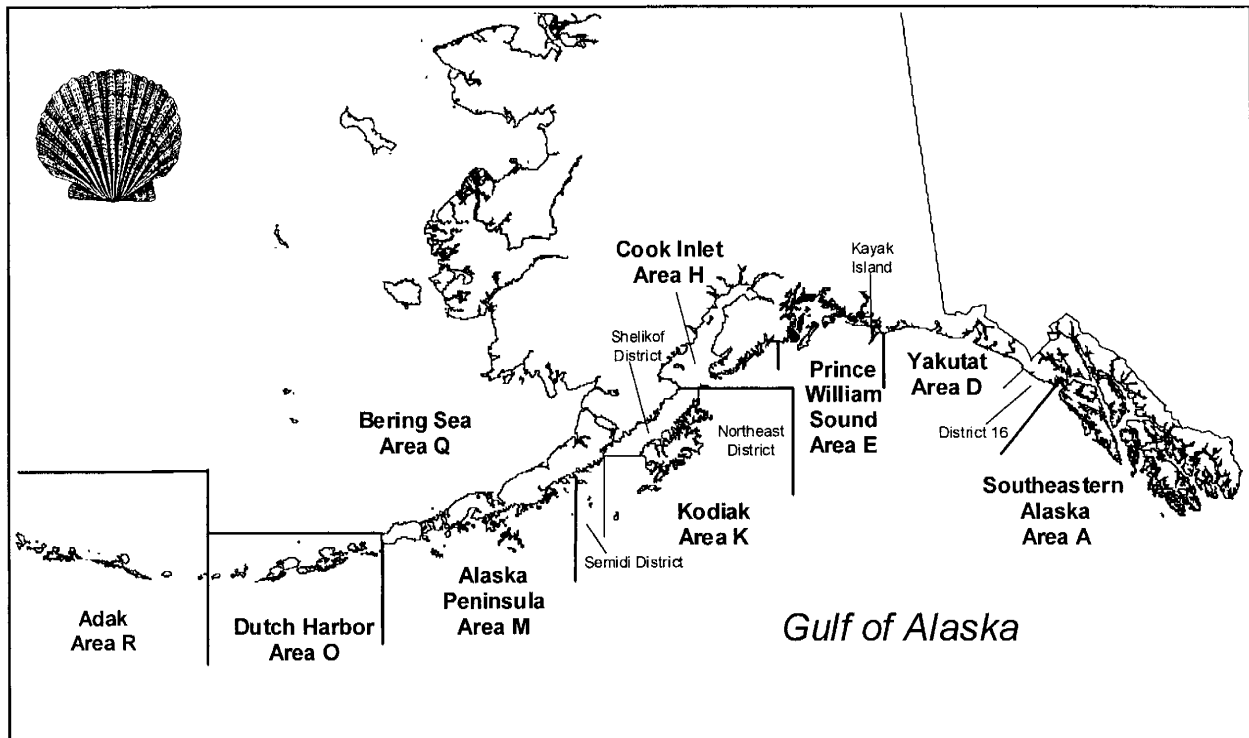


STOCK ASSESSMENT AND FISHERY EVALUATION REPORT

FOR THE WEATHERVANE SCALLOP

FISHERY OFF ALASKA



Compiled by

The Scallop Plan Team

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1 Introduction

The *National Standard Guidelines for Fishery Management Plans* published by the National Marine Fisheries Service (NMFS) require that a stock assessment and fishery evaluation (SAFE) report is prepared and reviewed annually for each fishery management plan (FMP). The SAFE report summarizes the current biological and economic status of the fishery and analytical information used in fishery management such as guideline harvest ranges (GHRs) and harvest strategies. The report is assembled by the scallop plan team with contributions from the State of Alaska Department of Fish and Game (ADF&G), the National Marine Fisheries Service (NMFS), and the North Pacific Fishery Management Council (NPFMC). The SAFE report is presented to the Council on an annual basis and is also available to the public.

The Scallop Plan Team met in Anchorage on February 22-23, 2006 to review the status of the weathervane scallop stocks, to discuss additional issues of importance in scallop management and to compile the annual SAFE report. The Plan Team review was based on presentations by staff of the NPFMC, NMFS and ADF&G with opportunity for public comment and input. Members of the Plan Team who compiled the report were Gregg Rosenkranz, Diana Stram, Scott Miller, Jie Zheng and Herman Savikko.

The scallop fishery in Alaska's Exclusive Economic Zone (EEZ; 3-200 miles offshore) is jointly managed by the state and federal government under the FMP. Most aspects of scallop fishery management are delegated to the State of Alaska, while limited access and other federal requirements are under jurisdiction of the federal government. The FMP was developed by the NPFMC under the Magnuson Stevens Act and approved by NMFS on July 26, 1995.

Although the FMP covers all scallop stocks off the coast of Alaska including weathervane scallops (*Patinopecten caurinus*), pink or reddish scallops (*Chlamys rubida*), spiny scallops (*Chlamys hastata*), and rock scallops (*Crassadoma gigantea*), the weathervane scallop is the only commercially exploited stock at this time. Commercial fishing for weathervane scallops occurs in the Gulf of Alaska, Bering Sea, and Aleutian Islands. Scallop registration areas are shown in Figure 1 while major scallop fishing locations in Alaska coastal waters during the 2003/2004 season are shown in Figure 2.

In 1996, optimum yield (OY) was established as 0 to 1.8 million pounds of shucked scallop meats. A more conservative approach was taken in 1998, when OY was defined as 0 to 1.24 million pounds of shucked scallop meats. Statewide scallop harvest has not exceeded OY, and scallop stocks are not overfished.

1.1 Summary of New Information Included in the SAFE Report

This SAFE Report includes updated information through the 2005/2006 fishing year. New information which is included in this report since the previous report (NPFMC 2006) includes the following:

- 1) Updated catch and effort data through 2005/2006 fishing year;
- 2) Dredge hours by season and registration area;
- 3) Shell height histograms by season and registration area for areas: Yakutat, Kodiak (Northeast District, Shelikof), Alaska Peninsula, Bering Sea;
- 4) Updated maps in the Trawl Survey Information section;
- 5) Total catch statewide compared with MSY;
- 6) New section on ecosystem considerations;
- 7) Updated information on recent regulatory actions with respect to the scallop fishery;
- 8) Updated overview paper of economic conditions in the scallop fishery;
- 9) Scallop management Annual Management Report published in 2006.

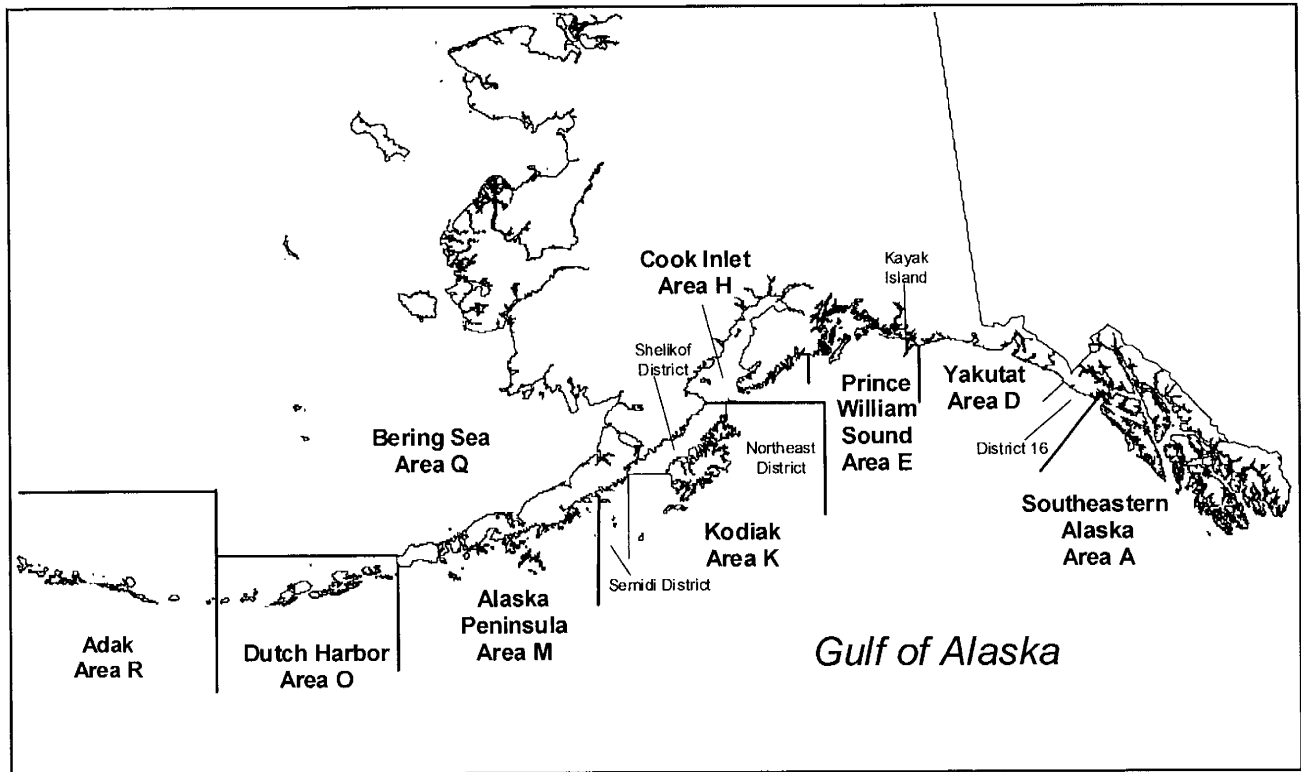


Figure 1 Alaska weathervane scallop fishing registration areas.

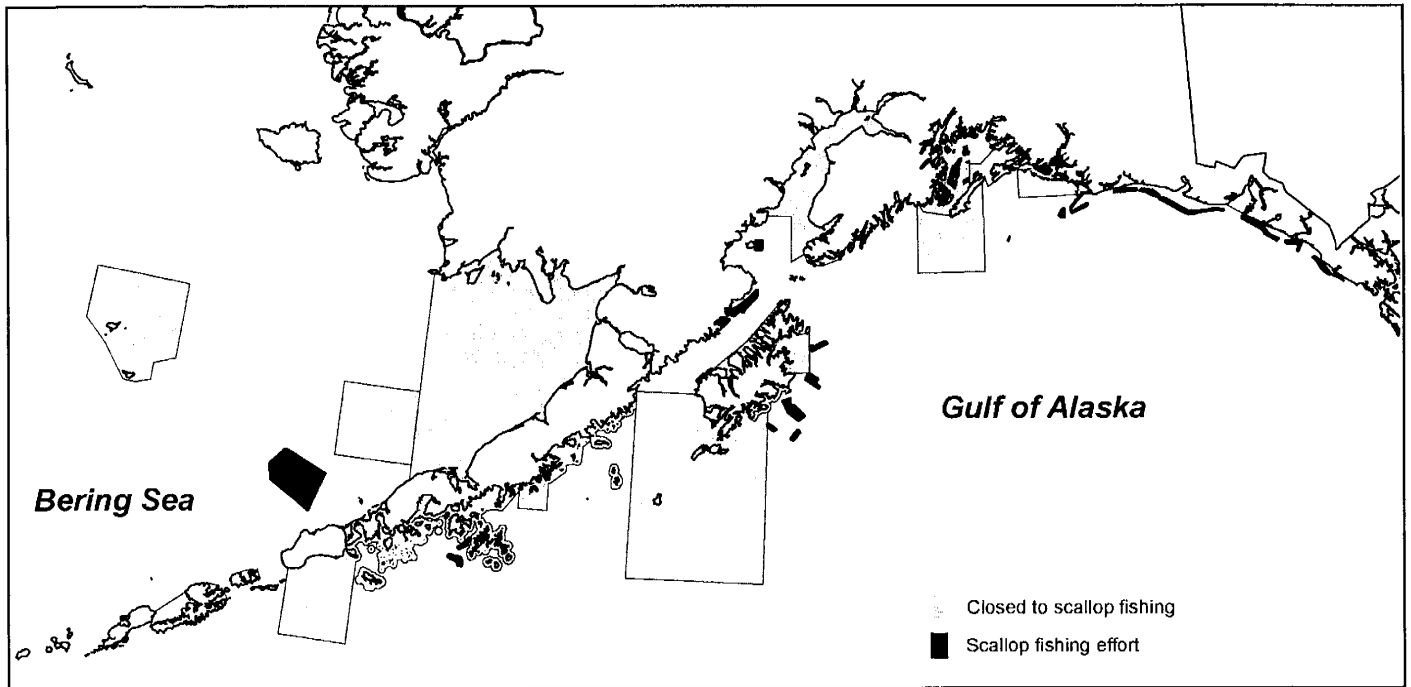


Figure 2 Scallop fishing locations (dark polygons) outside Cook Inlet during the 2003/04 season.

1.2 Historical Overview of the Scallop Fishery

Alaskan weathervane scallop *Patinopecten caurinus* populations were first evaluated for commercial potential in the early 1950s by both government and private sector research. However, it was not until the late 1960s as catches declined in the U.S. and Canadian scallop fisheries on Georges Bank that interest in a fishery off Alaska began to take shape. Initial commercial fishing effort took place in 1967 when two vessels harvested weathervane scallops from fishing grounds off the eastside of Kodiak Island. By the following year, 19 vessels consisting of New England type scallop vessels, converted Alaskan crab boats, salmon seiners, halibut longliners, and shrimp trawlers entered the fishery.

From the inception of the fishery in 1967 through mid May 1993, the scallop fishery was passively managed employing minimal management measures. Closed waters and seasons were established to protect crabs and crab habitat. As catches declined in one bed, vessels moved to better grounds. While this may have been generally acceptable for a sporadic low intensity fishery, increased participation led to boom and bust cycles (Barnhart 2003).

In the early 1990s, the Alaska weathervane scallop fishery expanded rapidly with an influx of scallop boats from the East Coast of the United States. Concerns about bycatch (in particular crab bycatch) and overharvest of the scallop resource prompted the Commissioner of ADF&G, under 5 AAC 39.210, to designate the weathervane scallop fishery a high impact emerging fishery on May 21, 1993. This action required ADF&G to close the fishery and implement an interim management plan prior to reopening. The interim management plan contained provisions for king and Tanner crab bycatch limits (CBLs) for most areas within the Westward Region. Since then, crab bycatch limits have been established for the Kamishak District of the Cook Inlet Registration Area and the Prince William Sound Registration Area. The commissioner adopted the regulations and opened the fishery on June 17, 1993, consistent with the measures identified in the interim management plan. The interim management plan included a provision for 100% onboard observer coverage to monitor crab bycatch and to collect biological and fishery-based data. In March 1994, the Alaska Board of Fisheries (BOF) adopted the interim regulations identified as the Alaska Scallop Fishery Management Plan, 5 AAC 38.076.

From 1967 until early 1995, all vessels participating in the Alaska scallop fishery were registered under the laws of the State of Alaska. Scallop fishing in both state and federal waters was managed under state jurisdiction. In January 1995, the captain of a scallop fishing vessel returned his 1995 scallop interim use permit card to the State of Alaska Commercial Fisheries Entry Commission in Juneau and proceeded to fish scallops in the EEZ with total disregard to harvest limits, observer coverage, and other management measures and regulations. In response to this unanticipated event, federal waters in the EEZ were closed to scallop fishing by emergency rule on February 23, 1995. The initial emergency rule was in effect through May 30, 1995, and was extended for an additional 90 days through August 28, 1995. The intent of the emergency rule was to control the unregulated scallop fishery in federal waters until an FMP could be implemented closing the fishery. Prior to August 28, NPFMC submitted a proposed FMP which closed scallop fishing in the EEZ for a maximum of one year, with an expiration date of August 28, 1996. The final rule implementing Amendment 1 to the FMP was filed July 18, 1996 and published in the Federal Register on July 23, 1996. It became effective August 1, 1996, allowing the weathervane scallop fishery to reopen in the EEZ. Scallop fishing in state waters of the Westward Region was delayed until August 1, 1996 to coincide with the opening of the EEZ. The state continued as the active manager of the fishery with in-season actions duplicated by the federal system (Barnhart 2003).

In March 1997, the NMFS approved Amendment 2, a vessel moratorium under which 18 vessels qualified for federal moratorium permits to fish weathervane scallops in federal waters off Alaska. By February 1999, the

Council recommended replacing the federal moratorium program with an LLP, which became Amendment 4 to the FMP. The Council's goal was to reduce capacity to approach a sustainable fishery with maximum net benefits to the Nation, as required by the Magnuson-Stevens Act. NPFMC's preferred alternative created a total of nine licenses with no area endorsements; each vessel is permitted to fish statewide. However, vessels that fished exclusively in the Cook Inlet Registration Area where a single 6-foot dredge was the legal gear type during the qualifying period were also limited to fishing a single 6-foot dredge in federal waters outside of Cook Inlet.

The Council modified this gear restriction in Amendment 10 to increase the dredge size to 2 dredges with a combined maximum dredge width of 20 feet. The Secretary approved Amendment 10 on June 22, 2005. NMFS published final regulations on July 11, 2005, which were effective August 10, 2005 (70 FR 39964). NMFS implemented Amendment 10 by reissuing the two LLP licenses with the larger gear restriction.

2 Description of Fishery and Management

The scallop fishery is managed jointly by NMFS and ADF&G under the Federal Fishery Management Plan (FMP) for the Scallop Fishery off Alaska. Most management measures under the FMP are delegated to the State for management under Federal oversight. ADF&G management of the weathervane scallop fishery covers both state and federal waters off Alaska.

The regulatory fishing season for weathervane scallops in Alaska is July 1 through February 15 except in the Cook Inlet Registration Area. In the Kamishak District of Cook Inlet, the season is August 15 through October 31, and in all other districts of Cook Inlet, the season is from January 1 through December 31 under conditions of an exploratory permit. Scallop fishing in any registration area in the state may be closed by emergency order prior to the end of the regulatory season. Scallop guideline harvest ranges (GHRs) and crab bycatch limits (CBLs) are typically announced by ADF&G approximately one month prior to the season opening date (see section 3.0 for GHRs; section 2.2 for CBLs).

The weathervane scallop fishery is prosecuted with standard New Bedford style scallop dredges. On average, a 15-foot dredge weighs a minimum of 2,600 pounds and a 6-foot dredge weighs about 900 pounds. The frame design provides a rigid, fixed dredge opening. Attached to and directly behind the frame is a steel ring bag consisting of 4-inch (inside diameter) rings connected with steel links. A sweep chain footrope is attached to the bottom of the mesh bag. The top of the bag consists of 6-inch stretched mesh polypropylene netting which helps hold the bag open while the dredge is towed along the ocean floor. A club stick attached to the end of the bag helps maintain the shape of the bag and provides for an attachment point to dump the dredge contents on deck. Steel dredge shoes that are welded onto the lower corners of the frame bear most of the dredge's weight and act as runners, permitting the dredge to move easily along the substrate. Each dredge is attached to the boat by a single steel wire cable operated from a deck winch.

All vessels fishing inside the Cook Inlet Registration Area are limited by state regulation to a single dredge not more than 6 feet in width. Unless otherwise restricted by the LLP, vessels fishing in the remainder of the state may simultaneously operate a maximum of 2 dredges that are 15 feet or less in width. Vessels used in the weathervane scallop fishery range in size from 58 feet to 124 feet length overall with a maximum of 1,200 horsepower.

Scallop fishing operations involve the following steps: (a) dredge deployment; (b) dredge towed for 50 to 60 minutes on the bottom at an average speed of 4.7 knots; (c) dredge retrieved; (d) dredge contents emptied on deck; (e) retained scallops sorted from the catch and bycatch discarded overboard; (f) baskets of retained scallops moved from the deck to the shucking area; (g) gear prepared for the next set; (h) gear deployed; and

(i) shuck, wash, grade, package and freeze scallop meats. The scallop meat is the single adductor muscle that is removed from the scallop by crew members using specialized hand-held scallop knives. Scallop meats represent approximately 8-12% of the total live weight depending on area and season (Barnhart and Rosenkrantz 2003). Scallop meats are graded by size and sold to domestic seafood markets (Kruse et al. in press) with a smaller amount going to foreign seafood markets (J. Barnhart, 2006, pers. comm.).

The Alaska Scallop Fishery Management Plan, 5 AAC 38.076 (g), allows the department to require a vessel, in a scallop fishery with a guideline harvest range established by regulation, to carry an onboard observer unless the department determines that carrying an observer in that fishery will not serve the purpose of the onboard observer program. The primary purposes of the onboard observer program are to collect biological and fishery-based data, monitor all bycatch including crab bycatch, and provide for regulatory enforcement of crab bycatch limits and other regulations (see section 2.1 for observer program information).

Commercial weathervane scallop fishing in federal waters is limited by a federal license limitation program (LLP), while participation in state waters (0-3 nautical miles) is limited by a vessel-based limited entry program. The LLP limits participation in the statewide scallop fishery in Federal waters to nine vessels (see section 2.3).

In 1997, the Alaska legislature approved legislation (AS 16.43.906) establishing a scallop vessel moratorium in state waters (0-3 miles). In 2001, the legislature authorized a 3-year extension of the moratorium, until July 1, 2004. During the 2002 legislative session, passage of CSHB206 (RLS) am S resulted in significant changes to the state's limited entry statutes. The changes authorized use of a vessel-based limited entry program in the weathervane scallop and hair crab fisheries. However, the program has a sunset provision. The vessel entry permits issued for the statewide weathervane scallop fishery will expire on December 31, 2008 unless statutory authority is extended. Eight vessel owners received permits to fish for weathervane scallops in state waters.

Two vessels with multiple LLP permits as well as state vessel-based limited entry permits, harvest almost all the scallop quota in the statewide fishery outside of the Cook Inlet Registration Area. Three vessels 80 feet or less LOA, typically participate in the Cook Inlet Registration Area fishery. Occasionally, one or two of these vessels participate in the scallop fishery outside of the Cook Inlet Registration Area.

LLP permits have been consolidated by the fleet through a voluntary industry cooperative. Six scallop vessel owners formed a fishing cooperative in May 2000. This program is self-regulated and is neither endorsed nor managed by ADF&G or NMFS. Within the cooperative, vessel owners allocate themselves shares based on previous fishing history. Some owners opted to remove their boats from the fishery and arranged for their shares to be caught by other members of the cooperative. Since formation of the cooperative, harvest rates have slowed and fishing effort occurs over a longer time period each season.

Vessel owners within the cooperative have taken an active role in reducing crab bycatch. Vessel operators provide confidential in-season fishing information to an independent consulting company contracted by the cooperative. This firm reviews crab bycatch data, fishing locations, and scallop harvest, which allows for real time identification of high crab bycatch areas. When these areas are identified, the fleet is provided with the information and directed to avoid the area. This mechanism only works if vessel operators submit their fishing data and the observer-collected crab bycatch data, to the independent consulting company in a timely fashion.

Many areas along the Alaska coast are closed to scallop dredging (Figure 2). These closures (some of which have been in place over 30 years) are instituted for a variety of reasons including the need to protect king and Tanner crab habitat and populations and to address potential gear conflicts.

2.1 Observer Program Overview

The primary purposes of the onboard scallop observer program are to collect a variety of biological and fishery-based data, monitor bycatch, and provide for regulatory enforcement. Data are collected on crab and halibut bycatch, discarded scallop catch, retained scallop catch, catch composition, scallop meat-weight recovery, location, area and depth fished, and catch per unit effort. Observers report scallop harvest, number of tows, area fished, and crab bycatch to ADF&G tri-weekly during the season by radio or email. Data are used to manage the fishery inseason and to set GHRs for the following season. Observer-collected data are used to manage the fishery inseason and to set guideline harvest ranges (GHRs) for the following season. Data are provided to local advisory committees, BOF, NPFMC, NMFS and the public to help answer a myriad of questions pertaining to the weathervane scallop fishery. These data have been invaluable for preparing Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC) documents. Observer data were particularly useful in showing that the proposed HAPC would have a minimal impact on the scallop fishery. For analyzing fine-scale spatial impacts, observer data are critical.

Some Alaska weathervane scallop fishery participants formed a vessel cooperative program prior to the 2000/01 regulatory season. Within this cooperative, vessel owners allocate vessel shares based on fishing history and other parameters. Some owners opted to remove their boats from the fishery and arranged for their coop shares to be caught by other vessels within the cooperative. Not all fishery participants are members of the cooperative. The cooperative has led to fewer vessels in the fishery, so it is important that all remaining vessels have observer coverage in order to collect adequate data to manage the fishery and ascertain its impacts.

Under state regulation 5AAC 39.141, “The Board of Fisheries finds that in particular shellfish fisheries, observers on board fishing vessels would greatly enhance management, primarily by facilitating information gathering, and by improving regulatory compliance”. Furthermore, “Onboard observer may be the only practical fishery monitoring, data-gathering or enforcement mechanism...”. Regulation 5AAC 39.654 states “The Board of Fisheries finds that onboard observers provide the only effective means of collecting essential biological and management data from catcher-processor and floating processor vessels that process shellfish...”. “These data are necessary to achieve the requirements set out in 16 U.S.C. 1801-1883 (Magnuson-Stevens Act) and the federal Fisheries Management Plan; including the sustained yield of the shellfish resource without overfishing”.

Onboard observer coverage is funded by industry through direct payments to independent contracting agents. Independent contracting agents provide the onboard observers who are trained at the University of Alaska North Pacific Fisheries Observer Training Center in Anchorage, Alaska. Onboard observer coverage is paid for by industry (Barnhart 2003). Observer training is funded by a federal grant. Federal assistance is provided to the State of Alaska by a NOAA grant award to cover additional costs incurred to meet federal oversight. ADF&G funds scallop stock assessments and day to day management of the resource including staff salaries and indirect costs incurred by field offices throughout the state.

Observer costs to those vessels limited to a single 6-ft dredge in federal waters were addressed in Amendment 10, section 6.8 of the Scallop FMP. “The Council recommended Amendment 10, because it found that it is not economically viable for vessels to operate outside of Cook Inlet (as authorized by authority of the LLP license) with the existing 6-ft dredge gear restriction. The Council determined that given existing observer requirements and their associated costs, the single 6-ft dredge restriction created a disproportionate economic hardship when fishing in federal waters (NPFMC 2004). Amendment 10 provided the potential for these two vessels to capture a larger share of the total catch, thus allowing them to offset observer costs and perhaps enhance their economic viability.

In summary, under 5 AAC 38.076 (g) of the Alaska Scallop Fishery Management Plan “The department may require a vessel fishing in the scallop fishery ... to carry an observer unless the department determines that carrying an observer will not serve the purpose of the onboard observer program”. Clearly, carrying an observer does serve the purpose of the program. Data collected from the scallop fishery are used to manage the fishery inseason, set GHRs for the following seasons, monitor crab bycatch and ensure established crab bycatch caps are not exceeded, provide for regulatory enforcement, and answer a host of questions about catch composition, bycatch, habitat, and the health of the scallop resource. These data are necessary to achieve the requirements set out in the Magnuson-Stevens Act and the Federal Fisheries Management Plan for the Scallop Fishery Off Alaska including the sustained yield of the shellfish resource without overfishing. In most areas of the state, the department does not conduct scallop stock assessment surveys, so observer-collected data are even more vital to the management of the resource. In areas where fishery independent assessment surveys do occur, fishery data provides another perspective on the health of the stock.

2.2 Crab Bycatch Limits

Bycatch of crabs in the scallop fishery is controlled through the use of Crab Bycatch Limits (CBLs) based on individual crab stock abundance. Crab bycatch limits (CBLs) were first instituted by the state in July 1993. Methods used to determine CBLs in 1993 and 1994 were approved by the BOF and the NPFMC and, with few exceptions, remain unchanged. Annual CBLs are established pre-season by ADF&G based on the most current crab resource abundance information. However, in some registration areas or districts, the CBL is a fixed number of crabs and is not adjusted seasonally.

In the Kodiak, Alaska Peninsula, and Dutch Harbor Registration Areas, the CBLs are set at 0.5% or 1.0% of the total crab stock abundance estimate based on the most recent survey data (Table 1). In registration areas or districts where red king crab or Tanner crab abundance is sufficient to support a commercial crab fishery, the cap is set at 1.0% of the most recent red king crab or Tanner crab abundance estimate. In registration areas or districts where the red king crab or Tanner crab abundance is insufficient to support a commercial fishery, the CBL is set at 0.5% of the most recent red king crab or Tanner crab abundance estimate. Bycatch caps are expressed in numbers of crabs and include all sizes of crabs caught in the scallop fishery.

In the Kamishak District of the Cook Inlet Registration Area, the Tanner crab bycatch limit is set at 0.5% of the total crab stock abundance and the red king crab limit is fixed at 60 crabs. In the Prince William Sound Registration Area the CBL for Tanner crab is fixed at 0.5% of the total crab stock abundance, although this is a recent change from a fixed number of crabs.

CBLs in the Bering Sea (registration Area Q) have evolved from fixed numbers in 1993 to a three tier approach used in the current fishery. In 1993, Bering Sea CBLs were set by ADF&G to allow the fleet adequate opportunity to explore and harvest scallop stocks while protecting the crab resource. CBLs were established at 260,000 *Chionoecetes* spp. and 17,000 red king crabs. In 1995, ADF&G recommended that CBLs be established at 0.003176 percent of the best available estimate of *C. opilio* (snow crab) and 0.13542 percent of the best available estimate of Tanner crab abundance in Registration Area Q. That equated to about 300,000 snow and 260,000 Tanner crabs based on 1994 crab abundance estimates in Registration area Q. In Amendment 1 of the federal scallop FMP, the NPFMC approved the CBLs established by ADF&G. The NPFMC also recommended that king crab bycatch limits be set within a range of 500 to 3,000 annually. Beginning with the 1996/97 fishing season ADF&G took a conservative approach and set the red king crab limit in Registration Area Q at 500 red king crabs annually.

From the 1996/97 through 1998/99 fishing seasons the CBL for *Chionoecetes* sp. in the Bering Sea was established annually by applying the percentages established for snow and Tanner crab limits in Amendment 1

of the FMP. In 1998, consistent with the Tanner crab rebuilding plan in the Bering Sea, crab bycatch limits were modified.

Table 1 Statewide crab bycatch limits, in percent of the crab abundance estimate or number of crab.

Scallop Registration Areas	Red King Crab	C. bairdi	C. opilio
Yakutat (D)			
District 16	NA	NA	NA
Remainder of Area D	NA	NA	NA
Prince William Sound (E)			
Eastern Section of outside District	NA	0.5% ^a	NA
Cook Inlet (H)			
Kamishak District	0.5% ^a	60 crabs ^a	NA
Outer/Easter/Barren Island Districts	NA	NA	NA
Kodiak (K)			
Shelikof District	0.5% or 1.0%	0.5% or 1.0%	NA
Northeast District	0.5% or 1.0%	0.5% or 1.0%	NA
Semidi District	Regulated inseason	Regulated inseason	NA
Alaska Peninsula (M)	0.5% or 1.0%	0.5% or 1.0%	NA
Bering Sea (Q)	500 crabs ^a	Three Tier Approach	Three Tier Approach
Dutch Harbor (O)	0.5% or 1.0%	0.5% or 1.0%	NA
Adak (R)	50 ^b	10,000 ^b	NA

NA= Not applicable

^aFixed CBL

^bBycatch limit set to allow scallop fleet adequate opportunity to explore and harvest scallop stocks while protecting the crab resource.

The current three tier approach was established utilizing the bycatch limits established in Amendment 1 of the FMP, 300,000 snow crab and 260,000 Tanner crab. The three tiers include (1) Tanner crab spawning biomass above minimum stock size threshold (MSST); bycatch limit is set at 260,000 crabs, (2) Tanner crab spawning biomass below MSST; bycatch limit is set at 130,000 crabs, and (3) Tanner crab spawning biomass is below MSST and the commercial fishing season is closed; Tanner crab limit is set at 65,000 crabs. A similar three tier approach was taken with the snow crab bycatch caps. The three tiers include (1) snow crab spawning biomass above the MSST; bycatch limit is set at 300,000 crabs, (2) snow crab spawning biomass below MSST; bycatch limit is set at 150,000 crabs, and (3) snow crab spawning biomass below MSST and the commercial fishing season is closed; the snow crab limit is set at 75,000 crabs.

Bycatch of snow crab, Bairdi Tanner crab and Bristol Bay red king crab by scallop fisheries in comparison with groundfish and directed crab fisheries are shown in Tables 2–4 below. Bycatch of snow and Tanner crabs in the scallop fisheries is much lower in recent years while red king crab bycatch remains at nearly zero. Closures based on the fleet reaching crab bycatch limits have decreased over the years since inception of CBLs in 1993, possibly due to decreased crab abundance (Barnhart and Rosenkranz 2003). During the 1993/94 season four statewide areas were closed due to crab bycatch. Since the 2000/01 season two areas have closed due to crab bycatch reaching the CBLs. ADF&G closely monitors bycatch rates during scallop seasons and has used a rate of 1 crab per pound of scallop meats as a benchmark since 1993. Harvests and CPUE in the Bering Sea may be affected due to bycatch concerns as vessel operators move or quit fishing when bycatch rates meet or exceed the benchmark.

Table 2 Bycatch of *C. opilio* crabs (numbers of crab) in Bering Sea fisheries, 1995-2005.

Year	Directed crab pot	Groundfish Trawl	Groundfish fixed gear	Scallop dredge	Total
1995	48,734,000	5,165,555	230,233	0	54,129,788
1996	56,570,785	3,643,612	267,395	104,836	60,586,628
1997	75,005,446	5,276,208	554,103	195,345	81,031,102
1998	51,591,453	4,122,648	549,139	232,911	56,496,151
1999	47,093,200	1,544,747	269,778	150,421	49,058,146
2000	5,020,800	2,207,279	270,000	105,602	7,603,681
2001	6,123,100	1,293,143	215,000	68,458	7,699,701
2002	15,823,300	882,967	n/a	70,795	n/a
2003	22,140,336	615,012	86,313	16,206	22,857,867
2004	4,800,043	1,693,101	140,428	3,843	6,637,415
2005 ¹	4,530,514	3,292,520	124,171	5,211	7,952,425

Table 3 Bycatch of Bristol Bay red king crabs (numbers of crab) in Bering Sea fisheries, 1995-2005.

Year	Directed crab pot	Groundfish Trawl	Groundfish fixed gear	Scallop dredge	Total
1995	0	44,934	3,257	0	48,191
1996	605,000	30,967	75,675	0	711,642
1997	985,000	50,711	25,579	0	1,061,290
1998	4,593,800	42,003	7,017	146	
1999	957,800	84,709	8,968	1	1,026,178
2000	1,701,000	70,787	39,754	2	1,653,542
2001	2,419,100	58,552	19,000	0	2,496,652
2002	1,677,800	89,955	27,477	2	1,795,234
2003	5,808,200	91,937	13,531	0	5,913,668
2004	2,470,868	78,742	15,014	0	2,564,624
2005 ²	5,724,919	111,249	19,723	2	5,855,893

¹ This estimate is from the 2005 Pre-rationalized opilio fishery and the 2005/2006 rationalized Bristol Bay red king crab seasons; does not include some bycatch during the 2005/2006 EBS snow and Tanner crab fisheries

² From the 2005/2006 rationalized BB red king crab fishery (Oct 15 2005 to January 15 2006) but little or no catch or effort from January 1-15. This does not include any bycatch from the rationalized 2005/2006 Tanner crab fishery.

Table 4 Bycatch of *C. bairdi* crabs (numbers of crab) in Bering Sea fisheries, 1995-2005.

Year	Directed crab pot	Groundfish Trawl	Groundfish fixed gear	Scallop dredge	Total
1995	15,897,300	2,212,181	87,674	0	18,197,155
1996	4,588,000	1,836,031	279,560	17,000	6,930,591
1997	4,865,900	1,917,736	50,218	28,000	6,861,854
1998	4,293,800	1,477,816	46,552	36,000	5,854,168
1999	1,995,100	901,619	43,220	n/a	n/a
2000	491,000	1,002,074	140,453	53,614	1,539,141
2001	626,400	950,331	80,000	48,718	1,705,449
2002	1,282,600	1,086,286	98,848	48,053	2,515,787
2003	626,000	897,340	105,094	31,316	1,659,750
2004	334,593	800,794	38,592	15,303	2,849,032
2005 ³	708,290	1,569,613	122,167	15,529	2,415,599

2.3 Scallop License Limitation Program

The Federal Scallop License Limitation Program (LLP) became effective in 2001. NPFMC created the scallop LLP (under Amendment 4 to the FMP) to limit the number of participants and reduce fishing capacity in the scallop fishery. More information on the analysis for Amendment 4 can be obtained through the Council office.

The LLP license is required on board any vessel deployed in the weathervane scallop fishery in federal waters off Alaska. NMFS granted 7 vessel owners licenses to fish statewide (outside of the Cook Inlet Registration Area). Originally, NMFS granted two vessel owners licenses to fish statewide utilizing a single 6-foot dredge. In August, 2005, NMFS implemented Amendment 10 to the FMP, which modified the gear restriction to allow these two licenses to be used on vessels with up to two 10-foot dredges statewide. All 9 licenses allow vessel owners to fish inside Cook Inlet with a single 6-foot dredge. Vessel length is limited to that of the qualifying period.

More information on the scallop LLP can be found on the NMFS Alaska Region web page at <http://www.fakr.noaa.gov/ram/smp.htm>.

2.3.1 Voluntary Scallop Cooperative

In May 2000, six of the nine LLP owners formed the North Pacific Scallop Cooperative under authority of the Fishermen's Cooperative Marketing Act, 48 Stat. 1213 (1934), 15 U.S.C. Sec. 521. The cooperative regulates individual vessel allocations within the GHR and crab bycatch caps under the terms of their cooperative contract. Non-coop vessels are not bound by any contract provisions. The cooperative does not receive an exclusive allocation of the scallop harvest.

³ This is from the pre-rationalized opilio fishery and the rationalized 2005/2006 BB re4d king crab fishery. This does not include bycatch during 2005 from the 2005/2006 EBS snow crab or direct3d Tanner crab fishery.

Cooperative members negotiate allocations of scallops and crab bycatch among themselves annually and enforce those allocations through provisions in the cooperative contract. The cooperative contract provides financial penalties for violating scallop harvest or crab bycatch limits for coop members. Vessel operators report inseason catch data to a third party contractor to monitor bycatch rates and hot spots.

More information on the voluntary scallop cooperative can be found in the EA/RIR/IRFA for Amendment 10 to the Scallop FMP available on the Council website: <http://www.fakr.noaa.gov/npfmc/analyses/analyses.htm>

3 Stock Status

The State of Alaska Scallop Fishery Management Plan established 9 scallop registration areas in Alaska for vessels commercially fishing for scallops (Figure 1). These include the Southeastern Alaska Registration Area (Area A); Yakutat Registration Area (Area D and District 16); Prince William Sound Registration Area (Area E); Cook Inlet Registration Area (Area H); Kodiak Registration Area (Area K), which is subdivided into the Northeast, Shelikof and Semidi Districts; Alaska Peninsula Registration Area (Area M); Dutch Harbor Registration Area (Area O); Bering Sea Registration Area (Area Q); and Adak Registration Area (Area R). However, scallop seasons are not opened in Area A, and effort occurred in Area R in 1995 only. Although the overfishing definition is based on the statewide scallop stock, ADF&G establishes GHRs and manages the fishery by registration areas and districts within regions. Stocks in each area are independently assessed with methods that vary by region. Statewide estimates of stock size are not available, and funding to perform extensive statewide surveys of scallop abundance is not anticipated in the foreseeable future.

ADF&G conducts biennial dredge surveys in the Kamishak District of the Cook Inlet Registration Area and near Kayak Island in the Prince William Sound Registration Area. For registration areas without surveys, stocks are assessed and managed conservatively based on extensive data sets collected by the on-board scallop observer program. These data consist of scallop harvest and fishing effort, including catch per unit effort (CPUE), fishing locations, size structure of the catch, discarded scallop catch, retained scallop catch, scallop meat weight recovery, and crab bycatch. Spatially explicit observer data that cannot be displayed in the SAFE report due to State of Alaska confidentiality regulations are examined in detail by ADF&G staff each year when GHRs are set. The observer program also provides management personnel with inseason summary reports. A fishing area may be closed prior to attainment of the upper end of the GHR due to concerns about localized depletion, overall trends in CPUE, or high crab bycatch. ADF&G research personnel have developed methodology for fishery-independent video surveys of scallop stocks in the highest-producing beds and expect to survey the Yakutat area in spring of 2006.

GHRs for registration areas where scallop fishing traditionally occurred were first established by the State of Alaska in 1993 under the Interim Management Plan for Commercial Scallop Fisheries in Alaska. The upper limit of the GHR (pounds of shucked meats) from traditional areas included Yakutat (250,000 pounds), Prince William Sound (50,000), Kamishak District of Cook Inlet (20,000 pounds), Kodiak (400,000 pounds), and Dutch Harbor (170,000) pounds. The combined upper limits of the GHRs totaled 890,000 pounds of shucked meats. GHRs for each area were determined by averaging historic catches from 1969 to 1992 excluding years when there was no fishing or a “fishing-up effect” occurred (Barnhart 2003). Production may be over-estimated by using “fishing-up” periods, when catches exceed sustainable levels when a newly established fishery crops off large, old individuals from the population including concentrations on marginal beds that rebuild slowly.

Prior to the August 1, 1996 opening of the weathervane scallop fishery, ADF&G established GHRs for non-traditional registration areas. GHR upper limits were established for the Alaska Peninsula (200,000 pounds), Bering Sea (600,000 pounds), District 16 (35,000 pounds) and Adak (75,000 pounds). The historic high

catches for each registration area were established as the GHR upper limit. The combination of GHRs from traditional and non-traditional areas totaled 1.8 million pounds of shucked scallop meats, which was defined as maximum sustainable yield (MSY) in Amendment 1 to the federal Fishery Management Plan for the Scallop Fishery off Alaska (FMP).

In 1998, the scallop plan team recommended a more conservative approach, defining MSY as 1.24 million pounds of shucked scallop meats based on average landings from 1990-1997, excluding 1995 when the fishery was closed most of the year. Subsequently, MSY was established in Amendment 6 of the FMP at 1.24 million pounds and optimum yield (OY) as a range from 0 to 1.24 million pounds. To accommodate the lower limits the department reduced the upper end of the GHR in Kodiak from 400,000 to 300,000 pounds, in Dutch Harbor from 170,000 to 110,000 pounds, and in the Bering Sea from 600,000 to 400,000 pounds.

3.1 Yakutat Registration Area

Seasonal GHRs for the 2005/06 season were set at 0–200,000 lbs of shucked meats for Yakutat Area D and 0–35,000 lbs for Yakutat District 16 (Table 5, Table 6, Figure 3, Figure 5). Two catcher-processors participated in the fishery and harvested 199,351 lbs from Area D and 13,650 lbs from District 16. Area D CPUE was 39 lbs meat/dredge hr for 2005/06, down slightly from the 2000/01–2004/05 average of 46 lbs meat/dredge hr. District 16 CPUE for 2005/06 was 34 lbs meat/dredge hr (Figure 5).

Several factors have contributed to changes in Yakutat Area scallop fishing effort since 2000. Formation of a vessel cooperative lowered fishing capacity and has in general led to slower harvest rates and longer seasons. Recent increases in scallop prices, however, led to increased effort and harvest during the 2005/06 Yakutat scallop fishery.

Members of the industry have noted that there is variability in scallop quality in the Yakutat region from year to year and bed to bed with neither some evidence of a clear spatial or temporal pattern nor understanding of what factors or combination thereof account for this. Scallops harvested with ‘weak meats’ are not marketable thus the fleet moves to other areas to search for better quality scallops. This affects CPUE and may also result in underutilization of the Scallop GHR in this region. Further study is encouraged to understand this problem.

Yakutat Area D shell height (SH) distributions (Table 5) indicate a relatively stable scallop population with regular but modest recruitment. In District 16 (Figure 6), strong recruitment observed during the 1997–1998/99 seasons has not recurred since.

Experimental scallop video research surveys were conducted in the Yakutat Registration Area in 2002 and 2006. ADF&G hopes to conduct regular surveys of the area every 2 or 3 years using imaging technology in the future.

Table 5 Yakutat Area D scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993	7 ^b	250,000	1,999	139,057	70
1994	10 ^b	250,000	4,130	246,862	60
1995	8 ^c	250,000	4,730	237,417	50
1996	4	250,000	4,438	238,736	54
1997	4	250,000	3,956	243,810	62
1998/99	8	250,000	4,154	242,929	58
1999/00	3	250,000	3,840	249,681	65
2000/01	3	250,000	4,241	195,699	46
2001/02	2	200,000	2,406	103,800	43
2002/03	2	200,000	2,439	122,718	50
2003/04	2	200,000	3,360	160,918	48
2004/05	2	200,000	2,132	86,950	41
2005/06	2	200,000	5,089	199,351	39

^aConfidential data released by vessel operators.

^bOne additional vessel fished by waiver without an observer; data not included.

^cTwo additional vessels fished by waiver without observers; data not included.

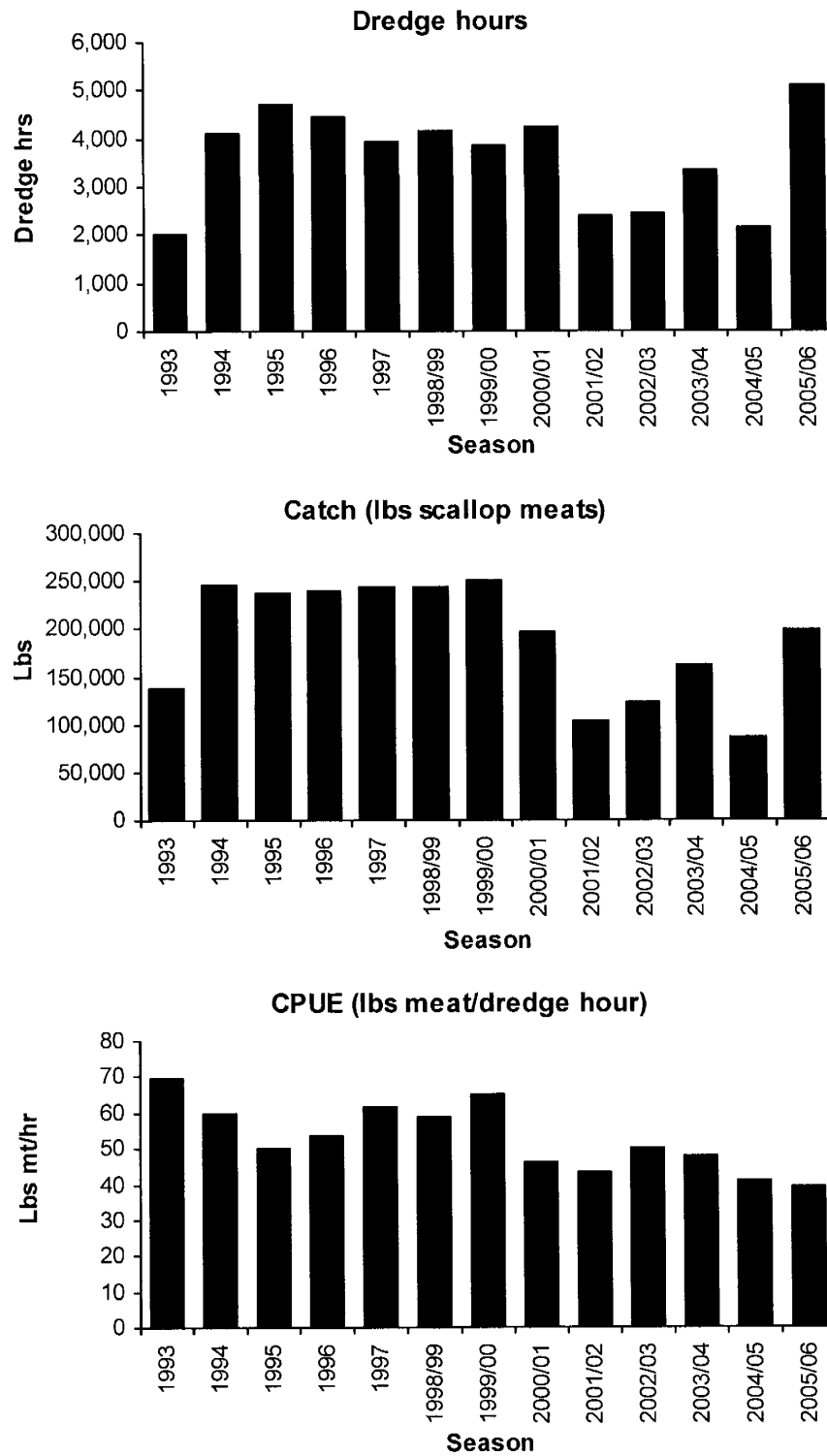


Figure 3 Barplots of Yakutat Area D scallop fishery statistics.

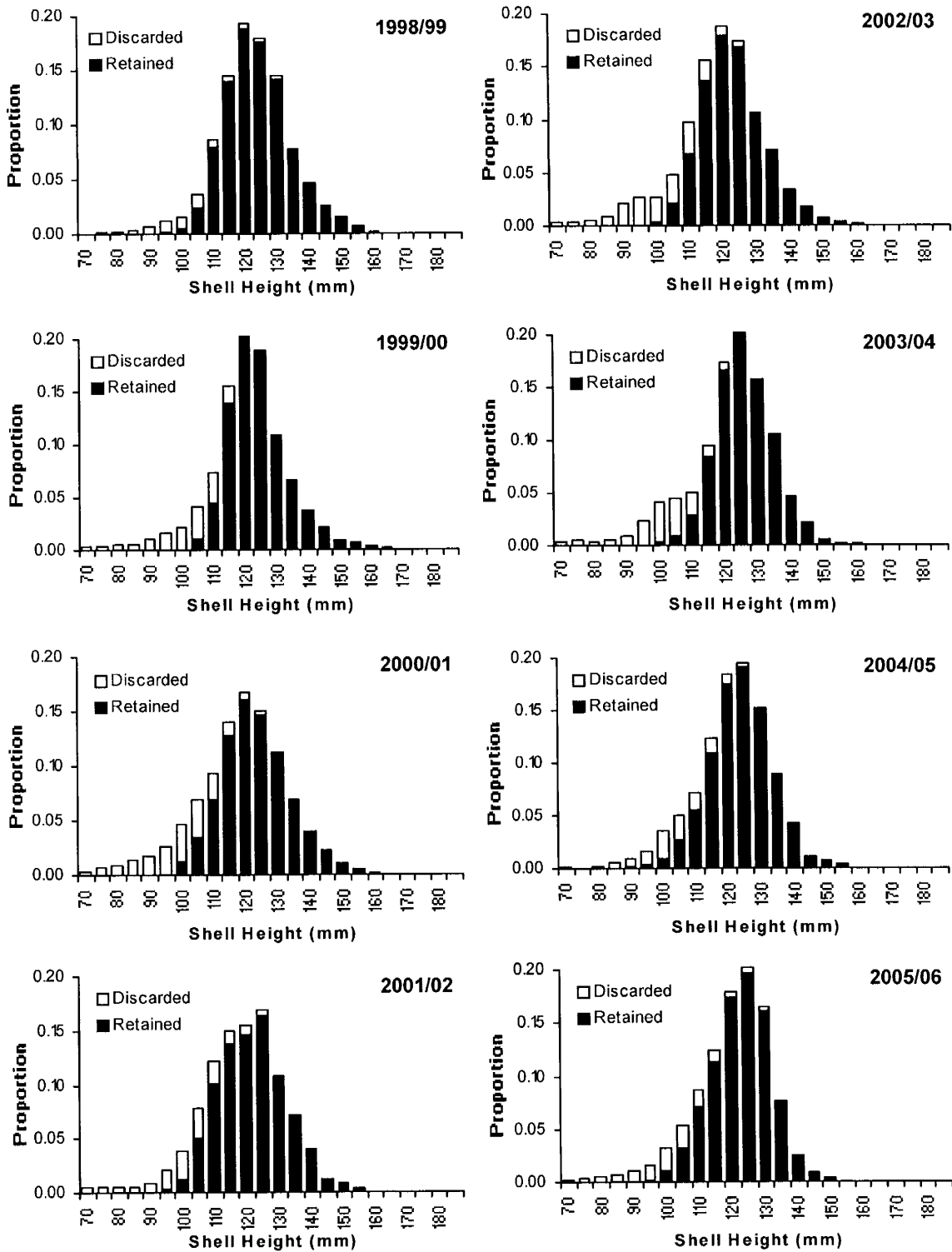


Figure 4 Shell height histograms from resampling Yakutat Area D observer data, 1998/99–2004/05 seasons.

Table 6 Yakutat District 16 scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993	1	35,000		confidential	
1994	7 ^b	35,000	408	22,226	54
1995	6 ^b	35,000	1,095	33,302	30
1996	2	35,000	917	34,060	37
1997	4	35,000	561	22,020	39
1998/99	2	35,000	702	34,153	49
1999/00	2	35,000	674	34,624	51
2000/01	3	35,000	476	30,904	65
2001/02	2	35,000	417	20,398	49
2002/03	2	35,000	100	3,685	37
2003/04	2	35,000	18	1,072	59
2004/05	2	35,000	419	24,430	58
2005/06	2	35,000	407	13,650	34

^aConfidential data released by vessel operators.

^bOne additional vessel fished by waiver without an observer; data not included.

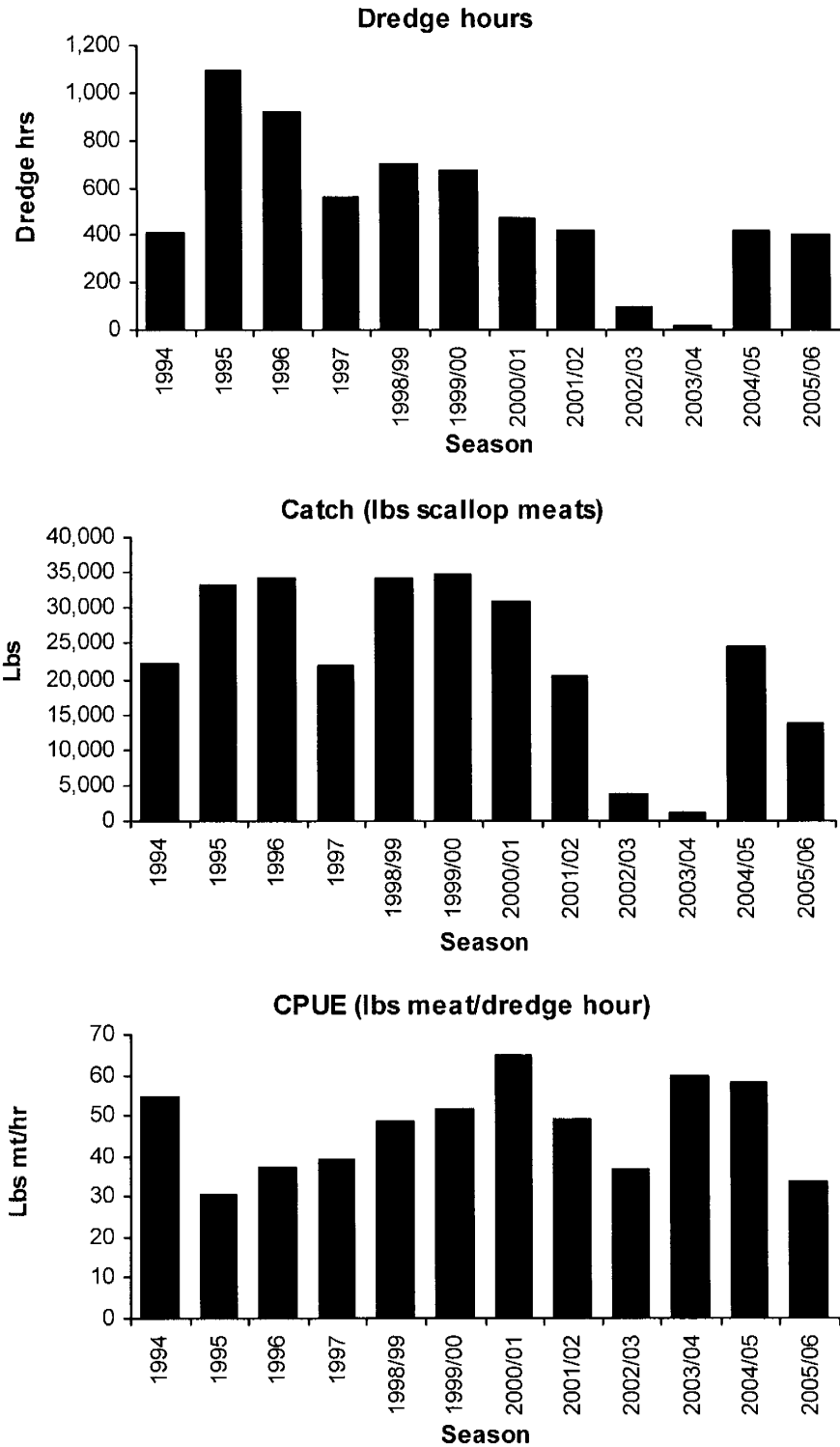


Figure 5 Barplots of Yakutat District 16 scallop fishery statistics.

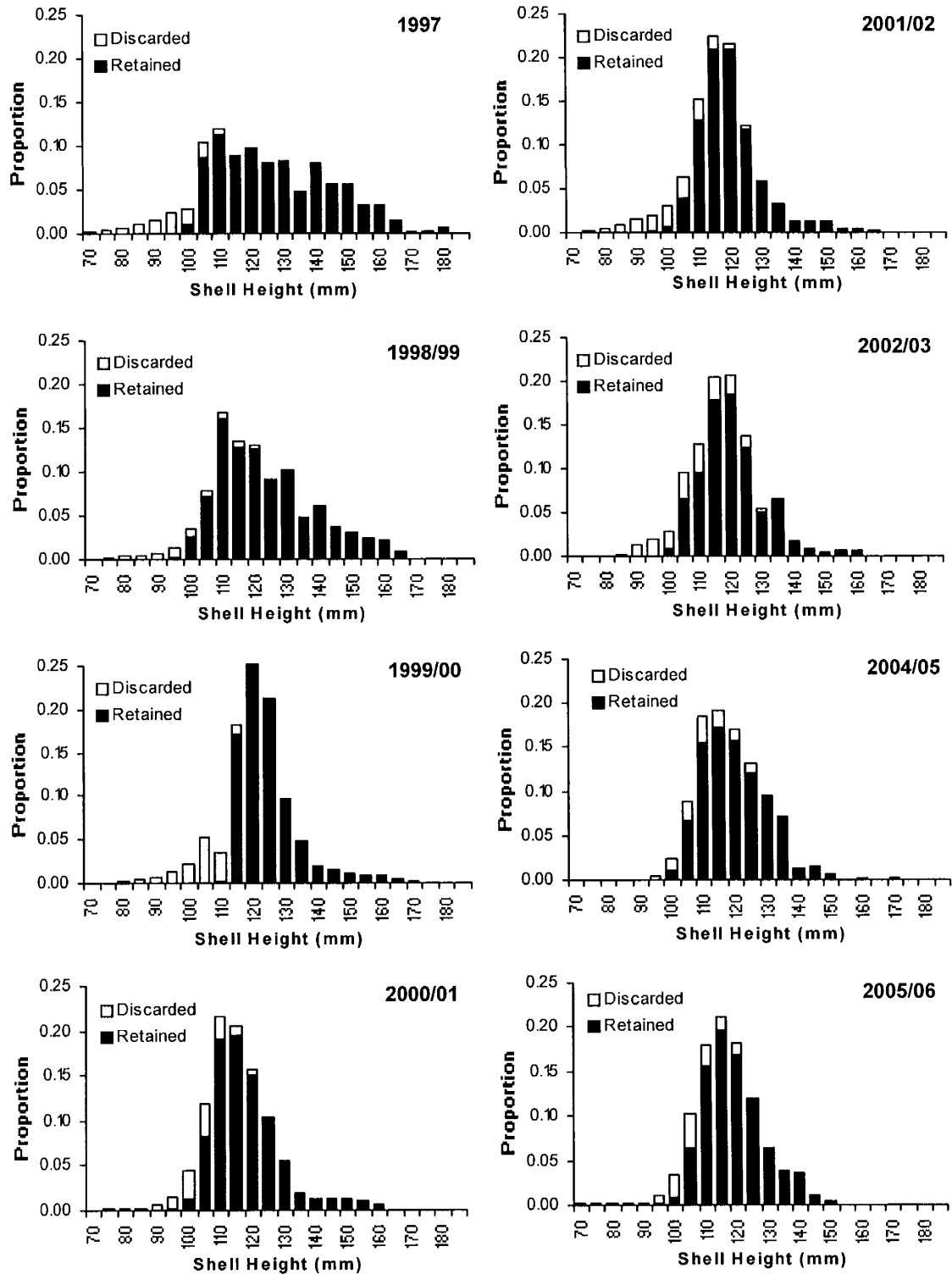


Figure 6 Shell height histograms from resampling Yakutat District 16 observer data, 1997–2005/06 seasons. Insufficient data were collected to produce a plot for the 2003/04 season.

3.2 Prince William Sound Registration Area

Scallop dredge surveys have been conducted biennially in the Prince William Sound Registration Area (Area E) near Kayak Island (Figure 1 and Figure 2) since 1996. Survey catches have varied considerably (Table 7), and concerns have been raised about dredge efficiency and performance (William Bechtol, ADF&G, personal communication). The 2004 survey produced a meat weight biomass estimate of over 750,000 lbs (Table 7), and small scallops that should recruit to the exploitable population during the next 2 years were captured in the lined survey dredge (William Bechtol, ADF&G, unpublished data). The most recent published survey report (Bechtol 2003) contains information on survey methodology as well as catch rates and size and age structure of the stock from previous surveys. Area E GHRs are established by ADF&G Central Region staff based on survey and fishery data, conservative harvest rates, and analysis of trends in recruitment and abundance.

Two catcher processors participated in the 2005/06 Area E fishery and harvested approximately 49,000 lbs of scallop meats (Table 8). Area E CPUE was 100 lbs meat/dredge hr for the 2005/06 season (Table 5, Figure 7), an increase over the two previous seasons. Area E CPUE remains the highest in the state.

Illegal fishing in the area by a single vessel outside the jurisdiction of the state of Alaska occurred in 1995 and led to a statewide scallop fishing closure in federal waters. Catch but no effort data are available for the illegal fishing incident (Table 8).

Plots of Prince William Sound SH distributions from the commercial fishery (Figure 8) show a cohort of small scallops that began to appear in catches during the 2003/04 season and indications of future recruitment in 2005/06.

Table 7 Kayak Island dredge survey summary.

East Bed							
Survey Year	Number stations sampled	Area Swept by dredge (km ²)	Total Area surveyed (km ²)	Total scallops caught	Scallop density (scal/10m ²)	Average weight (g/scal)	Estimated biomass (lbs meat)
1996	41	0.180	281	2,656	0.1148	245	153,115
1998	21	0.092	144	2,278	0.247	251	145,928
2000	25	0.110	171	5,104	0.466	238	298,822
2002	9	0.039	62	668	0.169	254	40,678
2004	24	0.105	171	4,823	0.458	255	281,992
2006	23	0.101	171	5,020	0.498	279	367,265
West Bed							
1998	13	0.057	89	2,844	0.499	246	178,472
2000	16	0.070	110	9,577	1.365	196	460,488
2002	13	0.057	89	2,784	0.488	242	161,752
2004	15	0.066	110	9,257	1.407	228	419,632
2006	13	0.057	96	5,290	0.928	227	290,418

Table 8 Prince William Sound Area E scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993	7	50,000	638	63,068	99
1994		Closed			
1995	3	50,000		108,000 ^b	
1996		Closed			
1997	1	17,200	171	18,000	105
1998/99	2	20,000	179	19,650	110
1999/00	2	20,000	149	20,410	137
2000/01	3	30,000	221	30,266	137
2001/02	1	30,000	263	30,090	114
2002/03	2	20,000	122	15,641	121
2003/04	1	20,000	216	19,980	93
2004/05	2	50,000	614	49,320	80
2005/06	3	50,000	491	49,205	100

^aConfidential data released by vessel operators.

^bPoundage includes illegal fishing by one vessel; effort data not available.

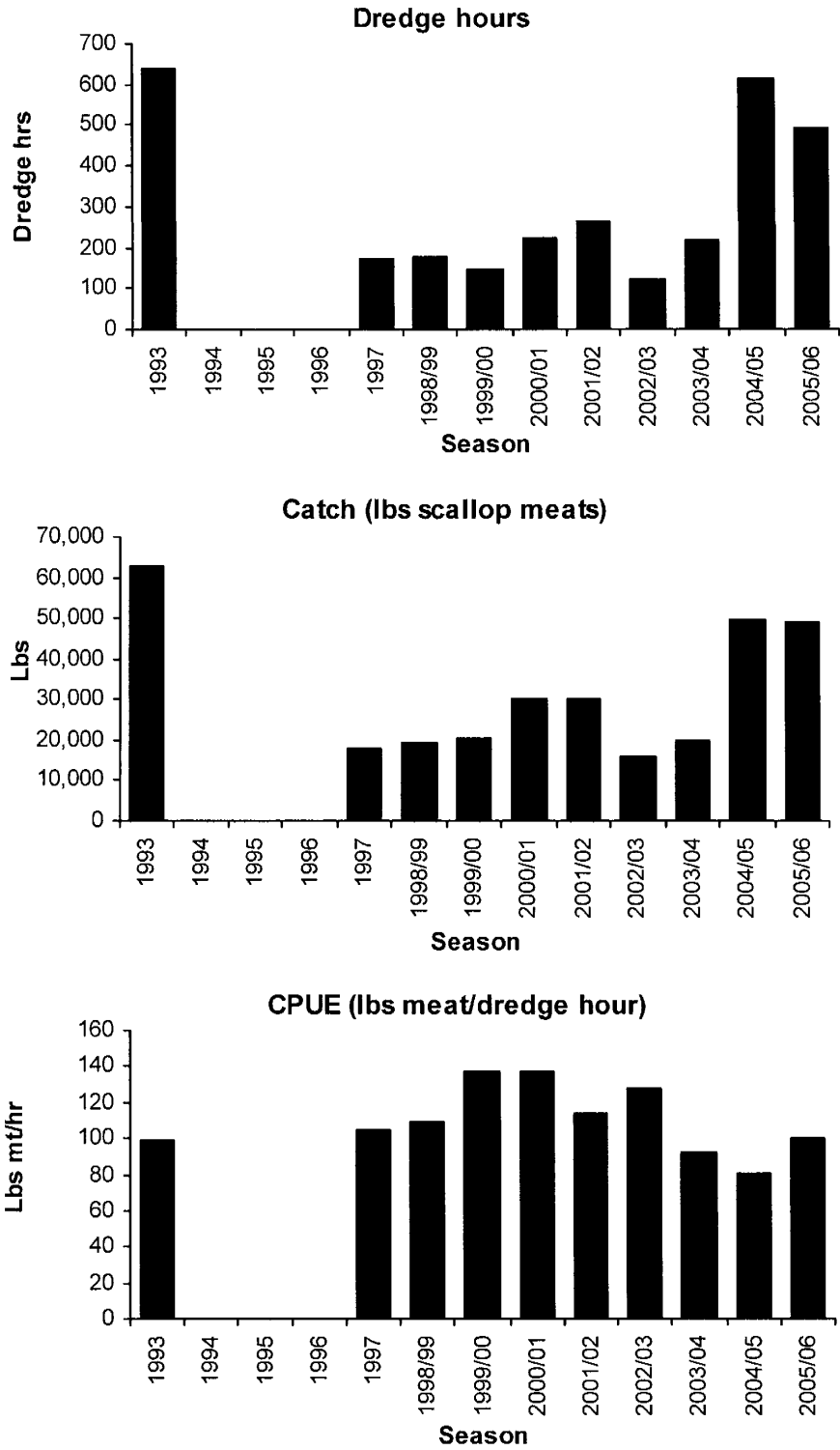


Figure 7 Barplots of Area E scallop fishery statistics.

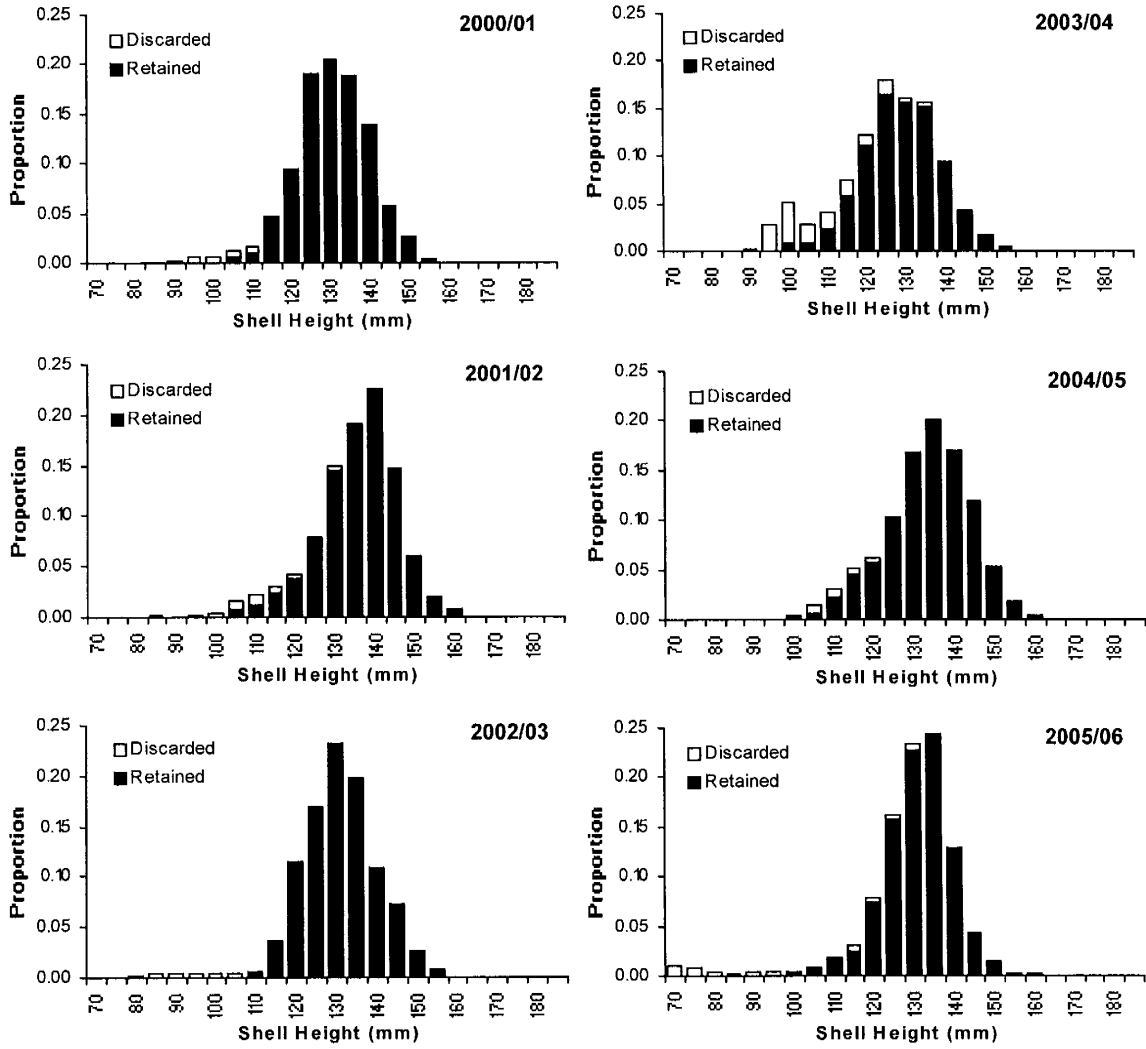


Figure 8 Shell height histograms from resampling Area E observer data, 2000/01–2005/06. Insufficient data were available to produce plots for earlier seasons.

3.3 Cook Inlet Registration Area, Kamishak District

The Cook Inlet scallop fishery is prosecuted in the Kamishak District by vessels that are limited to one 6-foot dredge. The third-party contract observer requirement is waived by the ADF&G fishery manager provided that participants accommodate an ADF&G observer when requested. Other areas of Cook Inlet were explored briefly but are not currently fished (Trowbridge and Bechtol 2003). Much of Cook Inlet, including all of Upper Cook Inlet, is closed to scallop dredging (Figure 2).

ADF&G conducted a dredge survey of the Kamishak District scallop population in 1984; however, it was not until 1996 that biennial surveys began. Biomass estimates from these surveys (Table 9) have been relatively stable, ranging from 438,000 lbs to 612,000 lbs since 1996. Information on survey methodology, catch rates and size and age structure of the stock from earlier surveys are available in published reports (e.g., Bechtol and Gustafson 2002).

The guideline harvest regulation specified by state regulation for the Kamishak District is 10,000 to 20,000 pounds of shucked meats. During the 2004/05 season, 3 vessels participated in the fishery harvesting 6,117 lbs of scallop meats (Table 10). Participation and CPUE in this small fishery vary widely (Table 10, Figure 9).

Table 9 Kamishak Dredge Survey Summary.

North Bed							
Survey Year	Number stations sampled	Area Swept by dredge (km ²)	Total Area surveyed (km ²)	Total scallops caught	Scallop density (scal/10m ²)	Average weight (g/scal)	Estimated biomass (lbs meat)
1984	47	0.206	192	3,664	0.178	361	209,305
1996	26	0.114	178	6,064	0.532	270	467,500
1998	14	0.061	199	2,531	0.412	352	438,290
1999	28	0.123	192	7,306	0.595	382	611,175
2001	25	0.110	178	5,297	0.483	435	510,701
2003	20	0.088	137	1,755	0.200	448	178,407
2005	23	0.101	158	1,802	0.179	448	185,291
South Bed							
2003	22	0.096	151	4,873	0.505	336	371,972
2005	13	0.057	89	1,360	0.239	302	94,524

Table 10 Cook Inlet, Kamishak District scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993	3		529	20,115	38
1994	4		454	20,431	45
1995		closed			
1996	5		534	28,228	53
1997	3	20,000	394	20,336	52
1998	1	20,000	390	confidential	
1999	3	20,000	333	20,315	61
2000	3	20,000	276	20,516	74
2001	2	20,000	406	confidential	
2002	3	20,000	311	8,591	28
2003	2	20,000	862	confidential	
2004	3	20,000	364	6,117	17
2005	2	7,000	199	confidential	
2006	1	7,000	10	confidential	

^aIncludes estimated dead loss.

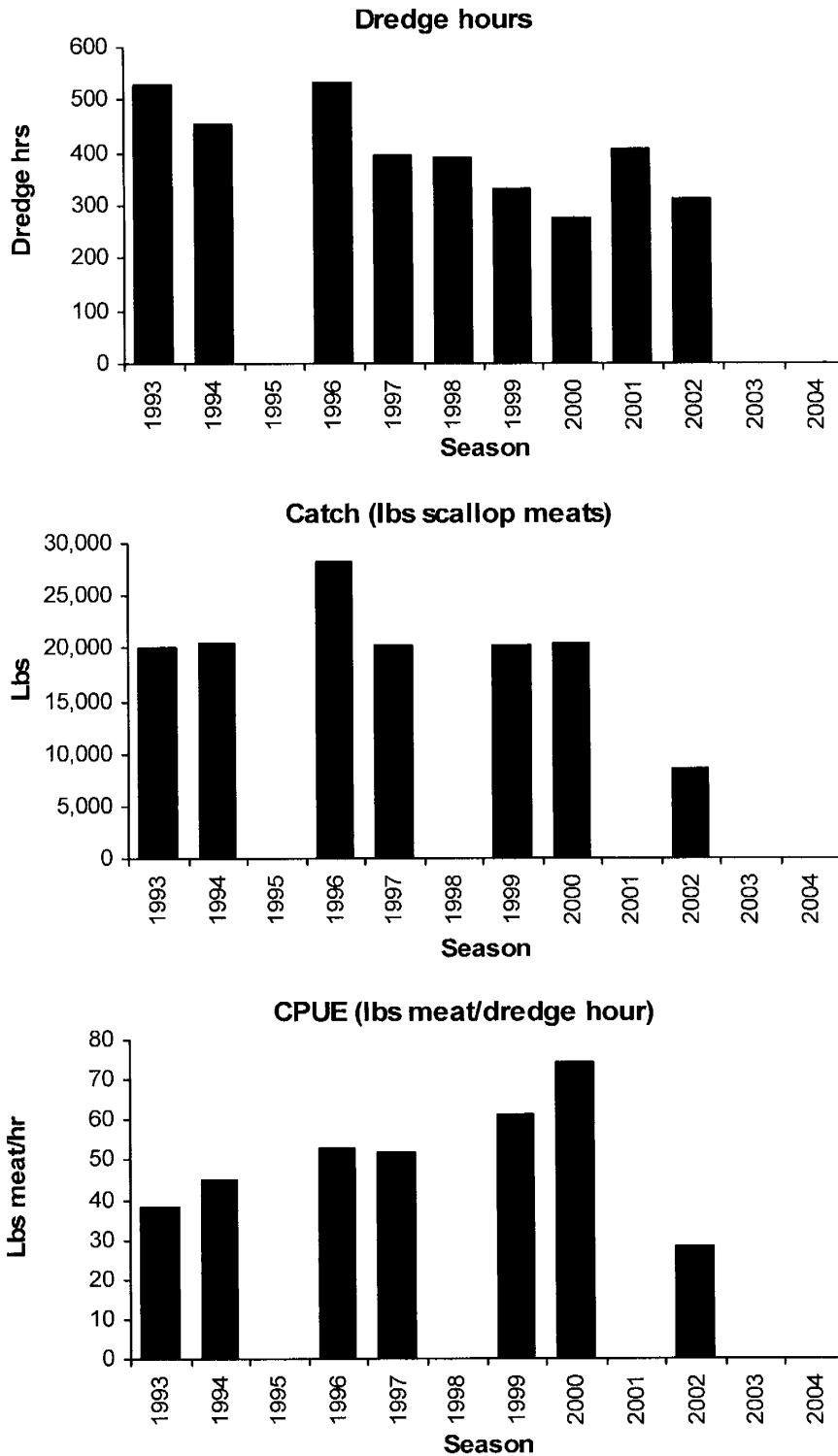


Figure 9 Barplots of Area H scallop fishery statistics.

3.4 Kodiak Registration Area, Northeast District

Three vessels harvested 79,990 lbs of scallop meats from the Northeast District of the Kodiak Management Area during the 2005/06 season (Table 11, Figure 10). CPUE for 2005/06 fell to 45 lbs meat/dredge hr, in part due to participation of a small vessel fishing with a single 8 ft dredge.

SH histograms (Figure 11) show that a broad range of scallop sizes are harvested in the fishery and indicate that recruitment to the harvestable population continues.

Large portions of the district known to contain scallops are closed to scallop dredging (Figure 2). These closures were recommended by ADF&G and adopted by the Alaska BOF over 30 years ago due to concerns about red king crab bycatch and conflict with other gear types.

The weathervane scallop population in the Northeast District of the Kodiak Registration Area is not currently surveyed and no abundance estimates are available.

Table 11 Kodiak Northeast District scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993/94	10	NA	6,940	155,187	22
1994/95	7	NA	1,773	35,207	20
1995/96		closed			
1996/97	3	NA	581	11,430	20
1997/98	3	NA	2,604	95,858	37
1998/99	4	NA	2,749	120,010	44
1999/00	3	75,000	1,384	77,119	56
2000/01	4	80,000	1,101	79,965	73
2001/02	3	80,000	1,142	80,470	70
2002/03	2	80,000	1,350	80,000	59
2003/04	2	80,000	1,248	79,965	64
2004/05	2	80,000	1,227	80,105	65
2005/06	3	80,000	1,759	79,990	45

^aConfidential data released by vessel operators.

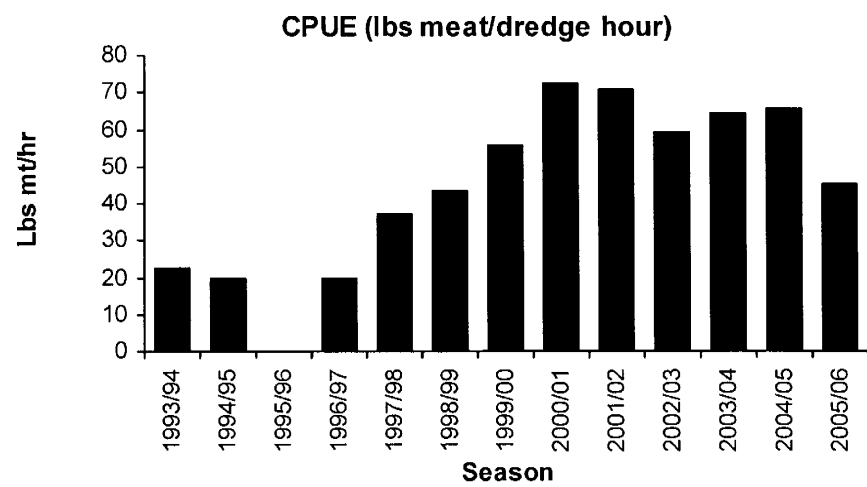
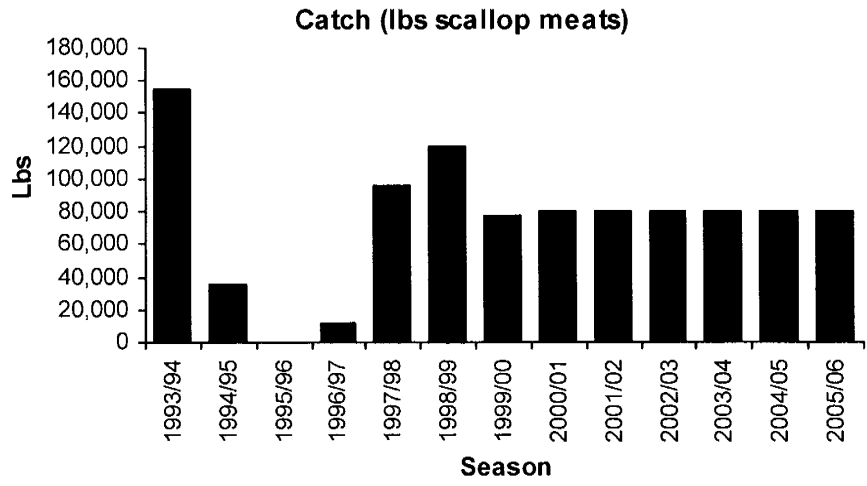
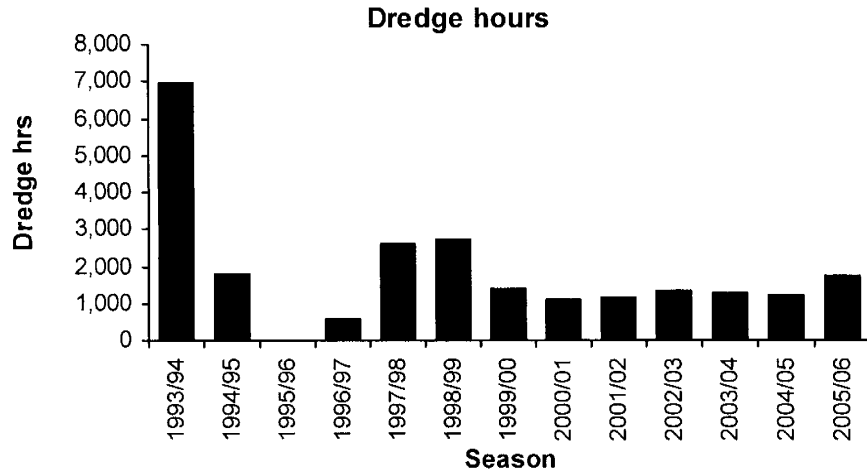


Figure 10 Barplots of Kodiak Northeast District scallop fishery statistics.

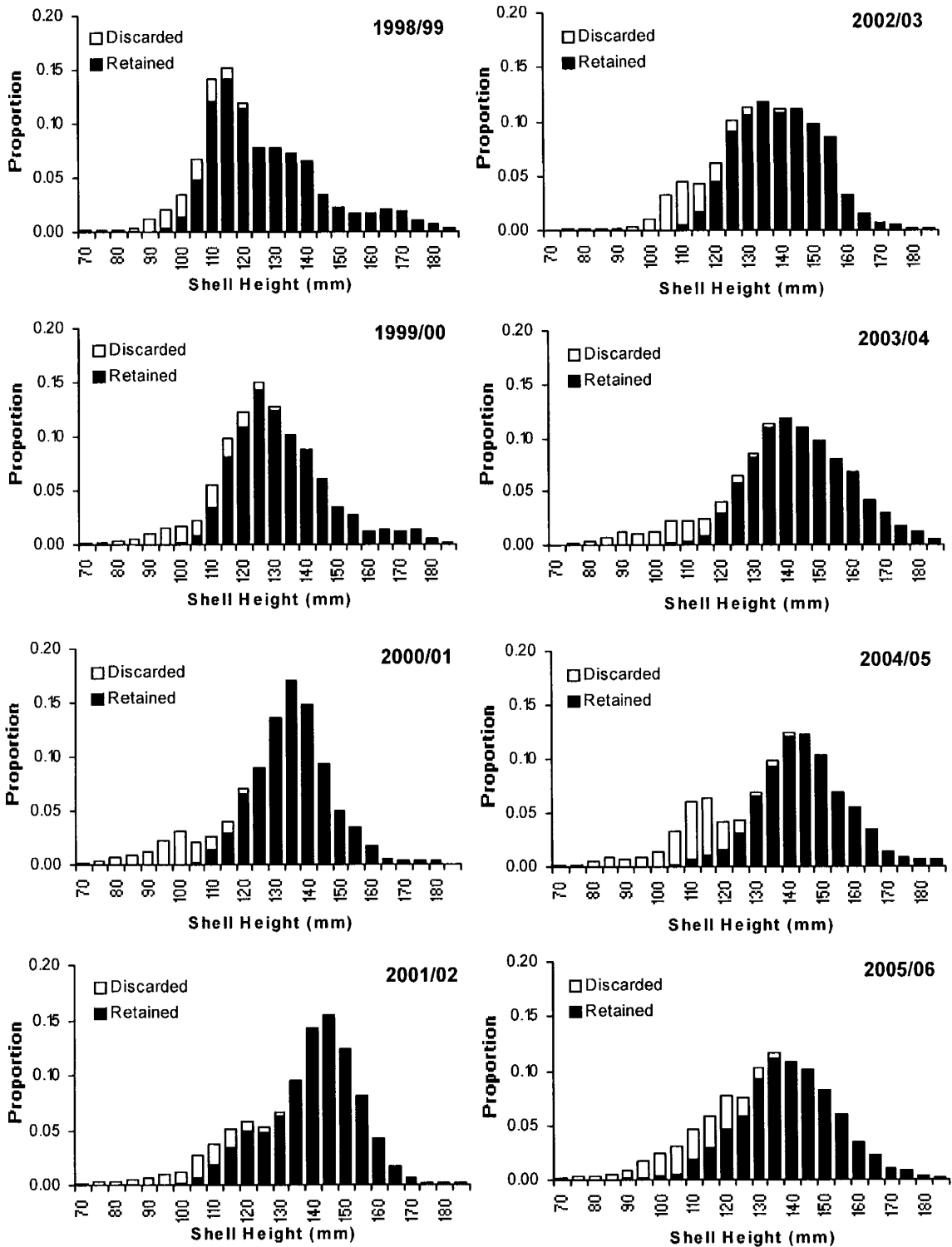


Figure 11 Shell height histograms from resampling Kodiak Northeast District scallop observer data, 1998/99–2005/06.

3.5 Kodiak Registration Area, Shelikof District

The upper end of the scallop GHR for the Shelikof District of the Kodiak Area was reduced from 180,000 to 160,000 lbs for the 2005/06 season (Table 12, Figure 12). Two vessels participated in the fishery and harvested 159,941 lbs of scallop meats; CPUE increased to 70 lbs meat/dredge hr from 50 lbs meat/dredge hr the previous season.

Scallop SH histograms (Figure 13) indicate continuing recruitment to the harvestable population in this area.

To protect depressed red king crab and Tanner crab populations, the BOF closed Kodiak's westside bays to scallop fishing in 1990; weathervane scallops are known to inhabit these closed waters (Figure 2).

Experimental video research was conducted in the Shelikof District in 2004. A stock assessment survey using ADF&G's new camera sled is planned for the Shelikof District in June 2007.

Table 12 Kodiak Shelikof District scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993/94	5	NA	2,491	105,017	42
1994/95	11	NA	8,662	314,051	36
1995/96		closed			
1996/97	3 ^b	NA	3,491	219,305	63
1997/98	4	NA	5,492	258,346	47
1998/99	8	NA	4,081	179,870	44
1999/00	6	180,000	4,304	187,963	44
2000/01	5	180,000	2,907	180,087	62
2001/02	4	180,000	3,398	177,112	52
2002/03	3	180,000	3,799	180,580	48
2003/04	2	180,000	3,258	180,011	55
2004/05	2	180,000	3,467	174,622	50
2005/06	2	160,000	2,280	159,941	70

^aConfidential data released by vessel operators.

^bOne additional vessel fished but data were not available.

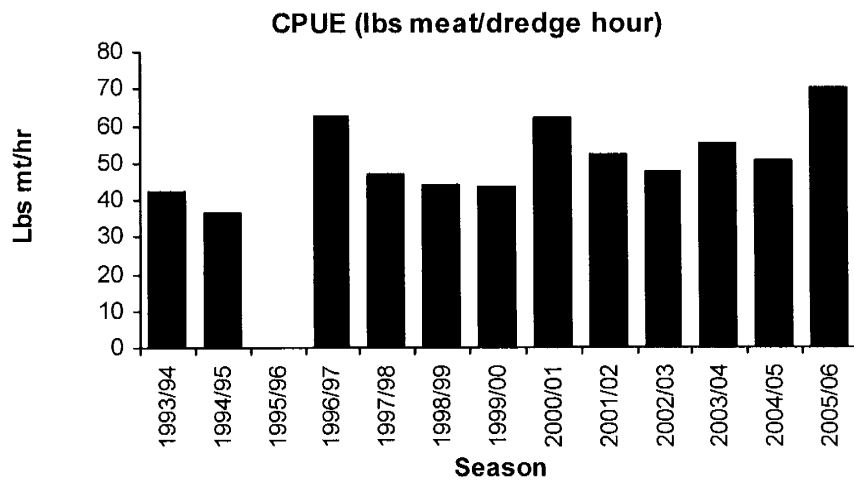
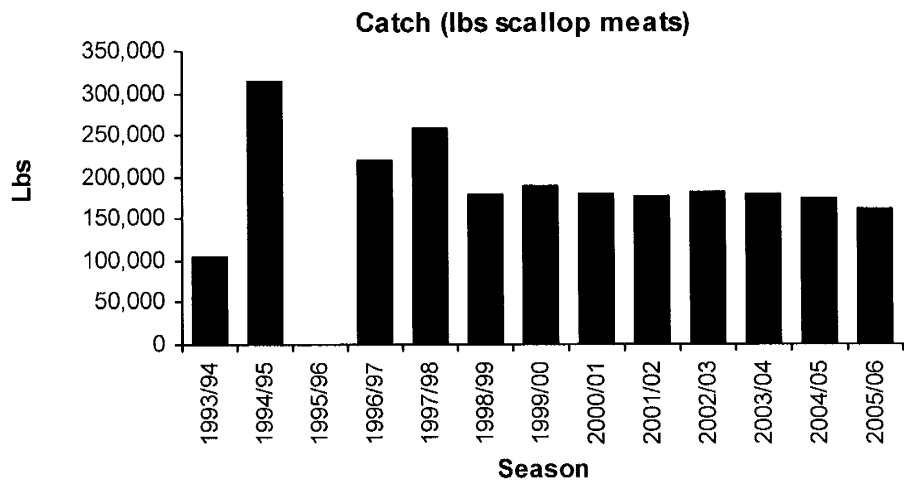
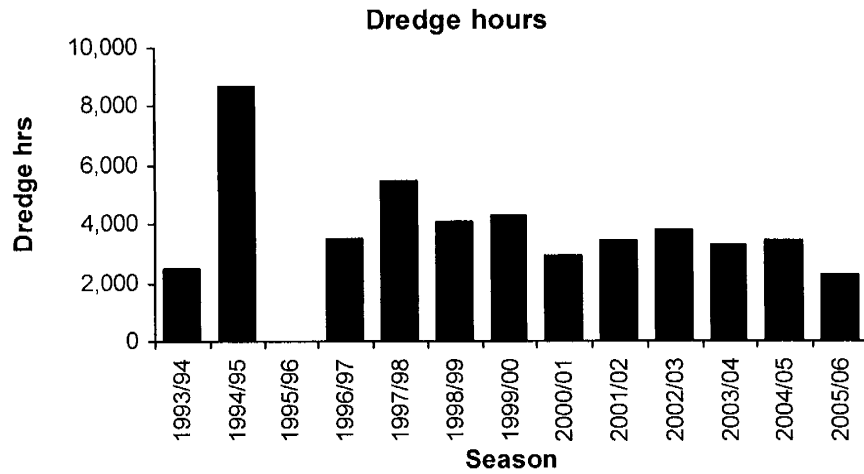


Figure 12 Barplots of Kodiak Shelikof District scallop fishery statistics.

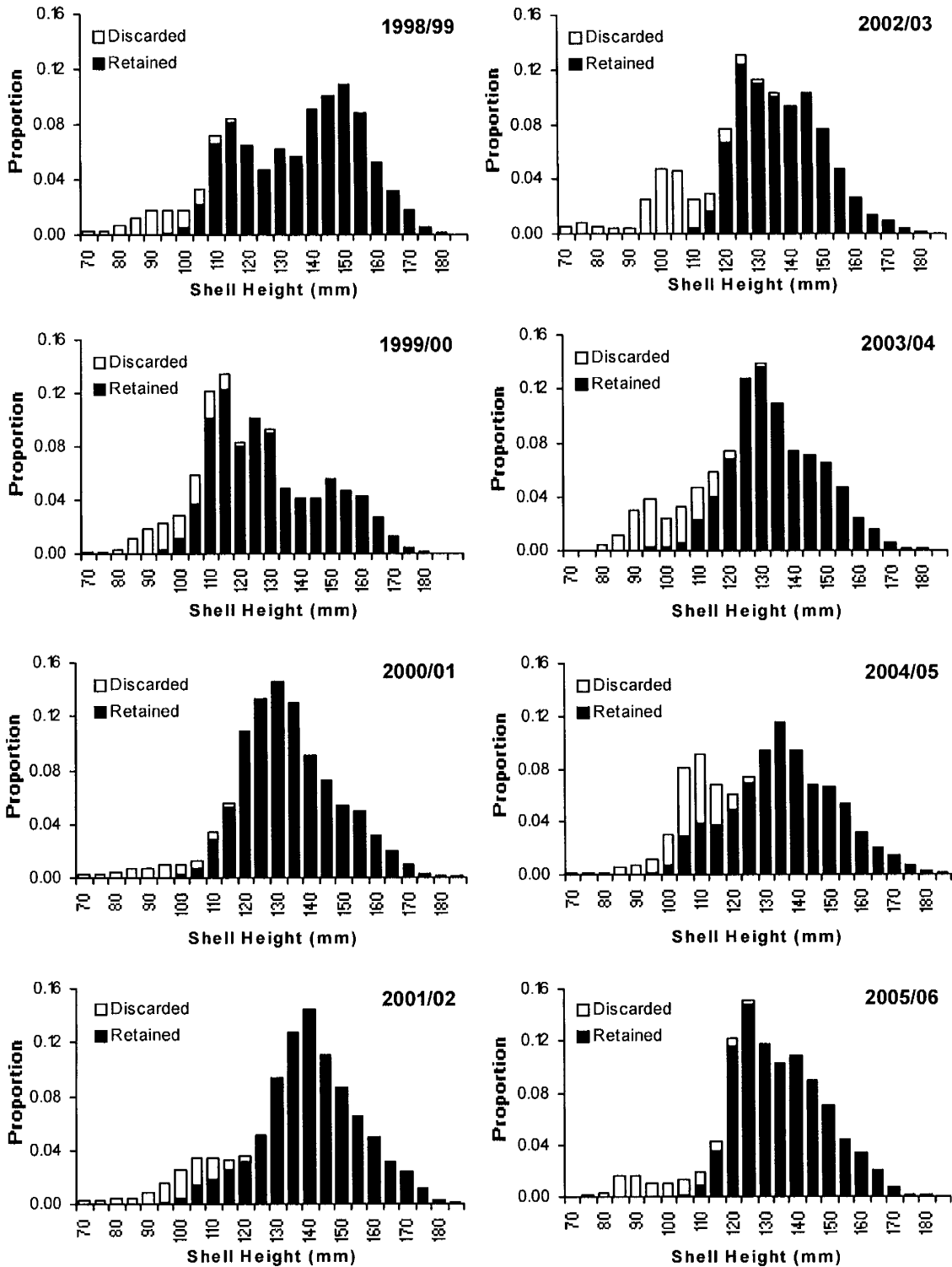


Figure 13 Shell height histograms from resampling Kodiak Shelikof District scallop observer data, 1998/99–2005/06.

3.6 Kodiak Registration Area, Semidi District

Traditional scallop fishing areas of the Semidi District are located in state waters that were closed to scallop dredging by the BOF in 2000 (Figure 2). Other parts of the district remain open to fishing, but no effort has occurred since the 1999/00 season (Table 13).

Table 13 Kodiak Semidi District scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993/94	6 ^b	NA	1,819	55,487	32
1994/95	2	NA	272	confidential	
1995/96		closed			
1996/97	3	NA	1,017	37,810	37
1997/98	1	NA	349	6,315	18
1998/99	2	NA	106	1,720	16
1999/00	1	NA	45	930	21
2000/01		NA	0		
2001/02		NA	0		
2002/03		NA	0		
2003/04		NA	0		
2004/05		NA	0		
2005/06		NA	0		

^aConfidential data released by vessel operators.

^bTwo additional vessel fished but data are not available.

3.7 Alaska Peninsula Registration Area

Scallop fishing in the Alaska Peninsula Registration Area (Area M) is concentrated in a small region near the Shumagin Islands between 160° and 161° W. longitude. Area M was closed for the 2000/2001 and 2002/03 seasons due to concerns about potential localized depletion (Table 14, Figure 14).

For the 2003/04 and 2004/05 seasons, the area between 160° and 161° W. longitude remained closed for stock conservation, while the remainder of the area was opened with a 10,000 pound GHR ceiling. For the 2005/06 season, the area between 160° and 161° W. longitude opened with a GHR ceiling of 10,000 lbs, plus the remainder of the area was opened with a GHR ceiling of 10,000 lbs. No effort has occurred since 2000/01.

Alaska Peninsula SH histograms (Figure 15) suggest that most large scallops were removed from the population prior to the 2000/01 season. Scallops are also found offshore and in state waters of the Alaska Peninsula that have been closed to scallop dredging for over 30 years as a conservation measure to protect crab habitat and populations.

Table 14 Alaska Peninsula Area scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993/94	8	NA	1,847	112,152	61
1994/95	7	NA	1,664	65,282	39
1995/96		closed			
1996/97	2	200,000	327	12,560	38
1997/98	4	200,000	1,752	51,616	29
1998/99	4	200,000	1,612	63,290	39
1999/00	5	200,000	2,025	75,535	37
2000/01	3	33,000	320	7,660	24
2001/02		closed			
2002/03		closed			
2003/04		10,000			
2004/05		10,000			
2005/06		20,000			

^aConfidential data released by vessel operators.

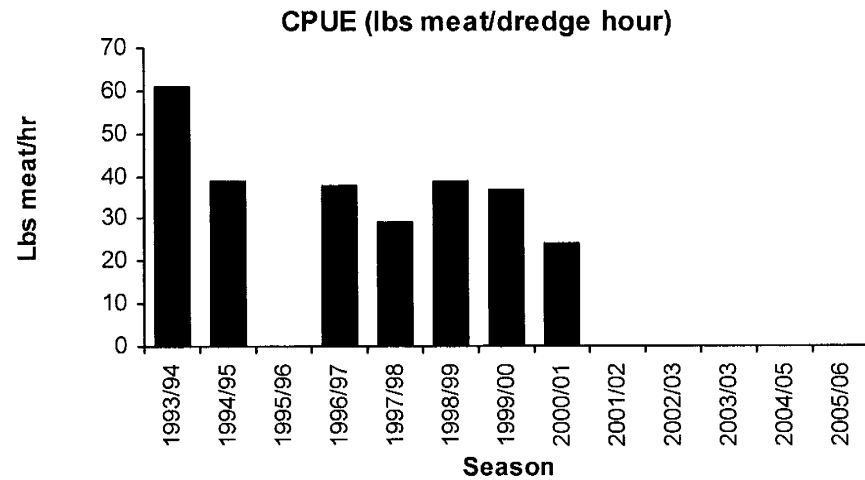
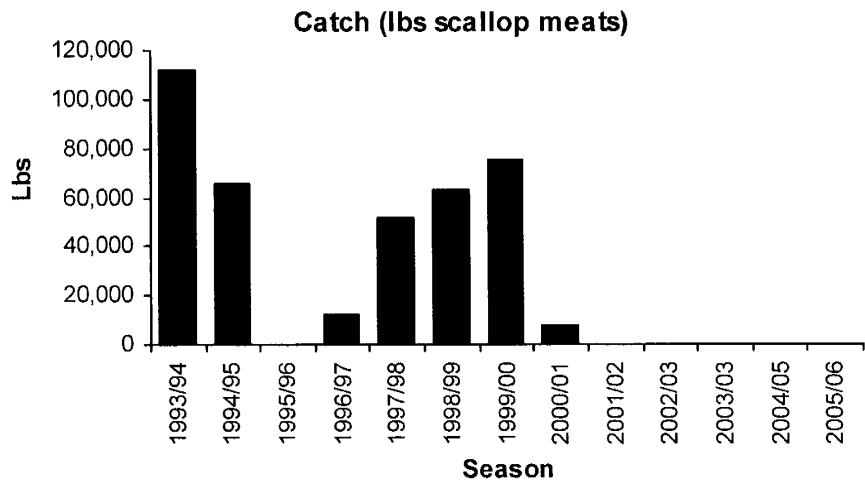
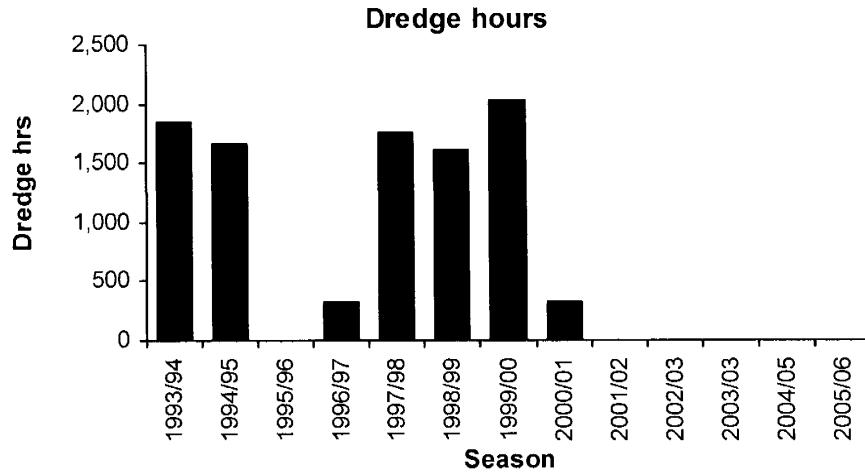


Figure 14 Barplots of Alaska Peninsula scallop fishery statistics.

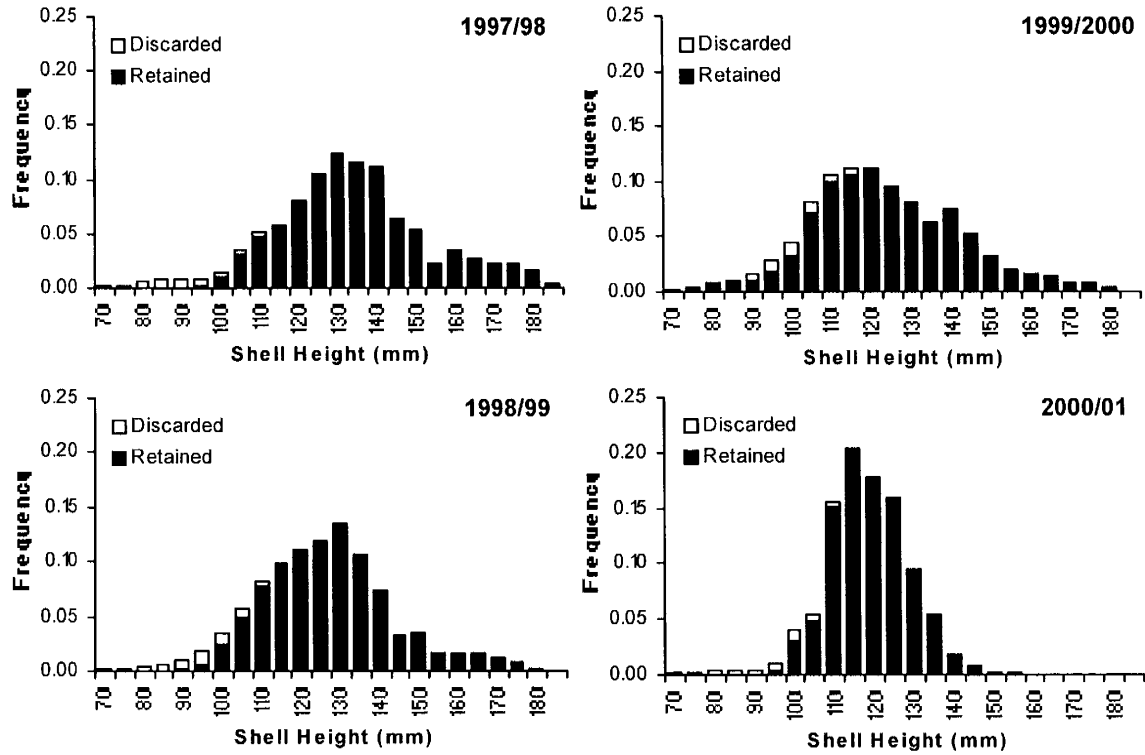


Figure 15 Shell height histograms from resampling Area M scallop observer data, 1997/98–2000/01.

3.8 Bering Sea Registration Area

Scallop fishing in the Bering Sea Registration Area (Area Q) occurs north of Unimak Island (Figure 1 and Figure 2). One vessel participated in the 2005/06 fishery and harvested 23,220 lbs of shucked scallop meats (Table 15, Figure 16). Large catches landed in the early 1990s during the “fishing-up” period do not appear to be sustainable.

Although incidental catches of *Chionoecetes* crabs in the Bering Sea scallop fishery have remained below CBLs in recent years, concerns about *Chionoecetes* bycatch rates have altered fleet behavior. Scallop vessels frequently move to avoid high crab bycatch areas, which may in turn reduce CPUE and profitability. Dredging operations tend to attract crabs, so when a profitable scalloping area is found, bycatch rates will tend to increase over time and the vessel will likely have to move. Industry attributes harvests that have fallen below the upper end of the GHR in recent seasons to bycatch avoidance.

Bering Sea SH histograms (Figure 17) indicate that modest recruitment to the harvested population has occurred over the past few years.

Large portions of the eastern Bering Sea shelf and the Pribilof Islands Habitat Conservation Area are closed to scallop fishing to protect red and blue king crab habitat and to provide for habitat conservation (Figure 2).

Experimental scallop video research was conducted in the Bering Sea Registration Area in 2003. Results from the survey showed that the stock is distributed over a wide, poorly defined portion of the Bering Sea shelf at low densities.

Table 15 Bering Sea Area scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993/94	9	NA	5,764	284,414	49
1994/95	8	NA	11,113	505,439	45
1995/96		closed			
1996/97	1	600,000	2,313	150,295	65
1997/98	2	600,000	2,246	97,002	43
1998/99	4	400,000	2,319	96,795	42
1999/00	2	400,000	3,294	164,929	50
2000/01	3	200,000	3,355	205,520	61
2001/02	3	200,000	3,072	140,871	46
2002/03	2	105,000	2,038	92,240	45
2003/04	2	105,000	1,020	42,590	42
2004/05	1	105,000	275	10,050	37
2005/06	1	50,000	602	23,220	39

^aConfidential data released by vessel operators.

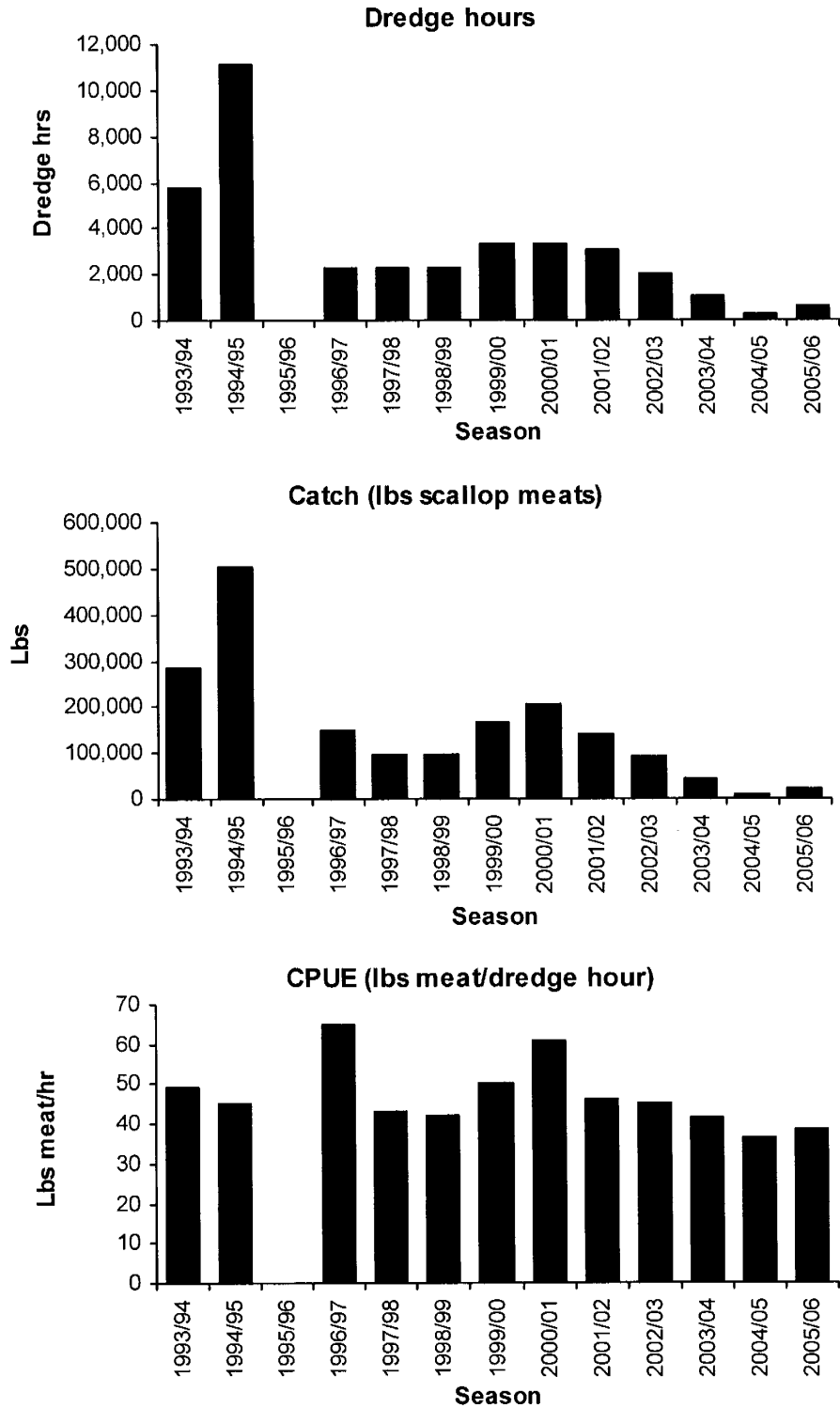


Figure 16 Barplots of Bering Sea scallop fishery statistics.

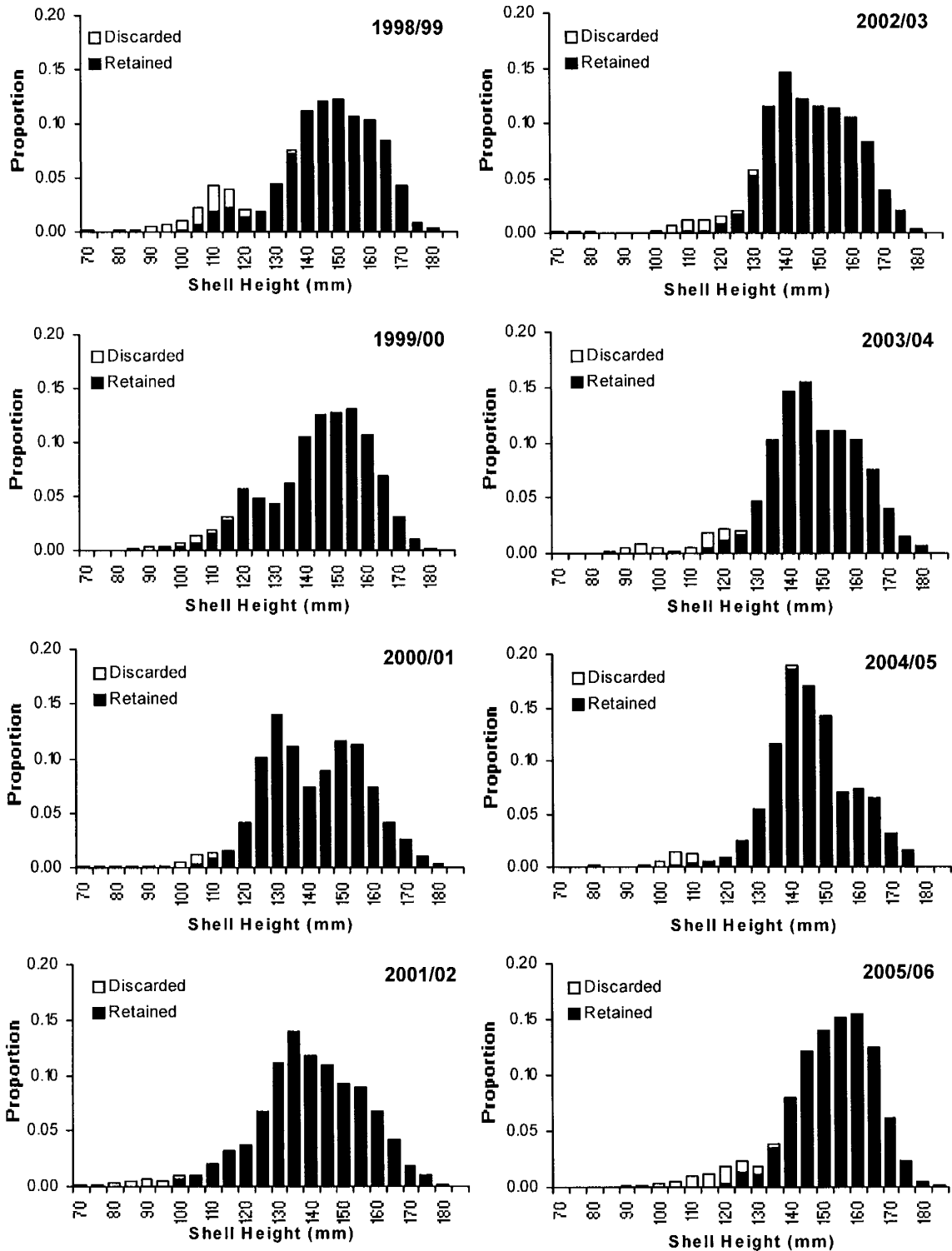


Figure 17 Shell height histograms from resampling Bering Sea scallop observer data, 1998/99–2005/06.

3.9 Dutch Harbor Registration Area

The Dutch Harbor Registration Area (Area O) was opened during 2002/03 for the first time since the 1999/00 season. One vessel fished briefly and harvested about 6,000 lbs of scallop meats, with CPUE that was low but comparable to CPUE from earlier seasons (Table 16, Figure 18). Managers decided in 2003 to close the area for at least 3 additional years to allow for stock rebuilding. Productive scallop grounds that contributed significantly to the overall harvest were closed to scallop fishing before 1986, primarily as a protective measure for crab nursery areas (Figure 2).

The weathervane scallop population in the Dutch Harbor Registration Area is not surveyed and no estimate of abundance has been made. There are currently no plans to survey this population.

Table 16 Dutch Harbor Area scallop fishery summary statistics.

Season	Number vessels	GHR ceiling (lbs meat)	Dredge hours ^a	Catch ^a (lbs meat)	CPUE (lbs meat per dredge hr)
1993/94	2	170,000	838	confidential	46
1994/95	3	170,000	81	1,931	24
1995/96	1	170,000	1,047	26,950	26
1996/97		170,000			
1997/98	1	170,000	171	5,790	34
1998/99	4	110,000	1,025	46,432	45
1999/00	1	110,000	273	6,465	24
2000/01		closed			
2001/02		closed			
2002/03	1	10,000	184	6,000	33
2003/04		closed			
2004/05		closed			
2005/06		closed			

^aConfidential data released by vessel operators.

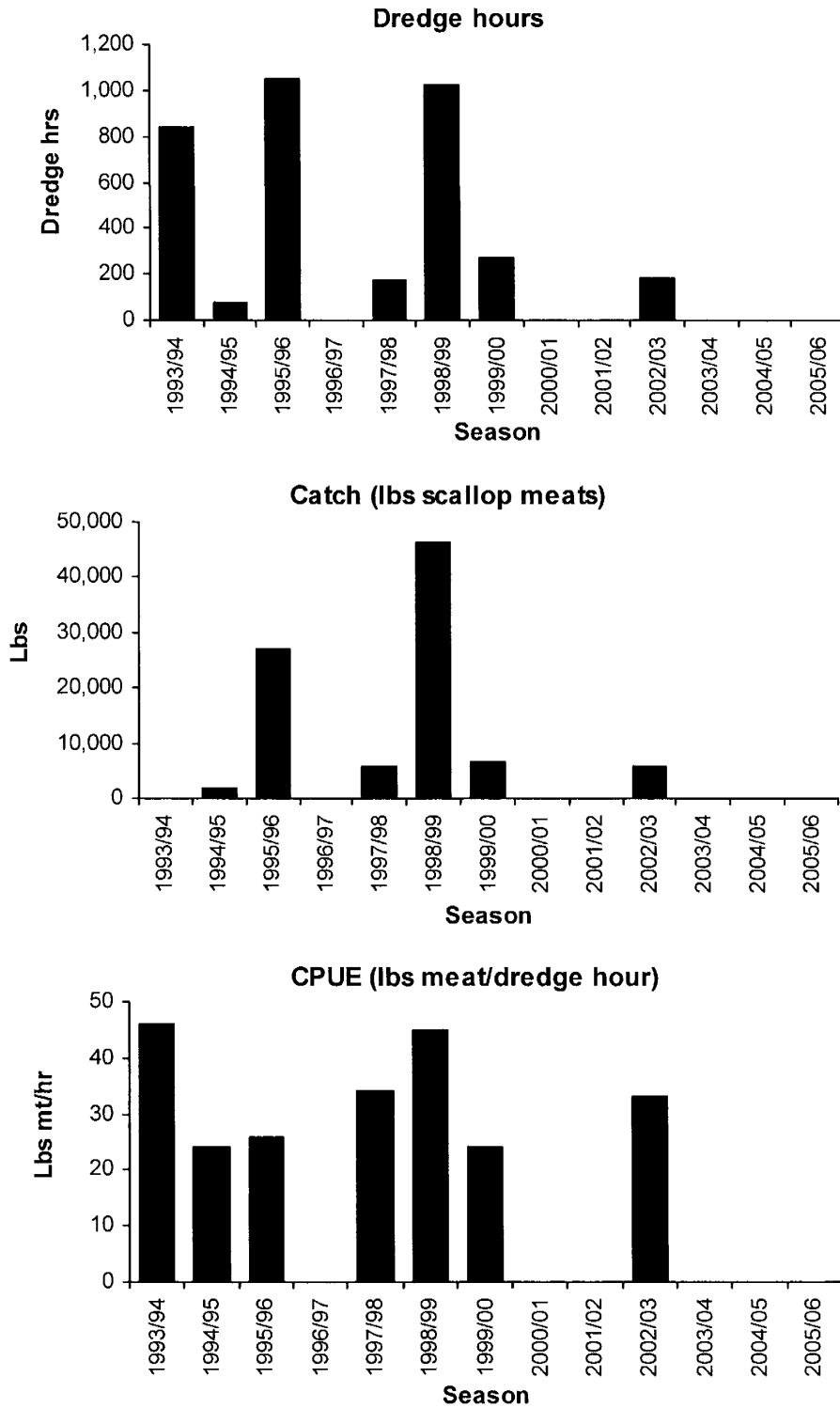


Figure 18 Barplots of Dutch Harbor scallop fishery statistics.

3.10 Adak Area

Scallops were last harvested from the Adak Registration Area in 1995. Effort was limited and little is known about the scallop population in the area. The continental shelf adjacent to the Aleutian Islands is narrow and hence provides limited habitat for weathervane scallops.

ADF&G records indicate that scallops were first harvested from the Adak Registration Area in 1979, and then again in 1992 and 1995. During those years few fishermen participated in any given year, so catch and effort data are confidential. Little is known about scallop populations in this area. The Petrel Bank, between 51°30' N. latitude and 54°30' N. latitude, west of 179 ° W. longitude and east of 179 ° East longitude was closed in 1991 due to concerns about king crab bycatch during the *Chlamys* (pink scallop) fishery.

The 2004/05 fishery opened July 1, 2004 and closed by regulation on February 15, 2005. The GHR ceiling was 75,000 pounds. No vessels participated in the 2004/05 season.

The weathervane scallop population in the Adak Registration Area is not surveyed and no estimate of abundance has been made. There are currently no plans to survey this population. The continental shelf adjacent to the Aleutian Islands is narrow, providing limited weathervane scallop habitat.

4 Trawl Survey Information on Scallop Stocks

Trawl surveys for fisheries stock assessment are conducted annually in the Gulf of Alaska and the Bering Sea by NMFS and ADF&G. Although these surveys target crab and groundfish and the gear is not designed to efficiently capture scallops, weathervane scallops are caught in some areas and survey data provide information on the range of the species.

In the eastern GOA (Figure 19), weathervane scallops have been captured during trawl surveys offshore from traditional scallop fishing grounds and in closed waters adjacent to Prince William Sound. Around Kodiak, trawl surveys have captured scallops in closed waters south of the island and in many bays and inlets (Figure 20). Along the south side of the Alaska Peninsula, trawl survey data indicate that most scallop habitat lies in coastal waters that are closed to scallop fishing, while scallops have been captured during trawl surveys over a large swath of the eastern Bering Sea shelf (Figure 21).

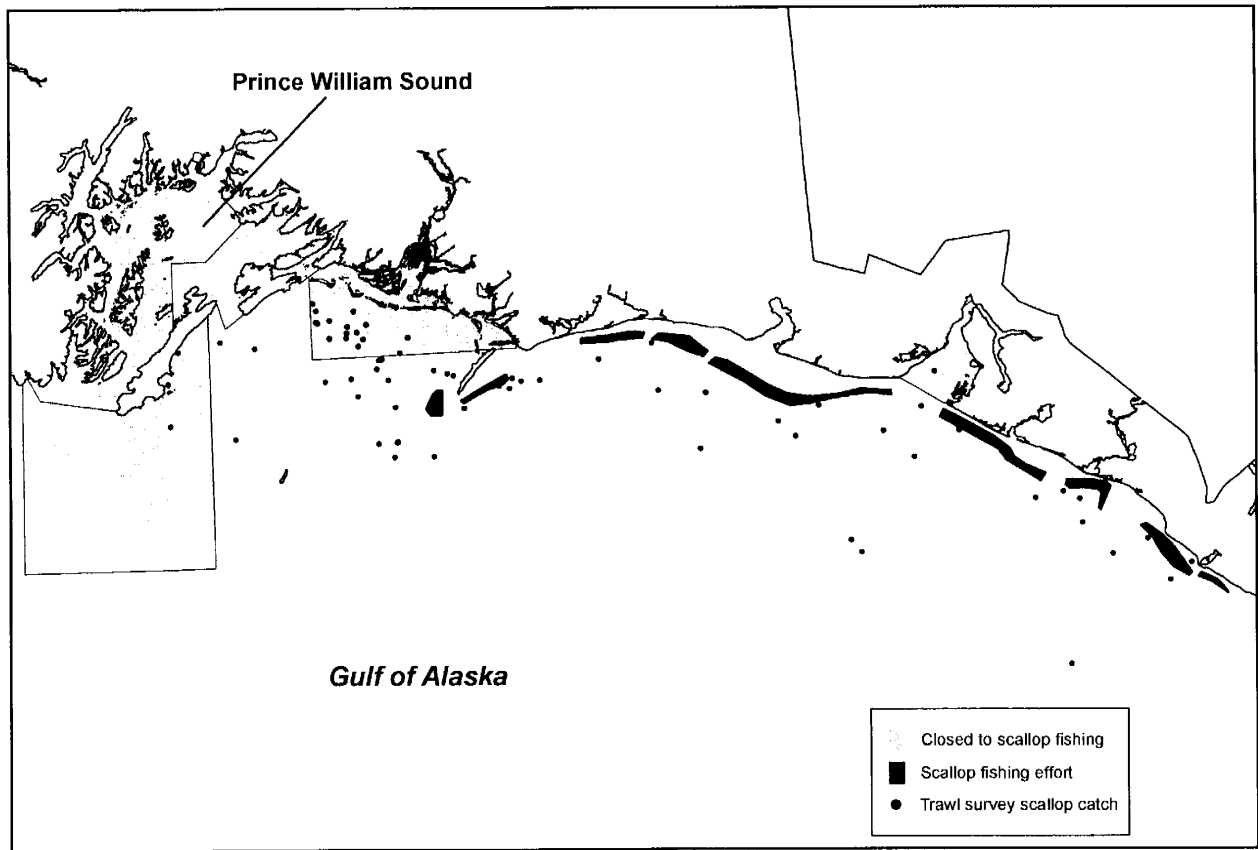


Figure 19 Map showing scallop fishing areas, areas closed to scallop fishing by regulation, and locations where weathervane scallops were captured during NMFS trawl surveys in the eastern Gulf of Alaska.

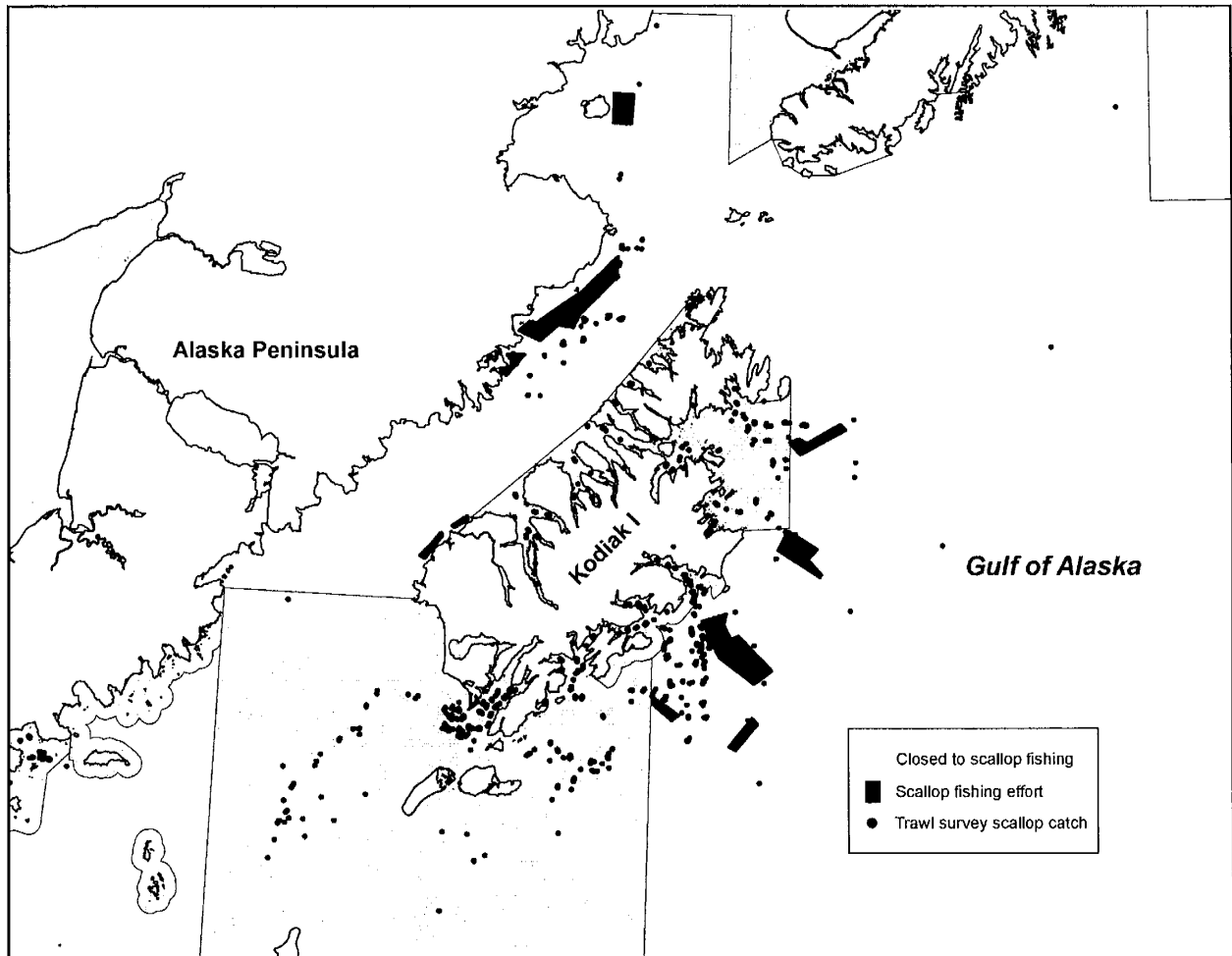


Figure 20 Map showing scallop fishing areas, areas closed to scallop fishing by regulation, and locations where weathervane scallops were captured during NMFS and ADF&G trawl surveys in the Kodiak Area.

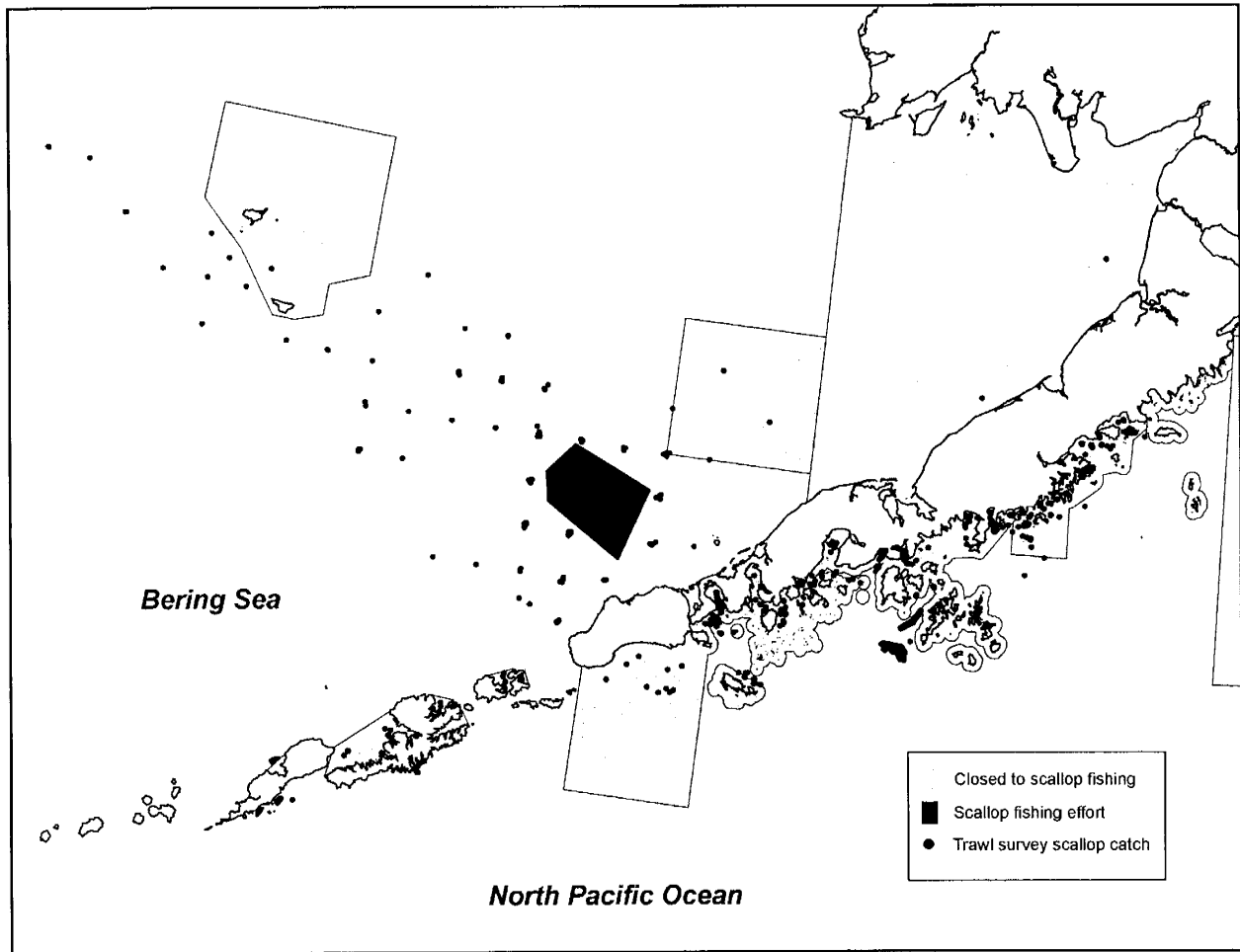


Figure 21 Map showing scallop fishing areas, areas closed to scallop fishing by regulation, and locations where weathervane scallops were captured during NMFS and ADF&G trawl surveys in western Alaska.

5 Overfishing Definition

Overfishing is a level of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis. MSY is defined as the largest long-term average catch that can be taken from a stock under prevailing ecological and environmental conditions. Amendment 6 to the scallop FMP established MSY for weathervane scallops at 1.24 million lbs of shucked meats based on the average catch from 1990-1997 excluding 1995. Optimum Yield (OY) was defined as 0-1.24 million lbs, and the overfishing control rule was defined as a fishing rate in excess of the natural mortality rate, which has been estimated as $F_{\text{overfishing}} = M = 0.13$ (12% per year) statewide. At this time, abundance is estimated for only two of the nine registration areas and a determination of MSST cannot be made. The fishery is managed conservatively with harvest levels well below MSY. Figure 22 shows the statewide scallop catch and the MSY levels both prior to amendment 6 and following inception of the new MSY level in 1996. Since 1996, catch has averaged between 39% to 66% of MSY (Figure 22, Table 17).

Table 17 Alaska weathervane scallop harvest and Maximum Sustainable Yield from FMP, 1993/94–2005/06 seasons.

Season	Harvest		
	(lbs meat)	MSY	% MSY
1993/94	984,583	1,800,000	55
1994/95	1,240,775	1,800,000	69
1995/96	410,743	1,800,000	23
1996/97	732,424	1,800,000	41
1997/98	818,913	1,800,000	45
1998/99	822,096	1,240,000	66
1999/2000	837,971	1,240,000	68
2000/01	750,617	1,240,000	61
2001/02	572,838	1,240,000	46
2002/03	509,455	1,240,000	41
2003/04	492,000	1,240,000	40
2004/05	425,477	1,240,000	34
2005/06	525,357	1,240,000	42

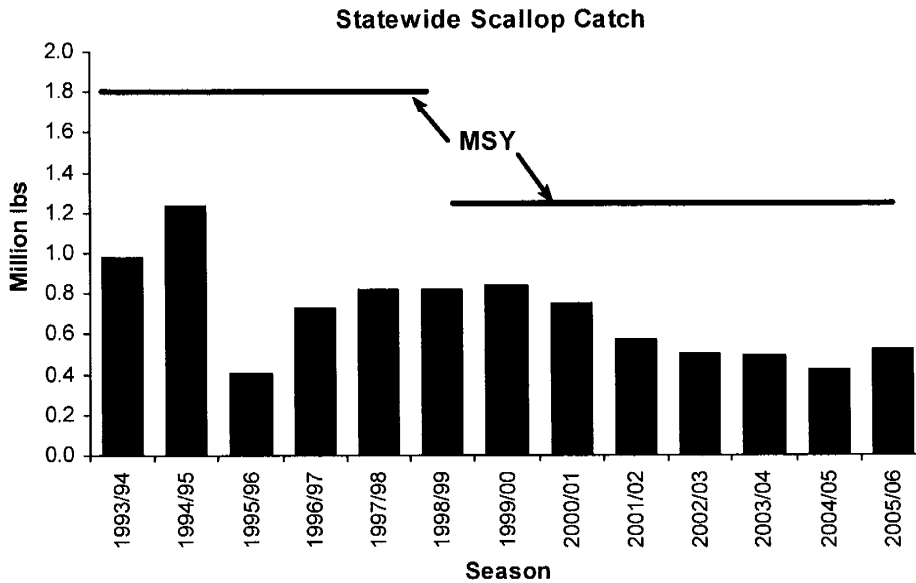


Figure 22 Statewide scallop harvest (pounds shucked scallop meats) and MSY levels from the FMP.

No control rules for other Alaskan scallop species have been developed as no commercial harvests occur for these species.

OY and MSY are established for the statewide stock despite the lack of a statewide biomass estimate. A statewide biomass estimate is not possible at this time given limitations in abundance information for many regions. Similarly, specification of area-specific overfishing definitions is also not feasible at this time given the absence of annual surveys in all regions as well as the need for improved abundance estimates in areas with available survey information. Amendment 6 to the FMP specified these definitions statewide based upon average landings, given a lack of available information at that time for either a statewide biomass estimate upon which to base MSY or area-specific biomass estimates upon which to base area-specific overfishing definitions. These data limitations still hold for scallops stocks in Alaska.

6 Habitat

Major scallop fishing locations in Alaska coastal waters are shown in Figure 1. Many areas of Alaska's coast are closed to scallop dredging to protect habitats important to other species (Figure 2).

Weathervane scallops are found in patchy distributions along the continental shelf from Southeast Alaska to the Bering Sea and Aleutian Islands at depths of 40–250 m. Commercial fishing effort is concentrated in 75–120 m depths. Approximately 128 square nautical miles were dredged during the 2001/02 season (Barnhart and Rosenkranz 2003). Bottom substrate types inhabited by weathervane scallops are variable throughout the state and include mud, clay, silt, sand, and pebble. Weathervane scallops are associated with other benthic species such as flatfishes, and Tanner and king crabs.

Scallops are typically found in elongated beds oriented along the coast in the same direction as prevailing currents. A combination of large-scale (overall spawning population size and oceanographic conditions) and small-scale (site suitability for settlement) processes influence recruitment of scallops to these beds. Spawning occurs annually between May and early July. Spermatozoa and eggs are released directly into the water where fertilization occurs. Fertilized eggs settle to the bottom where they hatch into larvae within several days then rise in the water column. Larvae drift with prevailing currents in the upper water column for about a month while undergoing metamorphosis. They then settle to the bottom as juveniles and may attach to the substrate with byssal threads.

Essential Fish Habitat (EFH) descriptions for weathervane scallops are being revised under Amendment 9 to the Scallop FMP. There is no available life history information for other scallop species (pink, spiny and rock scallops). More information on EFH designations may be found at: <http://www.fakr.noaa.gov/habitat/efh.htm>

7 Bycatch

The scallop fishery observer program provides excellent bycatch data. The fishery has 100% observer coverage in all areas outside of Cook Inlet (where vessels are limited to the use of a single 6ft dredge and observer coverage is not required). Bycatch in the scallop fishery includes prohibited species, other commercially important species of fish and invertebrates, miscellaneous non-commercial species, and natural and man-made debris. Prohibited species include king crab (*Paralithodes camtschaticus*), Tanner crab (*Chionoecetes bairdi*), snow crab (*C. opilio*), and Pacific Halibut (*Hippoglossus stenolepis*). Although a variety of marine vertebrates, invertebrates, and debris are caught incidentally in the scallop dredges, weathervane scallops predominate catches. Since 1996, the five most frequently caught species or items, by percent weight, from haul composition sampling are weathervane scallops 77%, numerous species of starfish 5%, natural debris (kelp, wood, etc.) 5%, empty bivalve shells 4%, and several species of skates 2%.

Gorgonian (hard) corals are infrequently encountered during observer sampling of scallop dredges. Since 1996, corals have been observed in only 11 of the 15,836 tows sampled for catch composition and bycatch. Detailed catch composition data from observer sampling are available in annual reports produced by ADF&G (e.g., Barnhart and Rosenkranz 2003).

8 Ecosystem Considerations

The Alaska weathervane scallop fishery occurs in continental shelf waters off the coast at depths 40–120 m in 3 main areas: the eastern Gulf of Alaska between Prince William Sound and Cape Spencer, around Kodiak Island, and in the eastern Bering Sea. (Figure 2). Little is known about ecosystem effects on scallop stocks, although ADF&G has noted that growth is significantly slower in the eastern GOA than around Kodiak and in the Bering Sea. This may be attributable to food supply, as productivity tends to be lower in the eastern GOA than in other scallop fishing locations (Evelyn Brown, University of Alaska Fairbanks, Institute of Marine Science, personal communication).

Effort in the fishery is limited to discrete areas on the continental shelf (Figure 23 and Figure 24); during the 2005/06 season, a total of 122.5 square nautical miles were dredged statewide excluding Cook Inlet. In recent years, effort has increased in the eastern GOA, decreased in the Bering Sea, and remained fairly constant around Kodiak (Figure 23). Camera sled data from the eastern Gulf of Alaska, Shelikof Strait, and the Bering Sea suggest that most scallop fishing occurs on silt and mud bottom. Scallop fishing factors with possible ecosystem consequences include damage to or removal of non-target organisms, suspension of sediments by dredges, and discarding of scallops and non-target species.

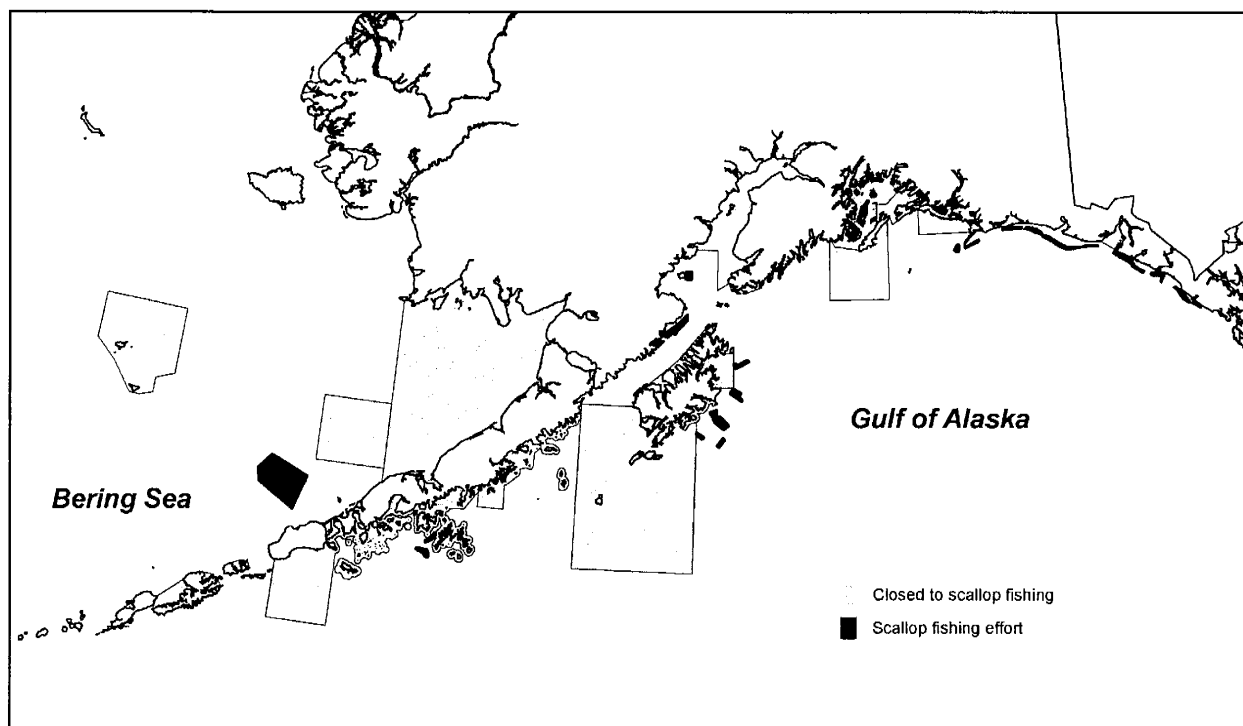


Figure 23 Historical scallop fishing effort and areas closed to scallop fishing.

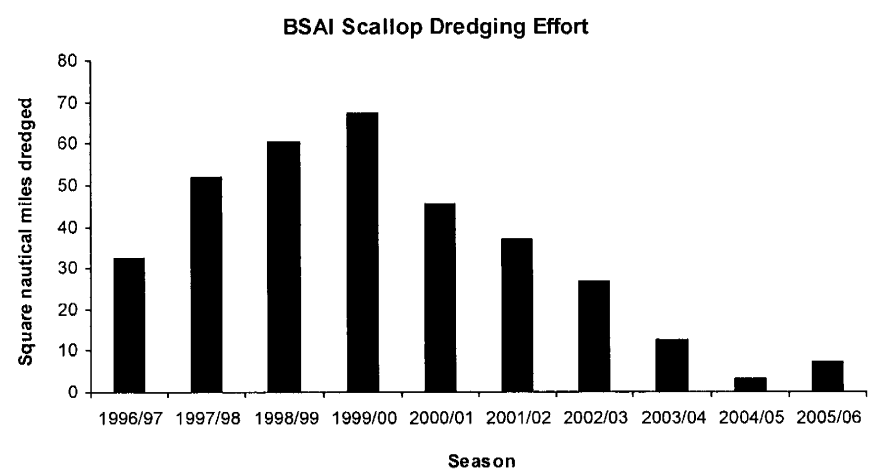
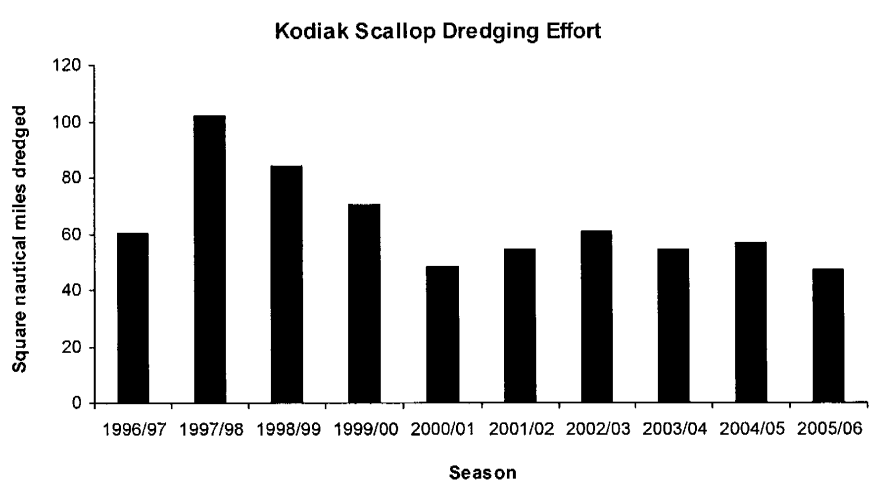
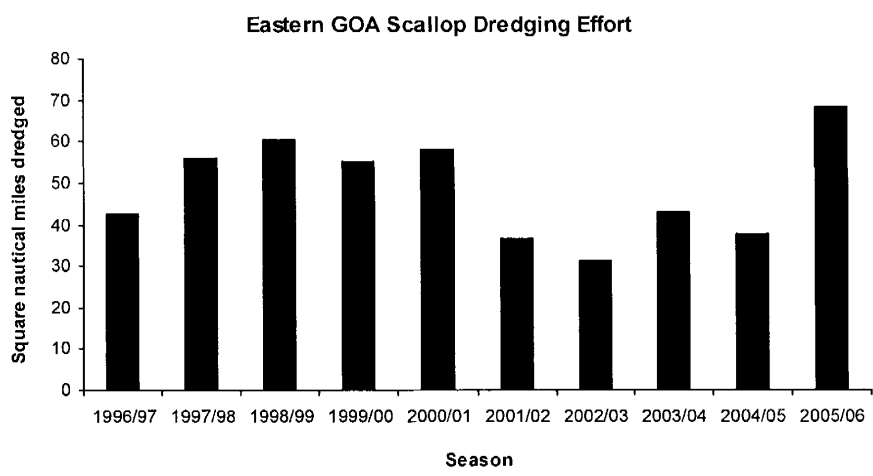


Figure 24 Scallop dredge effort by region, 1996/97 – 2005/06 seasons.

9 Recent Regulatory Actions

During the 2002 legislative session, passage of CSHB206(RLS) resulted in changes to the limited entry statutes authorizing use of a permanent vessel-based limited entry program in the weathervane scallop fishery. In 2004, eight vessel owners received permits to fish for weathervane scallops in state waters. Vessel entry permits issued for the statewide weathervane scallop fishery will expire on December 31, 2008 unless statutory authority is extended. If statutory authority is not extended, the state water fishery will revert to an open access fishery. A bill has been introduced to the Alaska legislature, House Bill #16 (HB16) to extend the sunset date to December 30, 2013. Additional details on this bill and the progress of it can be accessed at <http://www.legis.state.ak.us/basis/start.asp>.

10 Economic Overview of the Scallop Fishery

An overview of historic Alaska weathervane scallop harvest and wholesale revenue is presented in Table 18. This data is reprinted from Kruse et al. (2005) and updated with information from annual scallop harvest information (Barnhart, 2006). Vessel participation and numbers of landings in this fishery have varied considerably over time. Participation increased rapidly from an historic low of 2 vessels in 1967 to 19 in both 1968 and 1969. Similarly, only 6 landings occurred in 1967 but by 1969, 157 landings were made and that year is the historical peak in participation, landings, and catch and among the years with highest first wholesale gross revenue.

Following 1969, participation, landing, and catch trended downward through 1976. In 1977 and 1978 the fishery was open but fishermen opted not to fish. In 1980 there were 8 participants making 56 landings totaling more than 600,000 pounds of scallop meats. In the following years, participation, landings, and catch trended upwards until 1983 before cycling downward. There followed an upward trend in landings and catch through the mid 1990s. Since the mid 1990s, participation, landings, and catch have stabilized somewhat with catch consistently between 500,000 and 850,000 pounds each year, however, the 2004/05 catch of 431,596 pounds is the lowest level in nearly a decade. Vessel participation has been limited in recent years by the formation of the voluntary cooperative in May 2000, and by the implementation of the LLP in 2001. The Federal LLP limits the participation to 9 permit holders. Since 2000 no more than 8 vessels have participated and in recent years it has been even fewer.

Table 18 also provides historical statewide average price per pound of landed scallop meats as well as a consumer price index based inflation adjusted price. Total gross revenue is then calculated using landed pounds of meats multiplied by the adjusted price. Adjusted price converts the landed prices by year to year 2002/03 values so that comparisons can be made in current dollar values, after accounting for inflation. The 2002/03 base has been retained in this analysis for comparability with the original source of the data.

It is important to note that landed scallop meats have been processed (shucked) and frozen at sea. Prior to 1996 almost all scallop meats were placed in muslin bags and iced (not frozen) at sea. Thus, although landed price is often referred to as an ex-vessel price, in this case it is actually a first wholesale price in that the landed product is a primary processed product. Thus, gross revenue is identified as first wholesale value here.

Adjusted price generally trended upwards during the late 1960s and through the 1970s. Following the three years of closure, prices rose dramatically to nearly \$7.5 per pound, possibly in response to shortage of weathervane scallops caused by the closures. Historic prices peaked in 1983 at \$8.56 per pound before trending downward through the mid 1990s, upward during the late 1990s and then back downward from 1999 through

2002-03 when adjusted prices averaged \$5.25 per pound. This trend may be directly related to U.S. east coast scallop stock conditions and related market prices and the dependence of market prices in the Alaska scallop fishery on east coast markets is a topic for further research.

First wholesale revenue in this fishery has varied considerably over the years as both price and landings have varied. The peak value in the fishery occurred in 1992 when about \$8.8 million was earned. Since that time, total first wholesale revenue in the fishery has trended downward along with landings, catch, and prices. In 2002-03, the fishery yielded about \$2.7 million in total first wholesale revenue. The downward trend continued with the 2003-04 and 2004-05 seasons yielding \$2.6 million and \$2.3 million respectively. The 2004-05 season returned the lowest level of total revenue in the Alaska scallop fishery since 1988.

Table 18 Historic Statewide Commercial Weathervane Scallop Revenue Statistics, 1967-2004/05

Year	Vessels	Landings ^a	Catch (lbs meats) ^b	Average Price/Lb.	Inflation Factor	Adjusted Price	Wholesale Value
1967	2	6	778 ^c	\$0.70	0.219	\$3.20	\$2,487
1968	19	125	1,677,268	\$0.85	0.228	\$3.73	\$6,252,973
1969	19	157	1,849,947	\$0.85	0.238	\$3.57	\$6,606,954
1970	7	137	1,440,338	\$1.00	0.249	\$4.02	\$5,784,490
1971	5	60	931,151	\$1.05	0.260	\$4.04	\$3,760,418
1972	5	65	1,167,034	\$1.15	0.268	\$4.29	\$5,007,795
1973	5	45	1,109,405	\$1.20	0.285	\$4.21	\$4,671,179
1974	3	29	504,438	\$1.30	0.313	\$4.15	\$2,095,110
1975	4	56	435,672	\$1.40	0.339	\$4.13	\$1,799,235
1976	7	21	264,788	\$1.59	0.359	\$4.43	\$1,172,738
1977-78 No Fishery							
1979	1	4	24,826	NA	NA	NA	NA
1980	8	56	616,717 ^c	\$3.60	0.484	\$7.44	\$4,587,151
1981	18	101	924,441	\$4.00	0.529	\$7.56	\$6,990,102
1982	13	120	913,996	\$3.25	0.561	\$5.79	\$5,294,986
1983	5	30	192,310	\$5.00	0.584	\$8.56	\$1,646,490
1984	6	52	383,512	\$4.00	0.607	\$6.59	\$2,527,262
1985	7	47	615,564	\$4.00	0.627	\$6.38	\$3,927,043
1986	8	74	667,258	\$4.25	0.639	\$6.65	\$4,437,944
1987	4	54	599,947 ^d	\$3.45	0.661	\$5.22	\$3,131,342
1988	4	47	341,070	\$3.68	0.685	\$5.37	\$1,832,318
1989	7	55	534,763	\$3.87	0.714	\$5.42	\$2,898,505
1990	9	144	1,481,136	\$3.43	0.750	\$4.57	\$6,773,729
1991	6	136	1,136,649	\$3.82	0.777	\$4.92	\$5,588,159
1992	8	136	1,785,673	\$3.96	0.796	\$4.97	\$8,883,499
1993 ^e	7	51	568,077	\$5.15	0.816	\$6.31	\$3,585,290
1993/94	15	111	984,583	\$5.15	0.816	\$6.31	\$6,213,974
1994/95	15	104	1,240,775	\$5.79	0.833	\$6.95	\$8,624,354
1995/96	10	29	410,743 ^d	\$6.05	0.853	\$7.09	\$2,910,834
1996/97	9	30	732,424	\$6.30	0.876	\$7.19	\$5,267,433
1997/98	9	31	818,913	\$6.50	0.895	\$7.26	\$5,947,413
1998/99	8	35	822,096	\$6.40	0.908	\$7.05	\$5,794,509
1999/00	10	22	837,971	\$6.25	0.927	\$6.74	\$5,649,751
2000/01	8	20	750,617	\$5.50	0.958	\$5.74	\$4,309,388
2001/02	6	26	572,838	\$5.25	0.984	\$5.34	\$3,056,300
2002/03	6	28	509,455	\$5.25	1.000	\$5.25	\$2,674,639
2003/04	4	32	500,379	\$5.25	1.016	\$5.17	\$2,585,620
2004/05	5	22	431,594	\$5.50	1.028	\$5.35	\$2,308,681

a Prior to and including 1995, number of landings equals number of fish tickets. After 1995, the number of landings equals number of deliveries (off-loads). A delivery typically includes multiple tickets, normally one per week.

b Pounds of shucked scallop meats.

c Unshucked scallop deliveries were converted to shucked meats using a 10% conversion factor.

d Includes illegal harvest.

e January 1 through June 30

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APPENDIX A

Economic Factors in the Scallop Fishery off Alaska

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Introduction

This paper discusses available economic information in an attempt to identify factors that have contributed to major changes in the Alaska scallop fishery over time. An attempt has been made to conduct more advanced analyses than presented here; however, considerable additional effort would be required to conduct surveys and/or combine existing electronic data with paper records to make such analyses feasible. While that may be warranted for future efforts, this paper is a discussion of existing analyses and data.

The Early Years

The Atlantic sea scallop fishery is the predominant source of U.S. domestic sea scallop supply. A cyclical decrease in stocks, possibly due to overfishing, began to occur on the Atlantic's Georges Bank in the late 1960's. In response to these stock conditions, management measures, focused on protecting stocks, were adopted. The result was a steady decline in sea scallop landings from the Georges Bank area. As a direct result of these changes, interest in developing a weathervane scallop fishery off Alaska materialized in the late 1960's. Weathervane scallop stocks off Alaska had been evaluated for commercial potential in the 1950's (NPFMC, 2005) but the first effort recorded in the fishery occurred in 1967. In that year, two vessels made six landings of scallops totaling less than 1,000 pounds of shucked meats.

As shown in Table 1, an additional 17 vessels entered the fishery in 1968 and the 19 vessels that participated made 125 landings totaling 1,677,268 pounds of shucked meats. In 1969, 19 vessels continued harvesting scallops and made 157 landings totaling 1,849,947 pounds of shucked meats. The 1969 fishery had the largest number of landings and the largest pound total in the history of the fishery. The inflation adjusted first wholesale value of the 1969 catch was just over \$6.6 million, or an average of nearly \$350,000 per vessel, and was the fourth highest annual value on record. However, this level of harvest and effort was not to be sustained.

Data from 1970 suggest that there may have been relatively few vessels landing most of the scallops during 1968 and 1969. This appears so because only 7 vessels remained in the fishery in 1970 despite a 17 percent increase in the average price. These 7 vessels made 137 landings totaling 1,440,338 pounds of shucked meats, which was 78 percent of the harvest taken by 19 vessels the previous year. The inflation adjusted first wholesale value of the 1970 catch was about \$5.8 million, or an average of more than \$826,000 per vessel. While this revenue picture appears rosy, there is no data available on operating costs or effort levels in the early days of this fishery, and the trend during the rest of the 1970's suggests that the fishery was not as lucrative as the 1970 revenue numbers suggest.

In 1971, effort fell to 5 vessels and remained at 5 vessels for several years before falling to 3 vessels in 1974. During those years, landings fell from 137 in 1970 to 29 in 1974. However, shucked meat totals stayed near or above 1 million pounds through 1973 before falling by more than 50 percent to approximately a half million pounds in 1974. Prices continued to rise over this time frame, however, the declining catch forced revenue to decline to just under \$1.2 million in 1976 when 264,788 pounds, just 14 percent of the 1969 peak harvest, of shucked meats were caught. In 1977 and 1978, no effort was expended in the weathervane scallop fishery off Alaska.

The period of 1967 to 1976 demonstrates what can happen in an emerging fishery with passive management. There were no effort controls, limits, or guideline harvest levels in place. The fishery expanded rapidly as scallop beds were located and exploited, experienced substantial effort consolidation as marginal vessels departed, and eventually overexploited the known beds to the point that the fishery was not economically viable by 1977 and 1978. This could have been the end of the weathervane scallop

Table 1: Historic Statewide Commercial Weathervane Scallop Statistics, 1967-2004/05.

Year	Vessels	Landings ^a	Catch (lbs meats) ^b	Average Price/Lb.	Inflation Factor	Adjusted Price	Wholesale Value
1967	2	6	778 ^c	\$0.70	0.219	\$3.20	\$2,487
1968	19	125	1,677,268	\$0.85	0.228	\$3.73	\$6,252,973
1969	19	157	1,849,947	\$0.85	0.238	\$3.57	\$6,606,954
1970	7	137	1,440,338	\$1.00	0.249	\$4.02	\$5,784,490
1971	5	60	931,151	\$1.05	0.260	\$4.04	\$3,760,418
1972	5	65	1,167,034	\$1.15	0.268	\$4.29	\$5,007,795
1973	5	45	1,109,405	\$1.20	0.285	\$4.21	\$4,671,179
1974	3	29	504,438	\$1.30	0.313	\$4.15	\$2,095,110
1975	4	56	435,672	\$1.40	0.339	\$4.13	\$1,799,235
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1977-78 No Fishery							
1979	1	4	24,826	NA	NA	NA	NA
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2002/03	6	28	509,455	\$5.25	1.000	\$5.25	\$2,674,639
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a Prior to and including 1995, number of landings equals number of fish tickets. After 1995, the number of landings equals number of deliveries (off-loads). A delivery typically includes multiple tickets, normally one per week.

b Pounds of shucked scallop meats.

c Unshucked scallop deliveries were converted to shucked meats using a 10% conversion factor.

d Includes illegal harvest.

e January 1 through June 30

fishery off Alaska, except for the fact that scallops are somewhat resilient and discoveries of new beds had yet to be made.

In 1979, following two years with no harvest, a single vessel made 4 landings totaling less than 25,000 pounds of shucked meats. Three years of zero or minimal effort had likely allowed the scallop resource to regenerate somewhat. That likelihood, combined with a price increase to \$3.80 per pound contributed to 8 vessels making 56 landings totaling about 617,000 pounds in 1980. It is interesting to note that the inflation adjusted 1980 price of \$7.44 per pound is the third highest inflation adjusted price in history.

Given fishing success in 1980 and price increases, it is not surprising to see that 1981 participation increased to 18 vessels that made 101 landings totaling 924,441 pounds of shucked meats. The 1980 first wholesale value was just under \$7 million. However, data for the next several years show a similar cycle as occurred between 1969 and 1974. By 1983, five vessels made 30 landings totaling less than 200,000 pounds of shucked meats. However, 1983 was the year of record high prices of \$8.56 per pound so first wholesale value exceeded \$1.6 million.

Over the next several years, participation increased slightly as did landings and catch but repeated the cyclical pattern by trending back downwards before another cyclic increase in landings and catch began in 1989. Beginning in 1990, an influx of East Coast scallop vessels began to occur; once again this was because of unfavorable economic conditions in East Coast scallop fisheries. The upward trend continued into 1992, when the second highest historic catch of 1,785,673 pounds was taken by 8 vessels making 136 landings. The first wholesale value of over \$8.6 million recorded in 1992 stands as the historic high inflation adjusted catch value in the history of this fishery.

This period of this fishery has been characterized as a “goldrush atmosphere” (Barnhart, 2006). It is also important to note that by this time, scallop beds had been located in several areas around Kodiak Island, in Shelikof Strait, near Yakutat, in the Northern Gulf of Alaska near Kayak Island, in Cook Inlet, as well as in the Aleutians and Bering Sea.

In the early 1990's, the State of Alaska determined that the fishery was expanding rapidly without active management. Thus the State moved to declare this fishery a high impact emerging fishery in May of 1993. This action required fishery closure and implementation of an interim management plan. Table 1 shows that, prior to closure in May of 1993, the fishery had participation by 7 vessels with 51 landings totaling 568,077 pounds. Following implementation of the interim management plan, the fishery reopened on June 17, 1993. The interim management plan required 100 percent observer coverage and set crab bycatch limits. From this point on, data is presented by season years. Thus, the remainder of 1993 catch is listed for the 1993-94 season. The seasons established in the management plan extend into the first three months of the following year.

Catch statistics for the 1993-94 season indicate participation by 15 vessels making 111 landings of a total of 984,583 pounds of shucked meats. Total first wholesale value was just over \$6.2 million in 1993-94. The 1994-95 season also have participation by 15 vessels making 104 landings totaling 1,240,775 pounds. Total first wholesale value in 1994-95 exceeded \$8.6 million, the second highest value in history.

In 1995/96 year a the captain of a single vessel turned in his State scallop registration card but proceeded to fish scallops in the Federal waters of the Exclusive Economics Zone (EEZ) without State observer coverage and with total disregard for harvest limits. In response, Federal regulators closed the EEZ to scallop harvest by emergency rule on February 23rd of 1995 and then enacted a Fisheries Management Plan for the scallop fisheries off Alaska (FMP) and an amendment to that plan that closed the fishery in the EEZ until August of 1996, nearly 18 months later. (NPFMC, 2005) The actions of this one individual, and the resulting closures likely had a devastating economic impact on remaining participants.

Nonetheless, the period from 1994/95 to 2000, with the exception of the 1995/96 season, had fairly constant participation and landed pounds trended upwards.

In 1997, the North Pacific Fisheries Management Council (Council) sought to restrict effort in the scallop fishery off Alaska by adopting a vessel moratorium, under which 18 vessels qualified to fish in Federal waters. Following that action, the Council undertook analysis of further capacity reductions and adopted a License Limitation Program, including 9 vessels, which took effect in 2000.(NPFMC, 2005) These changes ushered in a new era in the scallop fishery off Alaska. The successes of the early exploratory years had now necessitated stock and effort management measures and capacity reduction.

Markets:

In the domestic U.S. market, Alaska weathervane scallops are similar to Atlantic sea scallops. Table 2 compares total landings and value of Alaska weathervane scallops with Atlantic sea scallops from 1990 through 2004. These data show that Atlantic sea scallop harvest is consistently orders of magnitude larger than weathervane scallop harvests off Alaska.

Table 2: US Scallop Landings and Value versus Scallop Imports and Value, 1990-2004

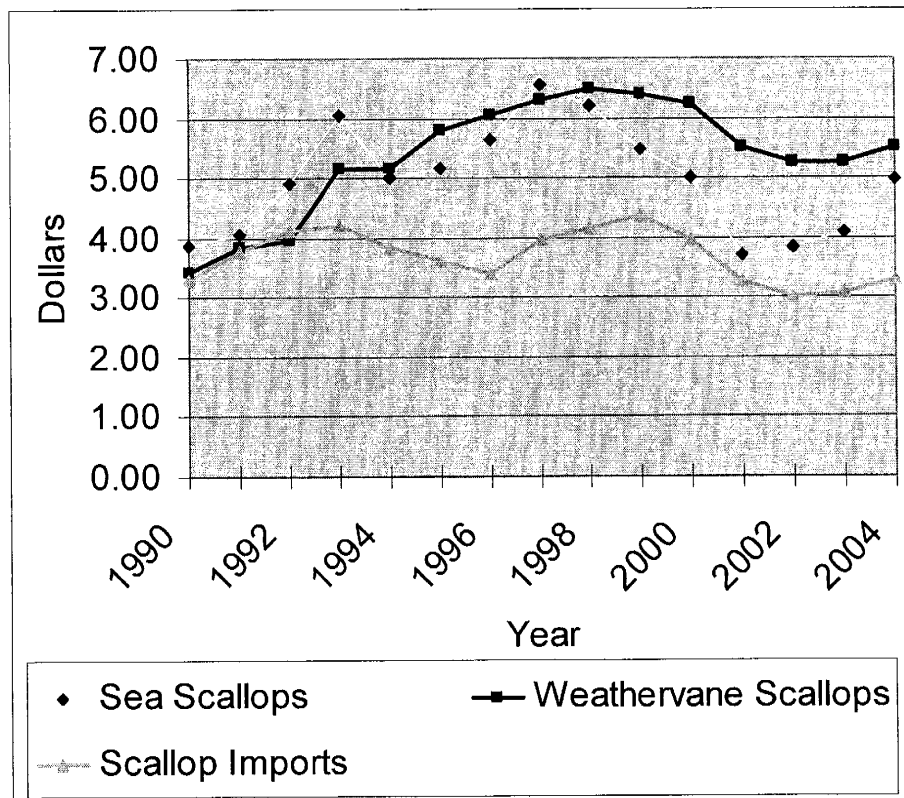
Year	Sea Scallops			Alaska Weathervane Scallops*			Scallop Imports, All Species Combined		
	Pounds	\$ Value	Av. \$/lb.	Pounds	\$ Value	Av. \$/lb.	Pounds	\$ Value	Av. \$/lb.
1990	38,122,499	147,652,629	3.87	1,481,136	5,080,296	\$3.43	40,019,022	131,561,184	3.29
1991	37,722,537	152,962,080	4.05	1,136,649	4,341,999	\$3.82	29,657,673	111,367,873	3.76
1992	31,142,424	152,613,014	4.90	1,785,673	7,071,265	\$3.96	38,835,772	160,209,462	4.13
1993	16,023,939	96,864,382	6.04	568,077	2,925,597	\$5.15	52,064,185	219,181,426	4.21
1994	16,693,648	83,668,338	5.01	984,583	5,070,602	\$5.15	56,803,716	216,872,816	3.82
1995	17,387,151	89,677,480	5.16	1,240,775	7,184,087	\$5.79	48,441,298	174,791,787	3.61
1996	17,456,928	98,511,157	5.64	410,743	2,482,941	\$6.05	58,848,419	198,798,644	3.38
1997	13,614,715	89,368,536	6.56	732,424	4,614,271	\$6.30	60,331,156	238,121,731	3.95
1998	12,110,282	75,034,905	6.20	818,913	5,322,935	\$6.50	53,200,242	221,115,522	4.16
1999	22,009,495	120,935,432	5.49	822,096	5,261,414	\$6.40	44,601,478	194,740,607	4.37
2000	32,132,910	160,756,579	5.00	837,971	5,237,319	\$6.25	54,080,178	214,764,421	3.97
2001	46,632,002	173,551,125	3.72	750,617	4,128,394	\$5.50	40,044,408	130,033,430	3.25
2002	52,576,168	201,794,044	3.84	572,838	3,007,400	\$5.25	48,958,906	146,690,423	3.00
2003	55,944,483	229,003,703	4.09	509,455	2,674,639	\$5.25	52,861,692	161,893,889	3.06
2004	64,580,564	321,382,534	4.98	431,594	2,373,767	\$5.50	45,342,736	149,386,682	3.29

Sources: NMFS Data at <http://www.st.nmfs.gov> and ADF&G Fish Ticket data.

* Seasonal data is displayed as annual data for comparison with annual sea scallop landings

Though this analysis has not found a published formal market study of price determination of weathervane scallops, there are some intuitive conclusions that can be made from the data presented in Table 2 and from the price trends displayed in Figure 1. First, domestic markets are dominated by Atlantic sea scallop production. Second, prices of weathervane scallops track closely to those of Atlantic sea scallops. Thus, it is highly likely that domestic market price is dominated by the relationship between quantity supplied in the Atlantic sea scallop fishery and domestic market demand.

Figure 1: Scallop Price Comparisons, 1990-2004



Another important factor in scallop market is imports of scallop products. Unfortunately, available import data commingles imports of several small scallop species (e.g. pink, calico, bay etc.) with larger scallop varieties such as sea scallops and weathervane scallops. However, as these products are substitutes for one another, although not perfectly, the imports of these other species may have an effect on domestic market prices. In any event, the imported value of scallops has been similar to, or exceeded, total domestic production in recent years. Thus, it is likely that domestic market prices are heavily influenced by imports.

The obvious conclusion that can be drawn from the data presented in Table 1 is that the wholesale price of weathervane scallops is determined largely by other domestic supply and import supply. This suggests that North Pacific harvesters have little, if any, market power to negotiate prices and are essentially price takers in the wholesale market. There is likely an exception to this condition.

The scallop fishery inside the Cook Inlet registration area is located close enough to the port of Homer that vessels participating in that area can make short trips and delivery fresh product to shoreside processors or distributors. Homer is linked to Anchorage by road and scallops landed there can enter the Anchorage white tablecloth market and/or be sold locally to tourists who flock to the region in recreational vehicles each summer. Thus, a somewhat separate market may exist for vessels that fish inside the Cook Inlet registration area. At present, so few vessels fish Inside the Cook Inlet registration area that the data is confidential.

Scallop Fishery Transition and Fleet Consolidation

A review of fish ticket data suggest that, in the early days of this fishery, much of the harvest was made by catcher vessels (CVs) making single day trips and delivering to shoreside processors. The shoreside processors then processed the meats (e.g. trim, freezing, and packaging) and moved the product to market, whether in fresh or frozen form. That method appears to have continued into the mid 1990's. At that time, single day trips had began to be replaced by multiday trips and freezing at sea by catcher processors (CPs). This change was likely the result of some vessels earning marginal returns due to the cost of daily transit to and from port as well as the 10 day maximum that shucked meats can be held on ice by a CV (Kandianis) The further vessels operated from port the more severe this inefficiency became. As new beds were found in distant areas some vessels likely found their participation was not economically sustainable. This fact was likely exacerbated by the fact that harvesters had little or no market power.

Under these conditions, vessel operators are constrained by the inefficiency of the day trip and external market forces dictating the value of their catch. Thus, operators would look to reduce inefficiencies, reduce operating costs, and attempt to capture processing value added that was being captured by the shoreside processing sector. Operators might even attempt to improve value by increasing quality. It can be argued that fresh frozen (at sea) product may be superior to product that is iced for a period of time before being consumed and/or frozen. The result of these forces appears to be the entrance of catcher processors (CPs) into the scallop fishery. That this began to happen should be no surprise. It was around this time that the CP fleet began to expand in several of the Bering Sea fisheries for many of the same reasons.

This practice expanded over the next several seasons. By the time the vessel moratorium was imposed in 1997 there were 18 vessels included under the moratorium. Further consolidation of the fleet was deemed necessary by the North Pacific Fisheries Management Council.

In 1999 the Council adopted Amendment 4 to the Scallop FMP, which established the Federal License Limitation Program (LLP). The LLP recognized 9 participants and granted them statewide access with maximum vessel length overall (MLOA) limits (equal to the length of the vessel they were using during the qualifying period) and with gear restrictions for two vessels that primarily fished inside the Cook Inlet registration area. All of the remaining 7 participants in the statewide fishery outside the Cook Inlet registration area were using vessels categorized at CPs. Thus, at the time of the LLP, virtually all effort in the statewide fishery outside the Cook Inlet registration area was from CPs. Thus, the transition away from the inefficiency of day trips, the capture of shoreside processing value added by offshore processing, and any potential improvement in quality brought about by at-sea freezing appeared to be complete by the time of LLP implementation in 2000. However, further fleet consolidation was predictable, and had already begun.

The Regulatory Impact Review (RIR) analysis supporting the action to create the LLP (NPFMC 1999) develops a breakeven analysis for the scallop fishery in the statewide fishery outside the Cook Inlet registration area. This analysis estimates the number of vessels that could breakeven in the fishery under a series of price and landings scenarios. The analysis is based on operating cost and revenue data provided voluntarily by fishery participants. Table 3 presents the analysis.

Table 3: Number of Vessels that Could Breakeven Under Various Price and Landings Scenarios (recreated from Regulatory Impact Review for Amendment 4 to the North Pacific Scallop FMP)

Price	Landing (pounds)			
	600,000	800,000	1,000,000	1,200,000
\$5.00	3.6	4.9	6.1	7.3
\$5.50	4.0	5.3	6.7	8.0
\$6.00	4.4	5.8	7.3	8.7
\$6.50	4.7	6.3	7.9	9.5
\$7.00	5.1	6.8	8.5	10.2
\$7.50	5.5	7.3	9.1	10.9
\$8.00	5.8	7.8	9.7	11.6

In the 1999/00 season 10 vessels, including two inside the Cook Inlet registration area, landed 837,971 pounds of scallops with an average price of \$6.25. The analysis recreated in Table 3 indicates that approximately 6 vessels could breakeven fishing in the statewide fishery outside the Cook Inlet registration area under this price and landings scenario. Thus, participation in the statewide fishery outside the Cook Inlet registration area exceeded the breakeven number of vessel by two.

In 2000/01 8 vessels, including two operating inside the Cook Inlet registration area, landed 750,617 pounds of scallops with an average price of \$5.50 per pound. The breakeven analysis suggests that this price and landings combination could probably support 5 vessels in the statewide fishery outside the Cook Inlet registration area; however, 6 were fishing in that season.

In 2001/02 6 vessels, likely four in the statewide fishery outside the Cook Inlet registration area, landed 572,838 pounds of scallops with an average price of \$5.25 per pound. In 2002/03 6 vessels, likely four in the statewide fishery outside the Cook Inlet registration area, landed 509,455 pounds of scallops with an average price of \$5.25 per pound. The breakeven analysis suggests that this landings and price scenario could support fewer than four vessels at breakeven levels. Interestingly, by 2003/04 4 vessels harvested just over 500,000 pounds at \$5.25. In the most recent season, 5 vessels harvested 431,594 pounds at \$5.50.

In 2000 a group of six of the LLP holders, who traditionally have fished in the statewide fishery outside the Cook Inlet registration area, formed a voluntary marketing cooperative (NPFMC 2005). The cooperative members agreed to reduce harvesting capacity and entered into revenue sharing agreements with members who agreed to not use their vessel(s). That the cooperative chose to do this is not surprising given the effect of declining landings and price on breakeven numbers in this fishery between 2000/01 and 2002/03.

In 2001, the cooperative reduced vessel participation by 50 percent, however, one vessel continued to operate independently in the statewide fishery outside the Cook Inlet registration area. Two vessels continued to fish independent of the cooperative inside the Cook Inlet registration area. Thus, capacity reduction efforts made by the cooperative had reduced overall capacity but not to the level suggested by the breakeven analysis presented above.

A point worth considering is that several of the LLP holders who had joined the cooperative had, at one time, been involved in the East Coast Atlantic sea scallop fishery. This was true of the LLP associated with the vessels Carolina Girl and Carolina Boy and the vessel Pursuit. The Pursuit was operating out of Kodiak when the LLP was implemented and the Carolina Boy and Carolina Girl were operating out of Seward (Barnhart, 2006). Each of these operations, however, was East Coast based and likely had to bear

costs of travel to and from the east coast, vessel caretaking costs during the off-season, and idle vessel time. These factors likely contributed to these three vessels not fishing under the cooperative.

Instead of fishing, the owners of the LLP that originally used these vessels received some form of revenue and/or ownership sharing while the other cooperative members continued to fish. Evidence of this was presented in Appendix A to the Environmental Assessment conducted for Amendment 10 to the FMP (NPFMC 2005b). Provider Inc. and Ocean Fisheries LLC provided operating cost data for their scallop fishing enterprise in 2003. This data shows that these two operators paid \$244,516 in “scallop leases” in 2003.

The lease fees paid by Ocean Hunter and Provider Inc. could only be afforded if the operations gained considerably more revenue and/or if they are able to decrease operating costs under the cooperative. The revenue earned by these two vessels is confidential. However, the breakeven analysis presented in the RIR for Amendment 4 (LLP) to the FMP determined that the average fixed and variable non-labor costs of the fleet at the time (pre LLP, pre coop) was approximately 59 percent.

The data provided by Provider Inc and Ocean Hunter/ Ocean Fisheries LLC in 2003 indicate a non-labor cost ratios of 59 percent and 57 percent for Provider and Ocean Hunter respectively. However, these non-labor cost ratios include lease fees of \$157,493 paid by Provider Inc and \$87,097 in lease fees paid by Ocean Hunter. Thus, these two cooperative vessels were able to maintain the same, or slightly lower, cost ratio inclusive of leases paid to other cooperative members totaling \$244,516. While revenue cannot be discussed directly, it is likely that overall revenue for these vessels increased with fewer vessels fishing. It is likely that payments to labor, including owner shares, increased with greater overall revenue and similar non-labor cost ratios.

While the cooperative initially limited effort by using revenue sharing to compensate owners of unused vessels, a more permanent effort reduction began to take place in 2002. It is important to understand that Federal Alaska Scallop LLP permits are not directly associated with a specific vessel. The only vessel requirement on the LLP permit is that it cannot be used on any vessel larger than the MLOA assigned to the LLP. Further restrictions are that no more than two LLPs may be held by one “individual” and that LLPs may not be leased.

In contrast, the Alaska Commercial Fisheries Entry Commission (CFEC) Limited Entry Scallop permit is specifically attached to a vessel. Thus, to fish in both Federal and State waters, one must have a Federal LLP and would need to use the actual vessel assigned the CFEC Limited Entry permit. However, if one wanted to fish only in Federal waters, without harvest restriction, they could use any vessel so long as it was under the MLOA of that LLP and was not an American Fisheries Act (AFA) vessel. Alternatively, if an individual or entity were to purchase a Federal LLP, they would not be required to actually fish the LLP, nor would they then have need of a CFEC Limited Entry licensed vessel.

In 2002, Alaska Scallop LLC was formed by Teresa Kandianis and Tom Mineo. Alaska Scallop LLC purchased the Scallop LLP formerly owned by Carolina Girl. In 2003 another cooperative member, Ocean Fisheries LLC, purchased the LLP originally awarded to Carolina Boy. Thus, Ocean Fisheries LLC now holds two Scallop LLPs, which it fishes on the vessel Ocean Hunter.

Provider Inc., another original LLP holder and cooperative member is owned by Mark Kandianis and Tom Doody (ADOR, 2006). Further, Tom Doody is part owner of Pursuit Inc, another original LLP holder and cooperative member. However, the vessel Pursuit has not fished in the Alaska scallop fishery in recent years.

There was one additional original cooperative member; Forum Star Inc. The vessel Forum Star is an AFA eligible vessel. Under Amendment 8 to the FMP authority was delegated to the State of Alaska to set an AFA sideboard in the scallop fishery. The State set a limit of approximately 35,000 pounds (Barnhart, 2006) at present stock levels, on that vessel. The Forum Star has not fished scallops in recent years and also appears to be a cooperative member that has not used its vessel to fish Alaska scallops.

In 2005, Forum Star Inc. and its Scallop LLP were purchased by American Seafoods LLC, also an AFA entity. If the LLP held by American Seafoods LLC remains in the control of an AFA entity, it will continue to be restricted by the AFA sideboard. It is, however, important to note that the LLP itself is not AFA endorsed. This means that it could presumably be sold to a non-AFA entity. As long as a vessel no longer than 97' (the MLOA allowed under Federal Scallop LLP #002) with no AFA endorsement is used with LLP #002, the AFA sideboard restriction would not apply. Thus, an existing scallop operation could buy this LLP and use it on a 97 foot non-AFA vessel. Alternatively, an existing entity would not have to use it at all as just holding the second permit means more scallop harvest for the remaining vessels.

Table 4 provides a summary of LLP holdings and changes in those holding over time. It appears that there are effectively two vessels fishing in the statewide fishery outside the Cook Inlet registration area for the cooperative; Ocean Hunter, and Provider. Whether the LLP now held by American Seafoods will continue in the cooperative, be fished independently, or be sold, is not known at present.

Effects of Fleet Consolidation

The story of fleet consolidation presented above is not unlike that of any other fishery that has had overexploitation under open access, inefficiency caused by the race for fish, and marginally profitable operations due to overcapacity. A major result of fleet consolidation is reduced non-labor costs. Such reductions in cost are likely due to reduced crowding on available grounds, and elimination of the inefficiencies of the race for fish that occurs in an overcapitalized fishery.

Fleet consolidation undoubtedly has a direct effect on the number of crew and operator positions in the fishery. At the time of the vessel moratorium, 18 vessels qualified and likely employed at least 216 crew members (12, including operator, cooks, mechanics, etc. per vessel). However, crew earnings and data linking crew members to vessels do not exist. It is impossible to say, using presently available data, exactly how many crew were employed or the amount of their crew shares. Similarly, it is impossible to determine how many crew were locally (Alaska Residents) acquired. In any event, the Federal LLP effectively reduced the number of crew positions, including operators etc., to 108. The fleet consolidation that has occurred under the cooperative has likely further reduced crew positions to 60, including two operations that have traditionally fished inside the Cook Inlet registration area. It is possible; however, that the crew shares earned by these crew members are higher than what was earned in the past.

As has been discussed above, the cooperative entered into a revenue sharing system that resulted in "lease payments" to members who agreed to not use their vessels. These LLP holders received payments from the cooperative. Instead of paying crew, purchasing vessel supplies, and making all the associated expenditures for vessel operations in Alaska, they received a revenue share that did not enter the Alaska economy. In fact, three of the inactive vessels are no longer located in Alaska. The expenditures these vessels traditionally made in Alaska, although possibly a result of inefficiency, have been eliminated under the cooperative. Further, one of the active vessels has relocated from Kodiak to Bellingham (Barnhart, 2006), however, that vessel and other remaining vessels fishing the EEZ still rely heavily on Kodiak for provisioning and landing for transshipment.

Reduced vessel expenditures undoubtedly have negative impacts on coastal communities; however, a full analytical treatment of the impacts would require a survey of vessel expenditure data, optimally for pre and post cooperative levels, and an input-output analysis of expenditure data.

Fleet consolidation has also affected deliveries to several Alaska ports. Table 5 provides data on scallop deliveries to ports from 1990-2003. These data show that, since formation of the cooperative and associated fleet consolidation, Cordova and Seward no longer receive scallop deliveries. This is likely due to the departure of the three east coast boats that operated primarily out of Seward.

Also of note is that the number of landings to Kodiak has dropped since pre-LLP levels. Some of the deliveries previously made to these ports appear to be going to Bellingham, Seatt, and to “at sea” transfers. Unfortunately, actual amounts of scallops landed in each delivery are largely confidential due to single purchasing points (processors/marketers) in each community. However, it is important to understand that while numbers of deliveries to outside of Alaska ports appear small, the length of trips and amount caught on each trip has increased under the cooperative. Thus, a small number of deliveries in 2003 could represent many more deliveries made to Alaska ports in, for example, 1999. Out of state deliveries also imply that greater expenditure for vessel servicing may be occurring outside of Alaska than in previous years.

A result of reduced port deliveries within Alaska may be reduced landings tax revenue. While all fishing related corporations in Alaska must pay a business tax, the landings tax is normally charged on fish landed in Alaska. Thus, landings to outside ports may result in reduced fish tax collections by the State. However, any reduction in landings tax is inconsequential compared to transit costs. Thus, outside deliveries are made only when the vessel is traveling outside and generally to reduce shipping fees but not necessarily to reduce taxes (Kandianis, 2007)

It is also possible that the local 1% fish tax charged by the community of Yakutat may be reduced by “at sea” and outside of Alaska landings. However, Yakutat is not able to support Scallop vessels with adequate fuel and supplies in during the winter. Vessel operators that operate outside of Cook Inlet report that Kodiak is still considered their primary port for provisioning and transshipment (Kandianis, Stone, 2007).

While the effects mentioned above have negative consequences for some fishery participants and fishing communities, it is likely that the overall effect of fleet reduction is improved profitability for the remaining participants, whether they belong to the cooperative or not. It has been shown that non-labor cost ratios may have decreased for the cooperative members that are actively fishing. It is also likely that their revenue has increased. Purchase of LLPs from other cooperative members has likely reduced “lease fee” obligations for active participants, albeit with the potential cost of debt finance for these transactions. Overall, it is likely that fleet consolidation has resulted in a more efficient fleet with lower operating costs, potentially greater average crew wages, and improved returns to owned capital.

Table 4: Federal Scallop LLP Holder History and Current Activity.

LLP	Original Holder	MLOA	Current Holder*	Restrictions	Corporate Ownership	Vessel Historically Used	Fished in 2004/05
Independent Operators							
003	Hogan, Thomas C.	75	Hogan, Thomas C.	2 dredges with 20' max. combined width	Not Incorporated	Kilkenny	yes
004	Hulse, Max G. et al.	79	Hulse, Max G. et al.	2 dredges with 20' max. combined width	La Brisa Inc: Max Hulse, Mary Hulse, Robert Hulse, Denise Hulse	La Brisa / Wayward Wind	yes
006	Oceanic Research Services	70	Thomas Gilmartin	none	Not Incorporated	Artic Storm	yes
Cooperative Members							
002	Forum Star Inc.	97	American Seafoods Co., LLC	State Imposed AFA Sideboard	American Seafoods Group, LLC	Forum Star	no
005	Ocean Fisheries LLC	100	Ocean Fisheries LLC	none	Mikkelsen Fisheries, Festus Fisheries, Inc., Stein Enterprises, Stone Maritime, Inc., Stuart Rickey (Agent)	Ocean Hunter	yes
007	Pursuit, Inc.	101	Pursuit, Inc.	none	Elenor Doody, Teresa Kandianis (Agent)	Pursuit	no
008	Provider, Inc.	124	Provider, Inc.	none	John Doody, Mark Kandianis, Corp. Service Co. (Agent)	Provider	yes
009	Carolina Boy, Inc.	95	Ocean Fisheries, LLC	none	Mikkelsen Fisheries, Festus Fisheries, Inc., Stein Enterprises, Stone Maritime, Inc., Stuart Rickey (Agent)	Ocean Hunter	yes
010	Carolina Girl, Inc.	96	Alaska Scallop, LLC	none	Teresa Kandianis, Tom Mineo	Formerly Carolina Girl	no

Source: Public records at <http://www.fakr.noaa.gov/ram>, and <https://myalaska.state.ak.us/business/sosbk>

* Bold indicates change in holder of the LLP

Table 5 Scallop Deliveries by Port, 1990-2003.

Source: Consolidated from data provided by Jeff Barnhart, ADF&G Kodiak Alaska.

Port	Year													Total		
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Landings	Landed Pounds
Bel/Sea, WA															5	123,632
Cordova	1		6	1		1		1	1	1	8	1	3	1	20	210,792
Dutch Harbor	12	13	8	32	27	1		14	4	3	2	4	4	3	127	2,013,740
Homer	2			15	12	2	11	7	12	4	8	6	7	13	99	242,568
Kodiak	70	48	49	64	44	6	15	14	15	12	6	8	9	10	370	5,808,856
Ketchikan	1														1	Confidential
Petersburg	2														2	Confidential
Pelican				3											3	Confidential
Seldovia														1	1	Confidential
Seward	5		1	3	4	2	7	5	20	21	10	3			81	2,086,133
Sitka	8	24	15	6	2	2				1				1	58	364,179
Sand Point															1	Confidential
Yakutat	22	16	34	3	5	3	4	6	10	3	3	12	7	2	130	2,000,195
At Sea												1	1	4	6	168,360

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**Appendix B. Annual Management Report for the Commercial
Weathervane Scallop Fisheries in the Westward District
2004/05**

Fishery Management Report No. 06-41

**Annual Management Report for the Commercial
Weathervane Scallop Fisheries in Alaska's Westward
Region, 2004/05**

by

Jeffrey P. Barnhart

July 2006

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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

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
caloric	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

FISHERY MANAGEMENT REPORT NO. 06-41

**ANNUAL MANAGEMENT REPORT FOR THE COMMERCIAL
WEATHERVANE SCALLOP FISHERIES IN ALASKA'S WESTWARD
REGION, 2004/05**

by

Jeffrey P. Barnhart

Alaska Department of Fish and Game, Division of Commercial Fisheries, Kodiak

Alaska Department of Fish and Game
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ABSTRACT

The Alaska Department of Fish and Game (ADF&G), Westward Region, includes all waters of the Territorial Sea and Exclusive Economic Zone (EEZ) in the Gulf of Alaska south of Cape Douglas (58° 51.10' N lat.) and west of 149° W long. and the Bering Sea to the U.S.-U.S.S.R. Maritime Boundary Agreement Line of 1990. This report presents details on the historic and present-day fishery management measures for the commercial weathervane scallop *Patinopecten caurinus* fishery occurring in the Kodiak, Alaska Peninsula, Bering Sea, Dutch Harbor, and Adak Registration Areas. A synopsis of the 2004/05 fishing season and stock status is discussed for each scallop registration area.

The Alaska Scallop Fishery Management Plan, 5 AAC 38.076 (g), allows ADF&G to require a vessel to carry an onboard observer unless the department determines that carrying an observer in that fishery will not serve the purpose of the onboard observer program. Management relies heavily on observer-collected data to help manage the weathervane scallop fishery. Onboard observers greatly enhance management, primarily by facilitating information gathering and by improving regulatory compliance.

Key words: Weathervane scallop, Westward Region, fishery observer, Kodiak, Alaska Peninsula, Bering Sea, Dutch Harbor, Adak, Aleutian Islands, Fishery Management Plan, crab bycatch, fishery cooperative

INTRODUCTION

Alaskan weathervane scallop *Patinopecten caurinus* populations were first evaluated for commercial potential in the early 1950s by both government and private sector research (Kaiser 1986). However, it was not until the late 1960s as catches declined in the United States and Canadian scallop fisheries on Georges Bank, that interest in a fishery off Alaska began to take shape (Orensanz 1968). Initial commercial fishing effort took place in 1967 when two vessels harvested weathervane scallops from fishing grounds off the east side of Kodiak Island. By the following year, 19 vessels consisting of New England-type scallop vessels, converted Alaskan crab boats, salmon seiners, halibut longliners, and shrimp trawlers entered the fishery (Kaiser 1986). The commercial fishery in Alaska progressed through several developmental phases. From 1967 through 1973, virgin scallop beds throughout the state were identified and exploited. This was followed by a period of declining scallop harvests from 1974 to the end of the decade. A smaller, more stable harvest followed through the 1980s (Shirley and Kruse 1995). In the early 1990s, the fishery again expanded with an influx of scallop boats from the east coast of the United States (Table 1).

In 1997, participation in the Alaska weathervane scallop fishery was limited by vessel moratoria in both federal and state waters. By 2001, a federal license limitation program (LLP) replaced the federal moratorium permanently limiting participation in the exclusive economic zone (EEZ). During the same year, the majority of vessel owners formed a fishing cooperative. The result of these actions, associated with a conservative management approach by the Alaska Department of Fish and Game (ADF&G), has been a reduction in the statewide scallop harvest since the late 1990s (Table 1).

The fishery changed in the 1990s from one distinguished by short trips with numerous deliveries each season to one of long trips with fewer deliveries as the majority of the fleet converted from icing to freezing of the product on board the vessel (Barnhart 2000). Between the 1990 and 1994/95 seasons when the product was iced on board and delivered fresh, the fleet averaged 136 deliveries per year (Table 1). Of the 136 deliveries, 114 were made by vessels participating in the statewide fishery (outside of Cook Inlet). By 1996, all scallop catcher boats participating exclusively in the statewide fishery (outside of Cook Inlet) were converted to catcher-processors

with freezing capability. Freezing product onboard allowed longer trips. As a result, the annual average number of deliveries between 1996/97 and 2002/03 for the catcher-processor fleet operating exclusively in the statewide fishery (outside of Cook Inlet), decreased to 20. However, the average number of deliveries over the same time period, including the Cook Inlet fishery, was 27. During the most recent season, 2004/05, the catcher-processor fleet operating exclusively in the statewide fishery, made 16 deliveries. During the same time period, the number of deliveries for all scallop vessels and all registration areas combined was 22.

Variable quantities of weathervane scallops are found in patchy distribution along the continental shelf from Southeast Alaska to the Bering Sea and Aleutian Islands. Scallop “beds” are typically elongated and oriented in a north-south direction consistent with prevailing currents parallel to Alaska’s coastline. Major scallop fishing locations in Alaska coastal waters are shown in Figure 1. Scallops are typically found at depths of 20–125 fathoms (120-750 feet), with the majority of the fishing effort occurring between 40 and 60 fathoms (240 and 360 feet; Barnhart and Rosenkranz 2000). Statewide, during the 2004/05 scallop season, a maximum of 97 nmi² were fished as calculated by area swept estimates. Bottom substrate types inhabited by weathervanes are variable throughout the state and include mud, clay, silt, sand, and pebble.

There are nine scallop fishing registration areas in Alaska (Figure 2). Unless otherwise indicated, this report describes fisheries within the ADF&G Westward Region (Registration Area J), including Kodiak (Area K), Alaska Peninsula (Area M), Bering Sea (Area Q), Dutch Harbor (Area O), and Adak (Area R) scallop registration areas. Registration Area J includes all waters of the Territorial Sea and EEZ in the Gulf of Alaska south of Cape Douglas (58° 51.10' N lat.), west of 149° W long. and the Bering Sea to the U.S.-U.S.S.R. Maritime Boundary Agreement Line of 1990.

MANAGEMENT HISTORY

HISTORIC MANAGEMENT MEASURES

Prior to an influx of boats from the east coast of the U. S. into the Alaska weathervane scallop fishery in the early 1990s, the fishery was open year-round in many parts of the state, without harvest restrictions. However, vessels were registered to fish under a commissioner’s permit, which could stipulate location and duration of harvest, limit gear and other harvest procedures, and require periodic or annual reporting. ADF&G required all vessels fishing scallops in Alaska to register with the state. Under federal law, because vessels were registered with the state, the state could regulate the fishery in federal waters. By 1993, scallop fishery management changed in response to increased effort. The fishery was declared to be a high impact and emerging fishery on May 21, 1993 by the Commissioner of ADF&G and was closed until a conservative management plan could be developed by the department. The resulting interim Alaska Scallop Fishery Management Plan approved by the ADF&G Commissioner in 1993 and established as regulation 5 AAC 38.076 by the Alaska Board of Fisheries (BOF) in 1994 includes a provision for onboard observer coverage, measures designed to limit efficiency and slow the pace of fishing, gear regulations that reduce the capture rate of small scallops, and crab bycatch limits.

At the BOF meeting in March 1994, the Westward Region regulatory season was established as July 1 through February 15. At the March 1997 BOF meeting, the regulatory season in all registration areas of the state, except the Cook Inlet Registration Area, was also established as July 1 through February 15. Although season dates were established to protect molting and

mating crab, they have the added benefit of not disturbing scallops prior to and during their spawning period of May through early-July.

Federal regulatory actions also changed the fishery. In January 1995, the captain of a scallop vessel returned his 1995 scallop interim use permit card to the Commercial Fisheries Entry Commission (CFEC) in Juneau and proceeded to harvest scallops in the Gulf of Alaska EEZ with disregard to harvest limits, observer coverage, and all other state regulatory and management measures. In response to the uncontrolled fishing for scallops in the EEZ by this single vessel outside the jurisdiction of the state of Alaska, the fishery was closed by the federal government from February 23, 1995 to August 1, 1996. Fishing in the EEZ was initially closed by federal emergency rule (60 FR 11054). Subsequent to expiration of the emergency rule on May 30, 1995, it was extended by the National Marine Fisheries Service (NMFS) for an additional 90 days through August 28, 1995. The emergency rule was activated to control unregulated scallop fishing in federal waters until a federal fishery management plan (FMP) could be adopted closing the fishery in federal waters. Prior to the August 28, 1995 emergency rule expiration date, the North Pacific Fishery Management Council (NPFMC) submitted a draft FMP that closed federal waters to scallop fishing for up to one year, with an expiration date of August 28, 1996. Amendment 1 to the FMP became effective August 1, 1996 allowing the fishery to reopen in federal waters. Scallop fishing in state waters, scheduled to open July 1, 1996, was delayed until August 1, 1996 to coincide with the federal water opening. Amendment 2 to the Fishery Management Plan for the Scallop Fishery off Alaska (FMP) was approved on April 11, 1997 (62 FR 17749). Amendment 2 established a federal moratorium on the entry of new vessels into the fishery. The vessel moratorium remained in effect until June 30, 2000. The moratorium was replaced by the LLP that became effective on January 16, 2001. Between June 30, 2000 and January 16, 2001 the fishery was in open access status. In 1998, Amendment 3 to the federal FMP delegated authority to the state of Alaska to manage all aspects of the scallop fishery in federal waters, except limited access (Barnhart 2000). This included the authority to regulate vessels not registered under the laws of Alaska. There have been a total of 10 amendments to the scallop FMP.

In 1997, the Alaska legislature enacted a temporary moratorium, AS 16.43.906, on vessels for state waters (0-3 nautical miles). In 2001, the legislature authorized a 3-year extension of the moratorium, with an expiration date of July 1, 2004. Passage of HB206 during the 2002 legislative session, resulted in changes to the limited entry statutes allowing for a vessel-based limited entry program. The CFEC adopted regulations 20 AAC 05.1400 through 20 AAC 05.1444 to establish a vessel permit limited entry system for the statewide weathervane scallop fishery prior to the moratorium expiration on July 1, 2004.

CURRENT MANAGEMENT

The weathervane scallop fishery, in both state and federal waters, is managed by the ADF&G. Provisions of the Magnuson-Stevens act and the scallop FMP apply in federal waters. Vessels eligible to fish in the EEZ are limited by the LLP, while vessels in state waters (0-3 nautical miles) are limited by a state limited entry vessel permit (Table 2).

Section 303(a)(7) of the Magnuson-Stevens Act requires all FMPs to describe and identify Essential Fish Habitat (EFH), which it defines as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” In addition, FMPs must minimize effects on EFH caused by fishing and identify other actions to conserve and enhance EFH. These

EFH requirements are detailed in Amendment 5 to the FMP for the Scallop Fishery off Alaska (NPFMC 2005). The scallop fishery does not occur on any areas designated as Habitat Areas of Particular Concern (HAPC). According to the Environmental Impact Statement (EIS) for EFH Identification and Conservation in Alaska, the potential impacts on EFH from the scallop fishery are “minimal and temporary” (NMFS 2005).

The regulatory fishing season is from July 1 through February 15 or unless closed by emergency order. Scallop guideline harvest ranges (GHRs) and crab bycatch limits for the 2004/05 season were announced by news release on June 4, 2004. The upper limit of the GHRs in the Westward Region totaled 395,000 lb.

Crab Bycatch Limits (CBLs) for red king crabs *Paralithodes camtschaticus*, Tanner crabs *Chionoecetes bairdi* and snow crabs *Chionoecetes opilio* have been established for registration areas and districts within the weathervane scallop fishery. Hybrid *Chionoecetes* crabs are included in the snow crab CBL. Each registration area or district has separate CBLs. The bycatch of crabs in the scallop fishery is controlled through the use of the CBLs. The state first instituted CBLs in July 1993. Methods used to determine CBLs in 1993 were approved by the ADF&G Commissioner and in 1994 were approved by the BOF and also the NPFMC (FMP Amendment 1) and, with few exceptions, remain unchanged. Annual CBLs are established pre-season by the ADF&G based on the most current crab resource abundance information. However, in some registration areas or districts, the CBL is a fixed number of crabs and is not adjusted seasonally.

In the Kodiak, Alaska Peninsula, and Dutch Harbor Registration Areas, the CBLs are set at 0.5% or 1.0% of the total crab stock abundance estimate based on the most recent survey data (Table 3). In registration areas or districts where red king crab or Tanner crab abundance is sufficient to support a commercial crab fishery, the cap is set at 1.0% of the most recent red king crab or Tanner crab abundance estimate. In registration areas or districts where the red king crab or Tanner crab abundance is insufficient to support a commercial fishery, the CBL is set at 0.5% of the most recent red king crab or Tanner crab abundance estimate. Bycatch caps are expressed in numbers of crabs and include all sizes of crabs caught in the scallop fishery.

In the Kamishak District of the Cook Inlet Registration Area, the Tanner crab bycatch limit is fixed at 0.5% of the total crab stock abundance and the red king crab limit is fixed at 60 crabs. In the Prince William Sound Registration Area the CBL for Tanner crab is fixed at 0.5% of the total crab stock abundance, although this is a recent change from a fixed number of crabs.

CBLs in the Bering Sea (Registration Area Q) have evolved from fixed numbers in 1993 to a three tier approach used in the current fishery. In 1993, Bering Sea CBLs were set by the ADF&G to allow the fleet adequate opportunity to explore and harvest scallop stocks while protecting the crab resource. CBLs were established at 260,000 Tanner and snow crab combined and 17,000 red king crabs. In 1995, ADF&G recommended that CBLs be established at 0.003176% of the best available estimate of *C. opilio* (snow crab) and 0.13542% of the best available estimate of Tanner crab abundance in Registration Area Q. That equated to 300,000 snow and 260,000 Tanner crabs based on 1994 crab abundance estimates in Registration area Q. In Amendment 1 of the federal scallop FMP, the NPFMC approved the CBLs established by the ADF&G. The NPFMC also recommended that king crab bycatch limits be set within a range of 500 to 3,000 crabs annually. Beginning with the 1996/97 fishing season, ADF&G took a conservative approach and set the red king crab limit in Registration Area Q at 500 red king crabs annually.

From the 1996/97 through 1998/99 scallop fishing seasons, the CBL for Tanner and snow crabs in the Bering Sea was established annually by applying the percentages established for snow and Tanner crab limits in Amendment 1 of the FMP. In 1998, consistent with the Tanner crab rebuilding plan in the Bering Sea, crab bycatch limits were modified utilizing a three tier approach.

The current three tier approach was established utilizing the bycatch limits established in Amendment 1 of the FMP, 300,000 snow crab and 260,000 Tanner crab. The three tiers include (1) Tanner crab spawning biomass above minimum stock size threshold (MSST); bycatch limit is set at 260,000 crabs, (2) Tanner crab spawning biomass below MSST; bycatch limit is set at 130,000 crabs, and (3) Tanner crab spawning biomass is below MSST and the commercial fishing season is closed; Tanner crab limit is set at 65,000 crabs. A similar three tier approach was taken with the snow crab bycatch caps. The three tiers include (1) snow crab spawning biomass above the MSST; bycatch limit is set at 300,000 crabs, (2) snow crab spawning biomass below MSST; bycatch limit is set at 150,000 crabs, and (3) snow crab spawning biomass below MSST and the commercial fishing season is closed; the snow crab limit is set at 75,000 crabs.

Closures based on the fleet reaching CBLs have decreased over the years since inception of CBLs in 1993, possibly due to decreased crab abundance (Barnhart and Rosenkranz 2003). During the 1993/94 season, four statewide areas were closed due to attainment of CBLs. Since the 2000/01 season, two areas have closed due to crab bycatch.

One management tool used by ADF&G when setting annual GHRs is evaluation of catch per unit effort (CPUE). Fishery-dependent data such as CPUE is affected by many variables and therefore must be used with caution. CPUE is expressed in two ways, scallop round weight and scallop meat weight. These are standardized to a dredge-hour, which is defined as one dredge towed for 60 minutes. Round weight represents the retained weight in lb of the live or whole animals. The round weight of retained scallops is estimated by the vessel operator for each tow by counting the number of bushels of retained scallops and multiplying by an estimated average weight per bushel. Processed product (scallop meat in the form of adductor muscles) is typically weighed directly during the case-up process. Therefore, CPUE based on scallop meat weight vs an estimate of round weight, provides a more standard measure of fishery performance across the fleet. Estimated round weight is used in conjunction with weighed scallop meats to determine estimated recovery rates, thus helping assure the accuracy of reported data.

OBSERVER PROGRAM

The Alaska Scallop Fishery Management Plan, 5 AAC 38.076 (g), allows ADF&G to require a vessel, in a scallop fishery with a guideline harvest range established by regulation, to carry an onboard observer unless the department determines that carrying an observer in that fishery will not serve the purpose of the onboard observer program. The primary purposes of the onboard scallop observer program are to collect a variety of biological and fishery-based data, monitor bycatch, and provide for regulatory enforcement. Data are collected on crab and halibut bycatch, discarded scallop catch, retained scallop catch, catch composition, CPUE, scallop meat-weight recovery, and location, area and depth fished (Barnhart and Rosenkranz 2003). Onboard observers report scallop harvest, number of tows, area fished, and crab bycatch to ADF&G tri-weekly during the season by radio, email, or satellite phone. Observer-collected data are used to manage the fishery in-season and to set GHRs for the following season. Data are provided to local advisory committees, BOF, NPFMC, NMFS and the public to help answer a myriad of

questions pertaining to the weathervane scallop fishery. These data have been invaluable for preparing EFH and HAPC documents. For analyzing fine-scale spatial and temporal impacts of the fishery, observer data are critical.

Onboard observer coverage is funded by industry through direct payments to independent contracting agents (Barnhart 2003). Independent contracting agents provide personnel that are trained at the University of Alaska North Pacific Fisheries Observer Training Center (OTC) in Anchorage, Alaska.

INDUSTRY

Prior to the 2000/01 regulatory season, six of the nine LLP owners formed a cooperative under authority of the Fishermen's Cooperative Marketing Act, 48 Stat. 1213 (1934), 15 U.S.C. § 521. No federal or state regulations established the cooperative, nor is it managed by the ADF&G or any federal agency. The cooperative is a voluntary association of vessels with no legal harvest allocation. That is, there is no direct harvest allocation under state or federal regulations. Within the cooperative, vessel owners allocate themselves shares of the scallop GHRs and CBLs based on historic participation in the fishery. The majority of the owners opted to remove their boats from the fishery and arranged for their co-op shares to be caught by others members of the cooperative. The formation of the cooperative extended the fishing season over a longer time period compared to the pre-cooperative fishery.

Vessel owners and operators within the cooperative, have taken an active role in developing measures aimed at reducing crab bycatch. Vessel operators provide their confidential inseason fishing information to an independent consulting company contracted by the cooperative. The independent consultant reviews the crab bycatch data, fishing location information, and scallop harvest, allowing for real-time identification of any high crab abundance areas discovered during the fishery. If at any time, an area of high crab abundance is identified, the co-op fleet is provided with location information and directed to avoid fishing in that area. This mechanism only works if vessel operators submit their fishing data and crab bycatch to the consultant in a timely fashion.

Vessel operators also voluntarily release their confidential fishing information to ADF&G so that it can be used in this and other reports to help the BOF make informed decisions on management issues in areas where few fishermen participate.

KODIAK REGISTRATION AREA

The Kodiak Registration Area (Area K) includes the waters of the Pacific Ocean south of the latitude of Cape Douglas (58° 51.10' N lat.), east of the longitude of Cape Kumlik (157° 27' W long.) and west of 149° W long. (Figure 3). The Kodiak Registration Area is comprised of the Northeast, Shelikof, and Semidi Island Districts. Extensive areas are closed to scallop fishing to protect crab habitat.

HISTORIC BACKGROUND

In 1967, when commercial fishing for weathervane scallops began in Alaska, vessel operators targeted fishing grounds along the east side of Kodiak Island. In 1968, 734,084 lb of scallop meats were landed from eight vessels (Table 4). The Kodiak scallop fishery peaked in 1970 when 1.4 million lb of scallop meats were landed from seven vessels. Catches declined by the mid-1970s with no participation in 1977 or 1978. Since 1979, landings have fluctuated from

24,826 lb to 689,497 lb of scallop meats, excluding 1995/96 when the scallop season in federal waters was closed by federal emergency rule and the Kodiak area season was closed by an ADF&G emergency order.

When the Alaska weathervane scallop fishery began in 1967, there were no closed seasons. Within two years from inception of the scallop fishery, concerns about dredging impacts on crab resources, specifically red king crab, began to develop. In 1969, by emergency order, the ADF&G closed extensive areas off the south end of Kodiak Island as well as Marmot Bay at the north end of Kodiak Island, to scallop fishing. These areas were closed due to concerns about crab bycatch and conflict with other gear types. Subsequently, the BOF adopted the department's recommendation, and closed both areas by regulation. During the early 1970s, to protect spawning, molting, or softshell red king crab, regulatory season opening dates of either June 1 or July 15 (depending upon geographical area) through March 31 were established by the BOF (Barnhart 2003). In 1990, to protect depressed red king and Tanner crab populations, the BOF closed scallop fishing in Kodiak's westside bays which had been previously closed to non-pelagic trawling. With development of the Alaska Scallop Fishery Management Plan in 1993, crab bycatch limits were developed for the Kodiak Area. In 1994, the regulatory season for weathervane scallops in the Westward Region was established by the BOF as July 1 through February 15.

2004/05 FISHERY

The 2004/05 scallop fishing season was open July 1, 2004 through February 15, 2005. Two catcher-processors fished in the Kodiak Registration Area. To facilitate distribution of fishing effort and crab bycatch limits, red king crab districts as described in 5 AAC 34.405 were utilized.

Northeast District

The Northeast District (Figure 3) of the Kodiak Registration Area as applied to the scallop fishery includes all waters northeast of a line extending 180° from the easternmost tip of Cape Barnabas, east of a line from the northernmost tip of Inner Point on Kodiak Island to the southernmost tip of Afognak Point, east of 152° 30' W long. in Shuyak Strait, and east of the longitude of the northernmost tip of Shuyak Island at 152° 20' W. long.

The GHR for the Northeast District was set at zero to 80,000 lb of shucked scallop meats (Table 5). For a second consecutive year, the GHR for the Northeast District of the Kodiak Registration Area was subdivided into harvest caps by individual statistical area or group of statistical areas. A statistical area is a defined block 30' of latitude by 1° of longitude in offshore waters, and smaller irregular areas inshore which are used as catch reporting areas for shellfish harvest (Urban 1996). The harvest cap in statistical area 525702 was 40,000 lb of shucked meats while the harvest cap in statistical area 525630 was 20,000 lb of shucked meats. The remaining 20,000 lb of the overall GHR was allocated to any other waters open to scallop fishing in the Northeast District.

Two catcher-processors participated in the fishery with initial effort in early July. Based on inseason observer reports, an estimated 30,000 Tanner crabs and no red king crabs were caught from a bycatch limit of 527,388 Tanner crabs and 40 red king crabs. Based on indications from observer reports that upper-end harvest caps would be met, statistical area 525630 was closed on July 19, 2004, statistical area 525702 was closed on July 31, 2004 and the remainder of the district was closed on August 10, 2004. The Northeast District scallop harvest as reported on fish tickets, totaled 80,105 lb of shucked meats (Table 5).

Figure 4 depicts the estimated shell height (SH) distributions of the retained and discarded scallop catch in the Northeast District, based on statistical resampling of the discarded and retained SH measurements in equal proportion. The plots depict annual recruitment to the Northeast District scallop population with above average recruitment in 2004/05, based on the estimated frequency of scallops <115 mm SH in the size distribution. A strong mode is evident between 105 and 115 mm SH. The average SH of retained scallops in the Northeast District during the 2004/05 season was 144 mm as compared to 145 mm SH during the previous season (Table 6).

A summary of the scallop catch in round weight (lb) of retained scallops, shucked meat weight (lb) of retained scallops, dredge hours, and CPUE expressed in lb of shucked scallop meats per dredge-hour (meat lb/drg-hr) from the 1993/94 through 2004/05 seasons is depicted in Figure 5. Since the 1999/2000 season, the fishery in this district is characterized by relatively steady effort (dredge hours), level harvest of shucked meats, and increasing to stable fishery performance as measured by CPUE in meat lb/drg-hr.

Stock Status

The weathervane scallop population in the Northeast District of the Kodiak Registration Area is not currently surveyed and no estimate of abundance has been made. There are currently no plans to survey this population. Since the 1999/2000 season, the commercial catch has remained level, ranging from 77,000 to 80,000 lb of shucked meats (Table 5). Over the same time period, the estimated round weight of the retained scallop catch ranged from 681,192 lb to 952,972 lb (Table 7).

Shelikof District

The Shelikof District of the Kodiak Registration Area includes all waters north of a line from the westernmost tip of Cape Ikolik to the southernmost tip of Cape Kilokak, west of a line from the northernmost tip of Inner Point on Kodiak Island to the southernmost tip of Afognak Point, west of 152° 30' W long. in Shuyak Strait, and west of the longitude of the northernmost tip of Shuyak Island at 152° 20' W long. (Figure 3).

The GHR for the Shelikof District was set at zero to 180,000 lb of shucked meats (Table 8). Two catcher-processors participated in the fishery with initial effort in late-July. Based on inseason observer reports, an estimated 35,188 Tanner crabs and no red king crabs were caught from a bycatch limit of 35,069 Tanner crabs and 25 red king crabs. Inseason observer reports indicated the CBL would be reached by December 9, 2005 prompting an emergency order closing the Shelikof District to scallop fishing on that date. The Shelikof District scallop harvest as reported on fish tickets, totaled 174,622 lb of shucked meats (Table 6).

Figure 6 depicts the estimated SH distributions of the retained and discarded scallop catch in the Shelikof District, based on statistical resampling of the discarded and retained SH measurements in equal proportion. Plots indicate annual recruitment to the population by the frequency of scallops <115 mm SH in the size distribution. In 2004/05, a strong mode occurred between 105 mm and 115 mm SH. A broad range of scallop sizes supports the fishery. The average SH of retained scallops in the Shelikof District during the 2004/05 season of 137 mm was similar to the average SH of 135 mm recorded the previous season. Since the 1993/94 season, the average annual SH has ranged from 128 mm to 140 mm (Table 6).

A summary of the scallop catch in round weight (lb) of retained scallops, shucked meat weight (lb) of retained scallops, dredge hours, and CPUE (meat lb/drg-hr) in the Shelikof District from 1993/94 through 2003/04 is depicted in Figure 7. CPUE decreased from 55 meat lb/drg-hr during the 2003/04 season to 50 meat lb/drg-hr in 2004/05 season (Table 8).

Stock Status

The weathervane scallop population in the Shelikof District of the Kodiak Registration Area is not currently surveyed. Experimental scallop video research was conducted in the Shelikof District in 2004. A scallop video stock assessment is planned for 2007. Between the 1998/1999 and 2003/04 seasons, the commercial catch has remained level, as the department allowed the annual harvest to reach the upper limit of the GHR, set at 180,000 lb of shucked meats. However, in 2004/05, the season was closed prior to reaching the GHR cap due to the attainment of the CBL. Between 1998/1999 and 2004/05, the estimated round weight of the retained scallop catch ranged from 1,641,608 lb to 2,129,025 lb, averaging 1,836,369 lb each season (Table 7).

Semidi Island District

The Semidi Island District of the Kodiak Registration Area includes all Pacific Ocean waters west of the longitude of Cape Kilokak (156° 20.22' W long.) and east of the longitude of Cape Kumlik at 157° 27' W long. (Figure 3). A GHR has not been developed for this district.

State waters of the Semidi Island District were closed to scallop dredging by the BOF at the March 2000 meeting; however, federal waters (EEZ) remain open. No fishing activity occurred in the Semidi Island District during the 2004/05 fishing season, although it was open from July 1, 2004 to February 15, 2005.

Since the 1993/94 season, harvest has ranged from zero to 55,487 lb of scallop meats (Table 9). Considering years when fishing occurred, CPUE ranged from 16 to 37 meat lb/drg-hr, which is lower than any other registration area or district within the Westward Region (Table 6).

Stock Status

The weathervane scallop population in the Semidi Island District is not surveyed and no estimate of abundance has been made. There are currently no plans to survey this population. No fishing effort has occurred since the BOF closed state waters to scallop fishing in 2000.

ALASKA PENINSULA REGISTRATION AREA

The Alaska Peninsula Registration Area (Area M) includes waters of the Pacific Ocean west of the longitude of Cape Kumlik (157° 27' W long.) and east of the longitude of Scotch Cap Light at 164° 44' W long. (Figure 8).

Areas closed to fishing include all state waters and offshore waters of Unimak Bight and Mitrofanina Island. Justification for the Unimak Bight closure adopted in the early 1970s was to protect king crab habitat. Closing the area to weathervane scallop fishing removed potential conflict with other gear types such as crab pots. The Mitrofanina Island closure was adopted in the mid-1980s to protect Tanner crabs.

HISTORIC BACKGROUND

Historic fishing effort for scallops in the Alaska Peninsula Registration Area was sporadic. Most catch and effort information prior to 1993 is confidential because few fishermen participated in

any given year. However, the average annual harvest during the nine years of participation prior to 1993 was 41,888 lb of scallop meats. The highest harvest occurred in 1982 when a reported 205,691 lb of shucked meats were landed from six vessels (Table 10). Since the 1993/94 season, CPUE has ranged from 24 to 61 meat lb/drg-hr (Table 11). Commercial harvest data from this registration area was misreported in the 1980s as evidenced in logbooks seized by Fish and Wildlife Protection agents. The extent of misreporting in the 1980s is unknown, but may have lead to artificially high catch data attributed to the Alaska Peninsula Registration Area in some years.

2004/05 FISHERY

In the Alaska Peninsula Registration Area, the historically important scallop grounds between 160° W long. and 161° W long. remained closed for stock conservation during the 2004/05 fishery. The remainder of the Alaska Peninsula Registration Area opened with a GHR of 0-10,000 lb.

STOCK STATUS

The weathervane scallop population in the Alaska Peninsula Registration Area is not currently surveyed and no estimate of abundance has been made. There are currently no plans to survey this population.

BERING SEA REGISTRATION AREA

The Bering Sea Registration Area (Area Q) includes waters of the Bering Sea north of a line extending from the latitude of Cape Sarichef at 54° 36' N lat. to 171° W long., north to 55° 30' and west to the U.S.-U.S.S.R. Maritime Boundary Agreement Line of 1990 (Figure 9). Large portions of the eastern Bering Sea shelf and the Pribilof Islands Habitat Conservation Area are closed to scallop fishing to protect blue king crab *Paralithodes platypus*, red king crab, juvenile Pacific halibut *Hippoglossus stenolepis*, and to provide for habitat conservation.

HISTORIC BACKGROUND

ADF&G records indicate that scallops were first harvested from the Bering Sea in 1987, and then again in 1990 and 1991 (Table 12). During those years, few fishermen participated in any given year, so catch and effort information is confidential. However, the average annual catch for the three confidential years was 68,189 lb of shucked meats. No additional landings were made from this area until calendar year 1993 (January 1-June 30, 1993 and 1993/94 regulatory seasons combined) when 605,953 lb of scallop meats were landed from ten different vessels. During the 1994/95 fishery, 505,439 lb of shucked meats were landed from eight different vessels. The 1995/96 fishery was closed by federal emergency rule. Between the 1993/94 and 1999/2000 regulatory seasons, scallop catches were constrained by Tanner crab or snow crab CBLs. Over this same time period, catches averaged 127,000 lb of shucked meats per season. Since the 2000/01 season, the Bering Sea fishery has not been constrained by CBLs.

2004/05 FISHERY

The GHR for the Bering Sea Registration Area was set at zero to 50,000 lb of shucked meats (Table 13). One catcher-processor participated in the Bering Sea fishery with initial effort in early July when the season opened. Inseason observer reports showed that an estimated 16,680 Tanner crabs, 4,183 snow and hybrid crabs, and zero red king crabs were caught from a bycatch limit of 65,000 Tanner crabs, 150,000 snow and hybrid crabs and 500 red king crabs. The

2004/05 fishery closed by regulation on February 15, 2005. The Bering Sea scallop harvest as reported on fish tickets, totaled 10,050 lb of shucked meats (Table 13).

Figure 10 depicts the estimated SH distributions of the retained and discarded scallop catch in the Bering Sea Registration Area, based on statistical resampling of the discarded and retained SH measurements in equal proportion. With exception of the 1998/99 and 2001/02 seasons, there has been little recruitment to the population. Predominately large, old animals support the fishery. Since the 1993/94 season when onboard observers began collecting data, scallop SH has ranged from 141 mm to 151 mm in the Bering Sea. They are among the largest scallops harvested in the Westward Region. The average SH of retained scallops during the 2004/05 season was 144 mm compared to the previous year at 148 mm SH (Table 6).

A summary of the scallop catch in round weight (lb) of retained scallops, shucked meat weight (lb) of retained scallops, dredge hours, and CPUE (meat lb/drg-hr) is depicted in Figure 11. The 2004/05 season CPUE of 36 meat lb/drg-hr was the lowest since data was first collected by the observer program during the 1993/94 season (Table 6).

STOCK STATUS

Experimental scallop video stock assessment research was conducted in May 2003. The video stock assessment survey methodology is in a developmental phase; however, there are some interesting results with regard to scallop distribution in the Bering Sea. Typically, scallop beds in the Gulf of Alaska are elongated, have well defined margins and are oriented in a north-south direction consistent with the prevailing coastal currents. However, the Bering Sea scallop bed does not exhibit those same characteristics. The margins are not well defined; nor is it oriented in a north-south direction. The scallops are distributed over a large area at low densities; at least one weathervane scallop was counted from each video tow. This is consistent with the low CPUE in this fishery. Small scale aggregations of weathervane scallops necessary for successful broadcast spawning were infrequently observed on the video. This is consistent with data collected from the onboard observer program that brings into question the reproductive viability of the population.

The 2004/05 harvest of 10,050 lb of scallop meats is the lowest on record (Table 13). The highest catch occurred in calendar year 1993 when 605,953 lb of scallop meats were harvested. Calendar year 1993 includes the pre-Scallop Management Plan harvest of 321,539 lb taken from January 1, 1993 – June 30, 1993 and the post-Scallop Management Plan harvest of 284,414 lb beginning July 1, 1993 (recorded as the 1993/94 regulatory season) (Table 12).

Since inception of the onboard observer program in July 1993 (1993/94 season), the estimated round weight of the retained scallop catch ranged from 129,220 lb in 2004/05 to 5,942,912 lb in 1994/95 (Table 7).

DUTCH HARBOR REGISTRATION AREA

The Dutch Harbor Registration Area (Area O) includes Aleutian Island waters west of the longitude of Scotch Cap Light (164° 44' W long.), east of 171°W. long. and south of the latitude of Cape Sarichef at 54° 36' N lat. (Figure 12).

HISTORIC BACKGROUND

In the Dutch Harbor Registration Area, closed waters were established in 1986 to protect crab nursery areas (Figure 12). Prior to the 1993 season, the registration area was open year-round to scallop dredging. At the March 1994 BOF meeting, the regulatory season date for this registration area was established as July 1 through February 15.

The first harvest of weathervane scallops from the Dutch Harbor Registration Area was in 1982 when 62,105 lb of scallop meats were landed from five vessels (Table 14). Catch data for most years between 1985 and 1992 is confidential, because few vessels participated; however, the average annual catch for those years was 203,695 lb of scallop meats. Commercial harvest data from this registration area was also misreported in the 1980s as evidenced in logbooks seized by Fish and Wildlife Protection agents. The extent of misreporting in the 1980s is unknown, but may have lead to artificially high catch data attributed to the Dutch Harbor Registration Area in some years. In addition, productive grounds that contributed significantly to the overall harvest were closed by 1986. Since the 1993/94 season, catches have ranged from zero to 46,432 lb of scallop meats per regulatory season (Table 15). Scallop fishing was limited to state waters during the 1995/96 season because the EEZ was closed by federal emergency rule.

2004/05 FISHERY

The Dutch Harbor Registration Area remained closed for stock conservation.

STOCK STATUS

The Dutch Harbor Registration Area was open one season, 2002/03, out of the last five seasons (Table 15). During that open season one vessel participated, but stopped fishing due to low catches, prior to achieving the upper-end of the GHR. The Dutch Harbor Registration Area may remain closed for up to five years to allow adequate time for juvenile scallops to mature and spawn prior to reopening the fishery under a conservative GHR.

The weathervane scallop population in the Dutch Harbor Registration Area is not surveyed and no estimate of abundance has been made. There are currently no plans to survey this population.

ADAK REGISTRATION AREA

The Adak Registration Area (Area R) includes Aleutian Island and Bering Sea waters west of 171°W. long., and east of the U.S.-U.S.S.R. Maritime Boundary Agreement Line of 1990 and south of 55° 30' N. lat. (Figure 13).

HISTORIC BACKGROUND

ADF&G records indicate that weathervane scallops were first harvested from the Adak Registration Area in 1979, and then again in 1992, and 1995. During those years few fishermen participated in any given year, so catch and effort information is confidential. Little is known about scallop populations in this area.

The Petrel Bank, between 51°30' N lat. and 54° 30' N lat., west of 179° W long. and east of 179° E long. was closed by emergency order on March 21, 1991 due to concerns about king crab bycatch in the *Chlamys* (pink scallop) fishery (Figure 13). On November 1, 1991, before the initial emergency order expired, a second emergency order was issued closing this area until June 1, 1994. This allowed time for ADF&G to bring the conservation concerns to the attention

of the BOF. In 1993, the BOF adopted the department's recommendation, and closed the area by regulation.

2004/05 FISHERY

The 2004/05 fishery opened July 1, 2004 and closed by regulation on February 15, 2005. A GHR of zero to 75,000 lb was announced by news release. No vessels participated in the fishery during 2004/05 season.

STOCK STATUS

The weathervane scallop population in the Adak Registration Area is not surveyed and no estimate of abundance has been made. There are currently no plans to survey this population. The continental shelf adjacent to the Aleutian Islands is narrow, providing limited weathervane scallop habitat.

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TABLES AND FIGURES

Table 1.—Historic statewide commercial weathervane scallop catch, number of vessels, and number of landings, 1967-2004/05.

Year	Number Vessels	Number Landings ^a	Commercial Catch ^b
1967	2	6	778 ^c
1968	19	125	1,677,268
1969	19	157	1,849,947
1970	7	137	1,440,338
1971	5	60	931,151
1972	5	65	1,167,034
1973	5	45	1,109,405
1974	3	29	504,438
1975	4	56	435,672
1976	7	21	264,788
1977		No Effort	
1978		No Effort	
1979	1	4	24,826
1980	8	56	616,717 ^c
1981	18	101	924,441
1982	13	120	913,996
1983	5	30	192,310
1984	6	52	383,512
1985	7	47	615,564
1986	8	74	667,258
1987	4	54	599,947 ^d
1988	4	47	341,070
1989	7	55	534,763
1990	9	144	1,481,136
1991	6	136	1,136,649
1992	8	136	1,785,673
1993 ^e	7	51	568,077
1993/94	15	111	984,583
1994/95	15	104	1,240,775
1995/96	10	29	410,743 ^d
1996/97	9	30	732,424
1997/98	9	31	818,913
1998/99	8	35	822,096
1999/2000	10	22	837,971
2000/01	8	20	750,617
2001/02	6	26	572,838
2002/03	6	28	509,455
2003/04	4	32	500,379
2004/05	5	22	431,594

AVERAGE 1990-1994/95 was 136 deliveries per year. January 1-June 30, 1993 was combined with 1993/94 and considered a single year.

AVERAGE 1995/96 - 2002/03 was 28 deliveries per year.

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Table 1.—Page 2 of 2.

- ^a Prior to and including 1994/95, reported number of landings (deliveries) equals number of fish tickets. After 1995/96, the reported number of landings equals number of off-loads. An off-load typically includes multiple fish tickets, normally one fish ticket per week of fishing.
- ^b Pounds of shucked scallop meats.
- ^c Deliveries of unshucked scallops were converted to shucked meats using a 10% conversion factor.
- ^d Includes illegal harvest.
- ^e January 1 through June 30.

Table 2.-Federal and State Weather-vane Scallop Permits, 2004.

<u>Federal Scallop License Limitation Permits</u>		
<u>License Holder</u>	<u>MLOA^a</u>	<u>Dredge-Size Restriction</u>
Ocean Fisheries, LLC ^b	95	None
Alaska Scallop, LLC ^c	96	None
Forum Star, Inc.	97	None
Hogan, Thomas C.	75	2 scallop dredges with a combined width of no more than 20 feet (6.1m)
Hulse, Max et al.	79	2 scallop dredges with a combined width of no more than 20 feet (6.1m)
Ocean Fisheries, LLC	100	None
Gilmartin, Thomas ^d	70	None
Provider, Inc	124	None
Pursuit, Inc	101	None
<u>State Scallop Limited Entry Vessel Permits</u>		
<u>License Holder</u>	<u>Statewide Permit</u>	<u>Dredge-Size Restriction</u>
Ocean Fisheries, LLC	Yes	None
Provider, Inc	Yes	None
Carolina Boy, Inc	Yes	None
Forum Star, LLC	Yes	None
Future Fisheries	Yes	None
La Brisa, Inc	Yes	None
Hogan, Thomas C.	Yes	None
Gilmartin, Thomas	Yes	None

^a Maximum length overall measured in feet. This is a license limitation program (LLP) provision.

^b Original LLP permit holder was Carolina Boy, Inc.

^c Original LLP permit holder was Carolina Girl, Inc.

^d Original LLP permit holder was Oceanic Research Services.

Table 3.-Crab bycatch limits by registration area and district, in percent of the crab abundance estimate or number of crab.

Scallop Registration Areas	Red King Crab	Tanner Crab	Snow Crab
Yakutat (D)			
District 16	NA ^a	NA ^a	NA ^a
Remainder of Area D	NA ^a	NA ^a	NA ^a
Prince William Sound (E)			
Eastern Section of outside District	NA ^a	0.5% ^b	NA ^a
Cook Inlet (H)			
Kamishak District	60 crabs ^b	0.5% ^b	NA ^a
Outer/Easter/Barren Island Districts	NA ^a	NA ^a	NA ^a
Kodiak (K)			
Northeast District	0.5% or 1.0%	0.5% or 1.0%	NA ^a
Shelikof District	0.5% or 1.0%	0.5% or 1.0%	NA ^a
Semidi District	Regulated inseason	Regulated inseason	NA ^a
Alaska Peninsula (M)			
	0.5% or 1.0%	0.5% or 1.0%	NA ^a
Bering Sea (Q)			
	500 crabs ^b	Three Tier Approach	Three Tier Approach
Dutch Harbor (O)			
	0.5% or 1.0%	0.5% or 1.0%	NA ^a
Adak (R)			
	50 ^c	10,000 ^c	NA ^a

^a Not applicable. Bycatch caps not established.

^b Fixed crab bycatch limit.

^c Bycatch limit set to allow scallop fleet adequate opportunity to explore and harvest scallop stocks while protecting the crab resource.

Table 4.-Historic commercial catch, effort, and value of weathervane scallops, Kodiak Registration Area, 1967-2004/05.

Year	Number	Number	Commercial	Average	First Wholesale		Number Tows
	Vessels	Landings ^a	Catch (lb) ^b	Landing (lb) ^b	Average Price/lb	Est. Value (dollars)	
1967 ^c	2	6	778	130	0.70	545	^d
1968 ^c	8	89	734,084	8,248	0.85	623,971	^d
1969	11	86	1,012,860	11,777	0.85	861,000	^d
1970	7	102	1,417,612	13,898	1.00	1,500,000	^d
1971	5	48	841,211	17,525	1.05	883,000	^d
1972	5	68	1,038,793	15,276	1.15	1,200,000	^d
1973	4	42	935,705	22,279	1.20	1,123,000	^d
1974	3	14	147,945	10,568	1.30	192,000	^d
1975	3	29	294,142	10,143	1.40	412,000	^d
1976	1	6	75,245	12,541	1.59	119,000	^d
1977				No Effort			
1978				No Effort			
1979	1	4	24,826	6,206	2.78	69,000	^d
1980 ^c	7	33	355,200	10,763	3.60	1,278,720	^d
1981	15	62	439,804	7,094	4.00	1,759,216	^d
1982	8	62	435,645	7,026	3.25	1,416,000	^d
1983	4	24	147,747	6,156	5.00	739,000	^d
1984	7	37	309,502	8,365	4.00	1,238,000	^d
1985	3	10	46,971	4,697	4.00	188,000	^d
1986	5	21	180,600	8,600	4.25	767,550	^d
1987	3	25	253,451	10,138	3.45	874,406	^d
1988	3	21	195,811	9,324	3.68	720,584	^d
1989	5	29	242,557	8,364	3.87	938,696	^d
1990	7	73	689,497	9,445	3.43	2,364,974	10,950
1991	4	61	514,348	8,432	3.82	1,964,809	12,884
1992	3	43	389,854	9,066	3.96	1,543,822	8,328
1993 ^{e,f}	4	16	88,279	5,517	5.15	454,637	1,708
1993/94	10	48	315,626	6,576	5.15	1,625,474	7,028
1994/95	11	32	355,628	11,113	5.79	2,052,543	6,449
1995/96				Closed			
1996/97	5	13	268,545	20,657	6.30	1,691,833	2,760
1997/98	5	14	360,339	25,739	6.50	2,342,203	4,757
1998/99	8	12	301,600	25,133	6.40	1,930,240	3,515
1999/2000	6	9	266,012	29,557	6.25	1,662,575	2,673
2000/01	5	7	260,052	37,150	5.50	1,430,286	1,989
2001/02	4	8	257,582	32,459	5.50	1,428,196	2,439
2002/03	3	11	260,580	23,689	5.20	1,355,016	2,779
2003/04	2	13	259,976	19,998	5.25	1,364,874	2,397
2004/05	2	9	254,727	28,303	5.50	1,400,998	2,454

-continued-

Table 4.-Page 2 of 2.

- ^a Prior to 1995/96, reported number of landings equals number of fish tickets. After 1995/96, the reported number of landings equals number of off-loads.
- ^b Pounds of shucked scallop meats.
- ^c Deliveries of unshucked scallops were converted to shucked meats using a 10% conversion factor.
- ^d Not available.
- ^e January 1 - June 30.
- ^f Includes harvest from exploratory fishery.

Table 5.-Kodiak Registration Area, Northeast District, scallop fishery summary statistics, 1993/94–2004/05.

Season	Number vessels	GHR ceiling (lb meat)	Dredge hours	Catch (lb meat)	CPUE (lb meat per dredge hr)
1993/94	10	NA ^a	6,940	155,122	22
1994/95	7	NA ^a	1,773	35,207	20
1995/96		Closed			
1996/97	3	NA ^a	581	11,430	20
1997/98	3	NA ^a	2,604	95,858	37
1998/99	4	NA ^a	2,749	120,010	44
1999/2000	3	75,000	1,384	77,119	56
2000/01	4	80,000	1,101	79,965	73
2001/02	3	80,000	1,142	80,470	70
2002/03	2	80,000	1,350	80,000	59
2003/04	2	80,000	1,248	79,965	64
2004/05	2	80,000	1,227	80,105	65

^a Not applicable. A guideline harvest range (GHR) ceiling was not established.

Table 6.-Commercial harvest, average shell height from retained catch, and catch per unit effort from observer data, Westward Region, 1993/94-2004/05.

Season	REGISTRATION AREA/DISTRICT ^a																		
	Kodiak Area						Alaska Peninsula			Bering Sea			Dutch Harbor						
	Northeast District		Shelikof District		Semidi Island District		Harvest ^b	SH ^c	CPUE ^d	Harvest ^b	SH ^c	CPUE ^d	Harvest ^b	SH ^c	CPUE ^d				
1993/94	Harvest ^b	155,122	144	22	105,017	128	42	55,487	145	32	112,152	119	61	284,414	146	49	38,731	128	46
1994/95		35,207	151	20	314,051	131	36	^e	153	^e	65,282	127	39	505,439	147	45	1,931	158	24
1995/96		Closed			Closed			Closed			Closed			Closed			26,950	134	26
1996/97		11,430	144	20	219,305	136	63	37,810	154	37	12,560	126	38	150,295	147	65	No Effort		
1997/98		95,858	140	37	258,346	139	47	6,135	147	18	51,616	135	29	97,002	151	43	5,790	127	34
1998/99		120,010	127	44	179,870	137	44	1,720	151	16	63,290	128	39	96,795	147	42	46,432	128	45
1999/2000		77,119	131	56	187,963	130	44	930	152	21	75,610	124	37	164,929	145	50	6,465	134	24
2000/01		79,965	135	73	180,087	134	62	No Effort			7,660	119	24	205,520	142	61	Closed		
2001/02		80,470	140	70	177,112	140	52	No Effort			Closed			140,871	141	46	Closed		
2002/03		80,000	140	59	180,580	138	48	No Effort			Closed			92,240	149	45	6,000	133	33
2003/04		79,965	145	64	180,011	135	55	No Effort			No Effort			42,590	148	42	Closed		
2004/05		80,105	144	65	174,622	137	50	No Effort			No Effort			10,050	144	36	Closed		

^a Confidential data voluntarily released by vessel operators.

^b Harvest in pounds of shucked meats.

^c Average scallop shell height (SH) in mm.

^d Catch per unit effort (CPUE) in pounds of shucked scallop meats per dredge hour.

^e Confidential.

Table 7.-Estimated round weight of the retained commercial scallop catch and catch per unit effort, Westward Region, 1993/94 - 2004/05.

Season	REGISTRATION AREA/DISTRICT ^a													
	Kodiak Area													
	Northeast District		Shelikof District		Semidi Island District		Alaska Peninsula		Bering Sea		Dutch Harbor		Total	
	Harvest ^b	CPUE ^c	Harvest ^b	CPUE ^c	Harvest ^b	CPUE ^c	Harvest ^b	CPUE ^c	Harvest ^b	CPUE ^c	Harvest ^b	CPUE ^c	Harvest ^b	CPUE ^c
1993/94	2,214,427	319	1,169,664	467	579,836	319	1,061,925	575	3,447,681	598	432,970	517	8,906,503	
1994/95	389,202	220	3,522,517	404	^d	^d	619,473	372	5,942,912	535	23,590	291	10,497,694	
1995/96	Closed		Closed		Closed		Closed		Closed		289,398	276	289,398	
1996/97	147,269	253	1,878,268	537	288,117	283	130,235	398	1,432,160	619	No Effort		3,876,049	
1997/98	1,143,926	439	3,101,152	565	61,320	176	654,960	374	1,082,825	482	55,725	326	6,099,908	
1998/99	1,365,836	497	2,129,025	522	15,806	149	617,120	383	1,193,071	514	427,422	417	5,748,280	
1999/2000	952,972	689	1,903,345	442	11,310	253	781,596	386	1,851,620	562	68,070	249	5,568,913	
2000/01	681,192	619	1,768,376	608	No Effort		95,510	299	2,376,601	708	Closed		4,921,679	
2001/02	822,110	720	1,830,265	539	No Effort		Closed		1,700,578	554	Closed		4,352,953	
2002/03	871,918	646	1,857,466	489	No Effort		Closed		952,958	468	59,116	322	3,741,458	
2003/04	747,517	600	1,724,498	529	No Effort		No Effort		537,552	527	Closed		3,009,567	
2004/05	848,527	692	1,641,608	473	No Effort		No Effort		129,220	470	Closed		2,619,355	

^a Confidential data voluntarily released by vessel operators.

^b Harvest in pounds of round scallops.

^c Catch per unit effort (CPUE) in estimated round weight of retained scallops per dredge-hour.

^d Confidential.

Table 8.-Kodiak Registration Area, Shelikof District, scallop fishery summary statistics, 1993/94 – 2004/05.

Season	Number vessels	GHR ceiling (lb meat)	Dredge hours	Catch (lb meat)	CPUE (lb meat per dredge hr)
1993/94	5	NA ^a	2,491	105,017	42
1994/95	11	NA ^a	8,662	314,051	36
1995/96		Closed			
1996/97	3 ^b	NA ^a	3,491	219,305	63
1997/98	4	NA ^a	5,492	258,346	47
1998/99	8	NA ^a	4,081	179,870	44
1999/2000	6	180,000	4,304	187,963	44
2000/01	5	180,000	2,907	180,087	62
2001/02	4	180,000	3,398	177,112	52
2002/03	3	180,000	3,799	180,580	48
2003/04	2	180,000	3,258	180,011	55
2004/05	2	180,000	3,467	174,622	50

^a Not applicable. A guideline harvest range (GHR) ceiling was not established.

^b One additional vessel fished but data are not available.

Table 9.-Kodiak Registration Area, Semidi Island District, scallop fishery summary statistics, 1993/94 – 2004/05.

Season	Number vessels	GHR ceiling (lb meat)	Dredge hours	Catch (lb meat)	CPUE (lb meat per dredge hr)
1993/94	6 ^b	NA ^a	1,819	55,487	32
1994/95	2	NA ^a	272	Confidential	
1995/96		Closed			
1996/97	3	NA ^a	1,017	37,810	37
1997/98	1	NA ^a	349	6,135	18
1998/99	2	NA ^a	106	1,720	16
1999/2000	1	NA ^a	45	930	21
2000/01		NA ^a		No Effort	
2001/02		NA ^a		No Effort	
2002/03		NA ^a		No Effort	
2003/04		NA ^a		No Effort	
2004/05		NA ^a		No Effort	

^a Not applicable. A guideline harvest range (GHR) ceiling was not established.

^b Two additional vessels registered but did not fish.

Table 10.-Historic commercial catch, effort and value of weathervane scallops, Alaska Peninsula Registration Area, 1975-2004/05.

Year	Number Vessels	Number Landings ^a	Commercial Catch (lb) ^b	Average Landing (lb) ^b	Average Price/lb	First Wholesale Est. Value (dollars)	Number Tows
1975	1	1	2,508	2,508	1.40	3,511	^c
1976			No Effort				
1977			No Effort				
1978			No Effort				
1979			No Effort				
1980			No Effort				
1981			Confidential				
1982	6	20	205,691	10,284	3.35	689,064	^c
1983			Confidential				
1984			No Effort				
1985			Confidential				
1986			No Effort				
1987			Confidential				
1988			Confidential				
1989			No Effort				
1990			Confidential				
1991			Confidential				
1992			No Effort				
1993 ^d			Confidential				
1993/94	8	7	112,152	16,012	5.15	577,583	949
1994/95	7	11	65,282	5,935	5.79	377,983	1,006
1995/96			Closed				
1996/97	2 ^c	2	12,560	6,280	6.30	79,128	185
1997/98	4	6	51,616	8,603	6.50	335,504	1,054
1998/99	4	4	63,290	15,822	6.40	405,056	684
1999/2000	5	5	75,610	15,107	6.25	472,094	1,107
2000/01	3	3	7,660	2,553	5.50	42,130	189
2001/02			Closed				
2002/03			Closed				
2003/04			No Effort				
2004/05			No Effort				

^a Prior to 1995/96, reported number of landings equals number of fish tickets. After 1995/96, the reported number of landings equals the number of off-loads.

^b Pounds of shucked scallop meats.

^c Not available.

^d January 1-June 30.

^e Vessel operators released confidential data.

Table 11.-Alaska Peninsula Registration Area scallop fishery summary statistics, 1993/94 – 2004/05.

Season	Number vessels	GHR ceiling (lb meat)	Dredge hours	Catch (lb meat)	CPUE (lb meat per dredge hr)
1993/94	8	NA ^a	1,847	112,152	61
1994/95	7	NA ^a	1,664	65,282	39
1995/96		Closed			
1996/97	2	200,000	327	12,560	38
1997/98	4	200,000	1,752	51,616	29
1998/99	4	200,000	1,612	63,290	39
1999/2000	5	200,000	2,025	75,610	37
2000/01	3	33,000	320	7,660	24
2001/02		Closed			
2002/03		Closed			
2003/04 ^b		10,000		No Effort	
2004/05 ^b		10,000		No Effort	

^a Not applicable. A guideline harvest range (GHR) ceiling was not established.

^b The area between 160° W long. and 161° W long. was closed. The remainder of the registration area was open to fishing.

Table 12.-Historic commercial catch, effort and value of weathervane scallops, Bering Sea Registration Area, 1987-2004/05.

Year	Number Vessels	Number Landings ^a	Commercial Catch (lb) ^b	Average Landing (lb) ^b	Average Price/lb	First Wholesale Est. Value (dollars)	Number Tows
1987				Confidential			
1988				No Effort			
1989				No Effort			
1990				Confidential			
1991				Confidential			
1992				No Effort			
1993 ^c	6	22	321,539	14,615	5.22	1,678,434	3,711
1993/94	9	16	284,414	17,776	5.22	1,484,641	3,578
1994/95	8	29	505,439	17,429	6.00	3,032,634	6,619
1995/96				Closed			
1996/97	1 ^d	2	150,295	75,147	NA	NA	952
1997/98	2 ^d	5	97,002	19,400	7.05	683,864	1,276
1998/99	4	4	96,795	24,198	6.30	609,808	1,175
1999/2000	2 ^d	4	164,929	41,232	6.25	1,030,806	1,736
2000/01	3	4	205,520	51,380	5.50	1,130,360	1,608
2001/02	3	5	140,871	28,174	5.25	739,572	1,406
2002/03	2 ^d	5	92,240	18,448	5.20	479,648	1,012
2003/04	2 ^d	3	42,590	14,197	5.25	223,597	517
2004/05	2 ^d	2	10,050	5,025	5.25	52,762	145

^a Prior to 1995/96, reported number of landings is equal to number of fish tickets. After 1995/96, the reported number of landings is equal to the number of off-loads.

^b Pounds of shucked scallop meats.

^c January 1- June 30.

^d Vessel operators released confidential data.

Table 13.-Bering Sea Registration Area scallop fishery summary statistics, 1993/94–2004/05.

Season	Number vessels	GHR ceiling (lb meat)	Dredge hours	Catch (lb meat)	CPUE (lb meat per dredge hr)
1993/94	9	NA ^a	5,764	284,414	49
1994/95	8	NA ^a	11,113	505,439	45
1995/96		Closed			
1996/97	1	600,000	2,313	150,295	65
1997/98	2	600,000	2,246	97,002	43
1998/99	4	400,000	2,319	96,795	42
1999/2000	2	400,000	3,294	164,929	50
2000/01	3	200,000	3,355	205,520	61
2001/02	3	200,000	3,072	140,871	46
2002/03	2	105,000	2,038	92,240	45
2003/04	2	105,000	1,020	42,590	42
2004/05	1	50,000	275	10,050	37

^a Not applicable. A guideline harvest range (GHR) ceiling was not established.

Table 14.-Historic commercial catch, effort, and value of weathervane scallops, Dutch Harbor Registration Area, 1982-2004/05.

Year	Number Vessels	Number Landings ^a	Commercial Catch (lb) ^b	Average Landings (lb) ^b	Average Price/lb	First Wholesale Est. Value (dollars)	Number Tows
1982	5	8	62,105	7,763	3.11	193,147	^c
1983				No Effort			
1984				No Effort			
1985				Confidential			
1986	5	37	406,642	10,990	3.50	1,423,247	8,752
1987				Confidential			
1988				Confidential			
1989				Confidential			
1990				Confidential			
1991				Confidential			
1992				Confidential			
1993 ^d				Confidential			
1993/94	2	6	39,346	6,558	^c	^c	572
1994/95	3	3	1,931	644	^c	^c	52
1995/96	1 ^e	2	26,650	13,475	^c	^c	747
1996/97				No Effort			
1997/98	1 ^c	1	5,790	5,790	7.05	40,819	105
1998/99	4	5	46,432	9,286	6.30	295,522	479
1999/2000	1 ^e	1	6,465	6,465	6.25	40,500	167
2000/01				Closed			
2001/02				Closed			
2002/03	1 ^e	1	6,000	6,000	5.20	31,200	115
2003/04				Closed			
2004/05				Closed			

^a Prior to 1995/96, reported number of landings is equal to number of fish tickets. After 1995/96, the reported number of landings is equal to the number of off-loads.

^b Pounds of shucked scallop meats.

^c Not available.

^d January 1–June 30.

^e Vessel operator released confidential data.

Table 15.-Dutch Harbor Registration Area scallop fishery summary statistics, 1993/94–2004/05.

Season	Number vessels	GHR ceiling (lb meat)	Dredge hours	Catch (lb meat)	CPUE (lb meat per dredge hr)
1993/94	2	170,000	838	39,346	46
1994/95	3	170,000	81	1,931	24
1995/96	1	170,000	1,047	26,950	26
1996/97		170,000		No Effort	
1997/98	1	170,000	171	5,790	34
1998/99	4	110,000	1,025	46,432	45
1999/2000	1	110,000	273	6,465	24
2000/01		Closed			
2001/02		Closed			
2002/03	1	10,000	184	6,000	33
2003/04		Closed			
2004/05		Closed			

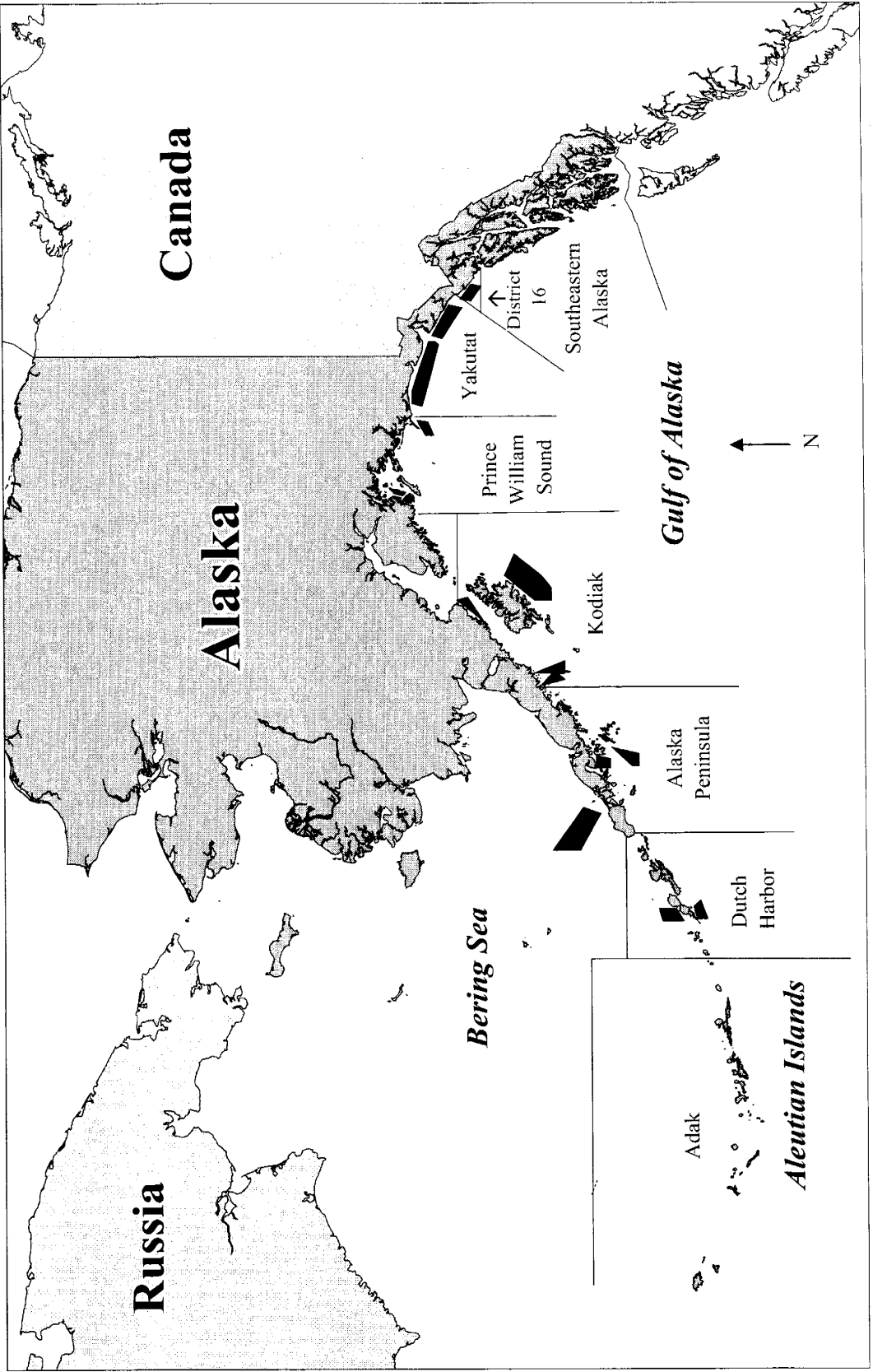


Figure 1.—Major weatherervane scallop fishing locations in coastal waters of Alaska.

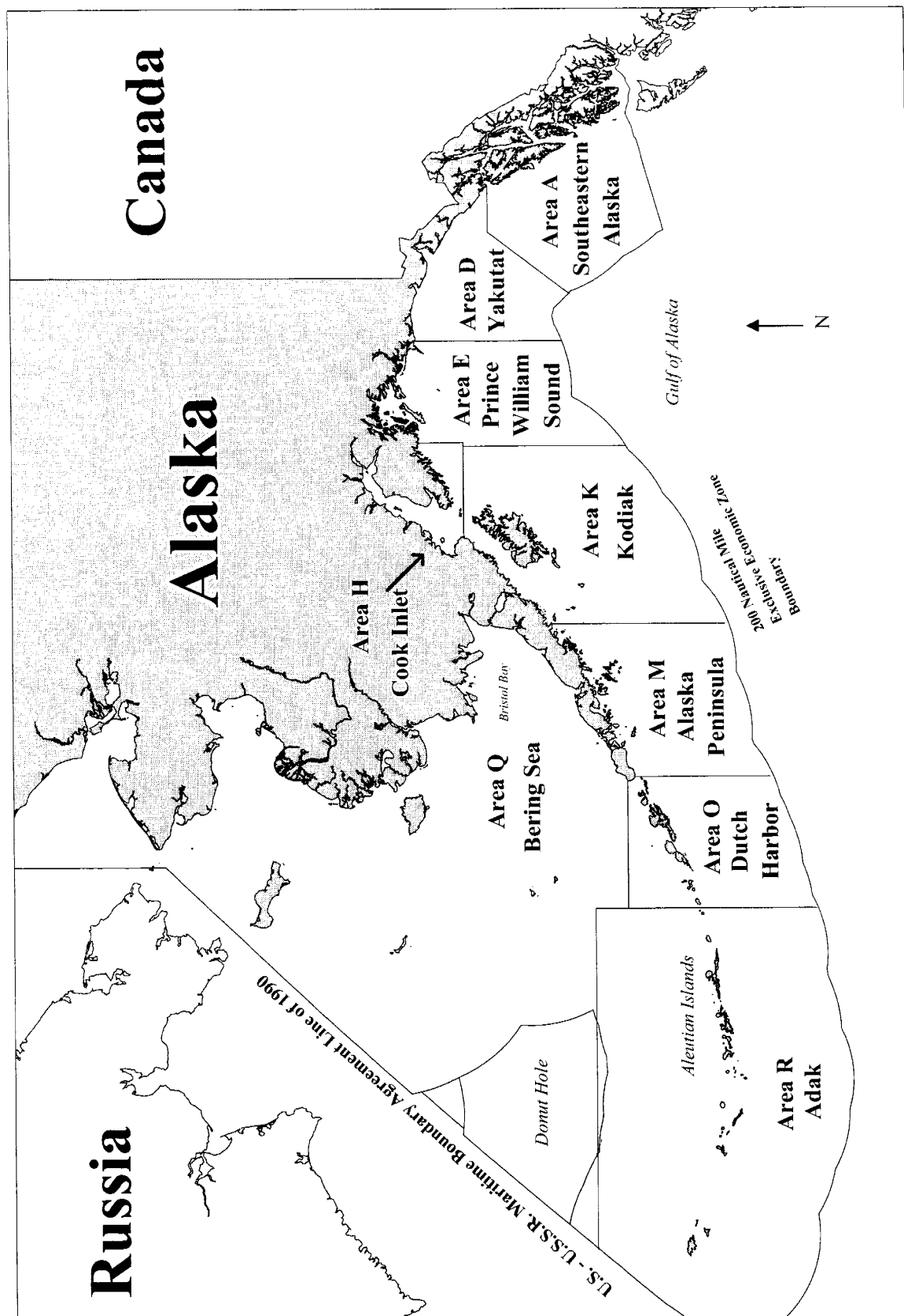


Figure 2.-State of Alaska weatherervane scallop fishing registration areas.

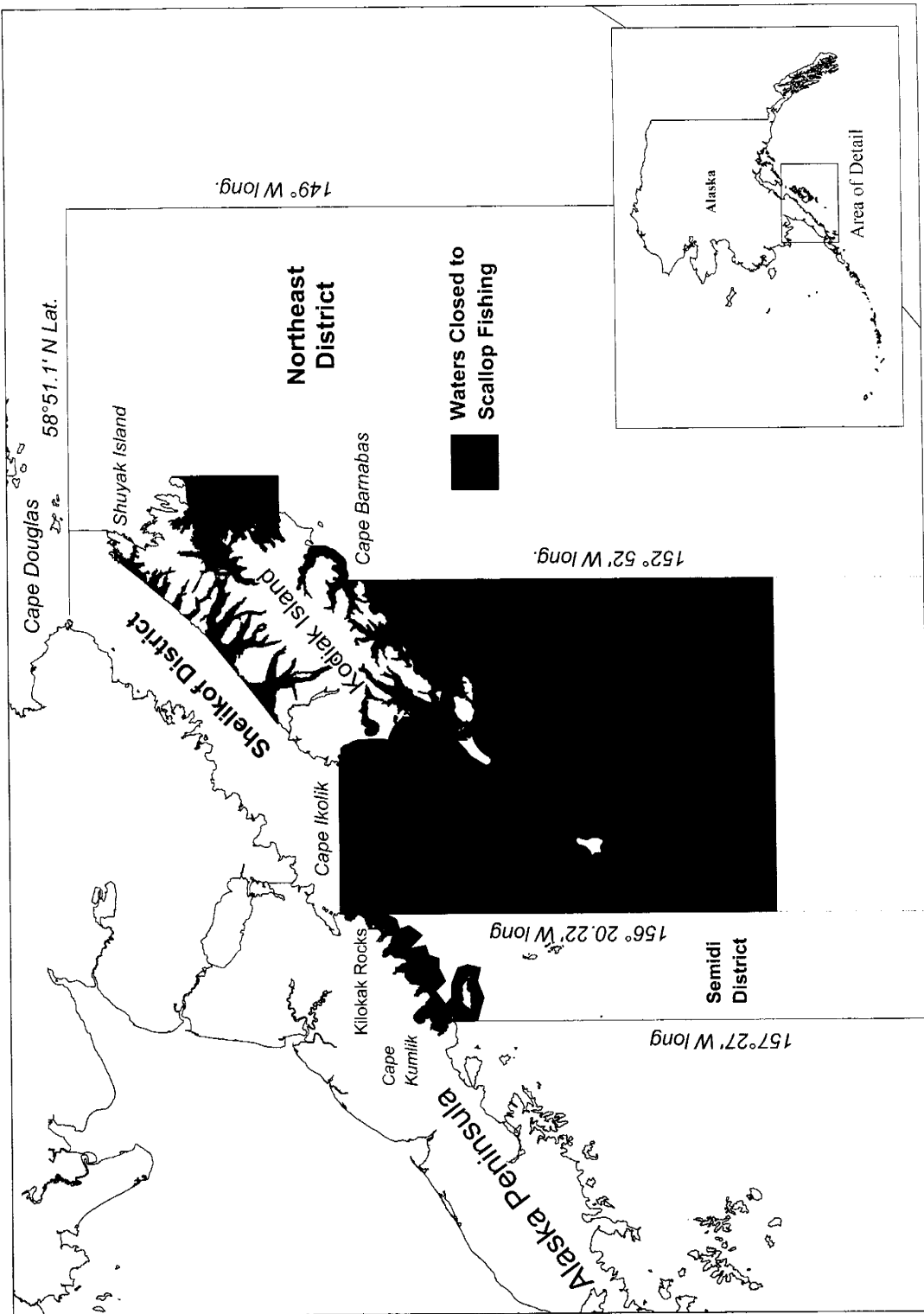


Figure 3.-Kodiak weathervane scallop fishing registration area and closed waters.

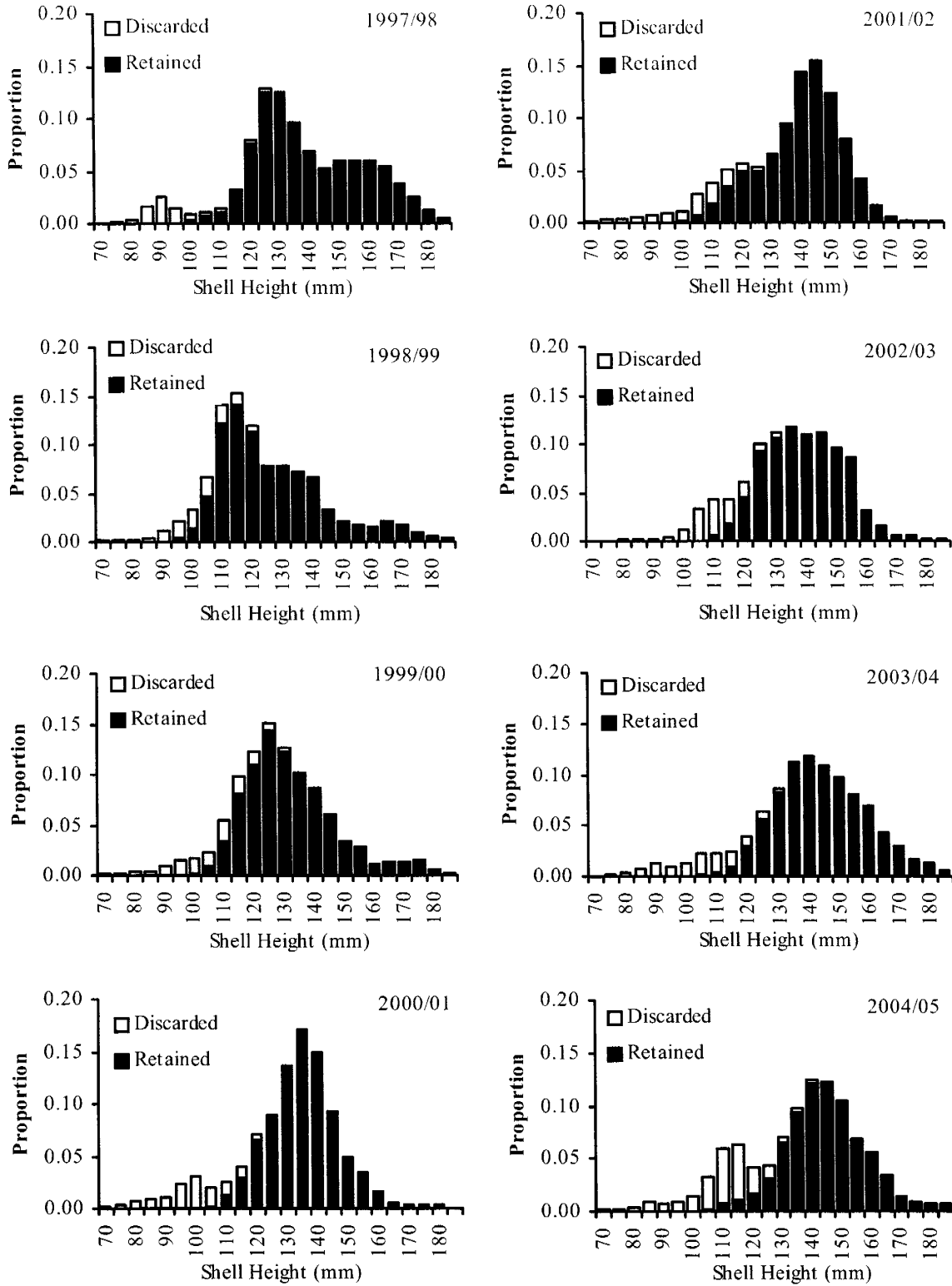
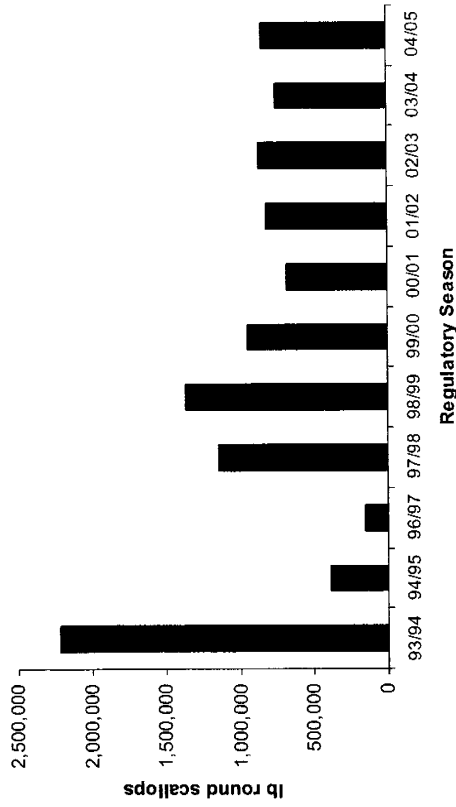
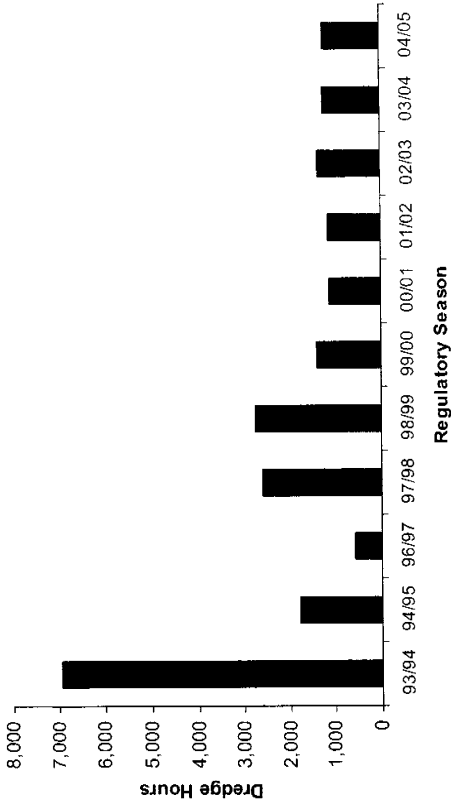


Figure 4.-Kodiak Northeast District scallop shell heights from resampling observer data, 1997/98-2004/05.

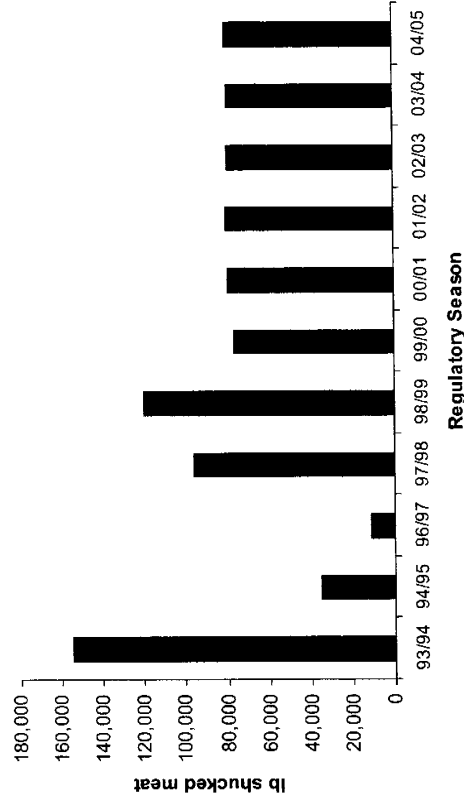
Round Weight of Retained Scallops



Total Dredge Hours



Shucked Meat Weight of Retained Scallops



CPUE (Pounds of Shucked Meat per Dredge Hour)

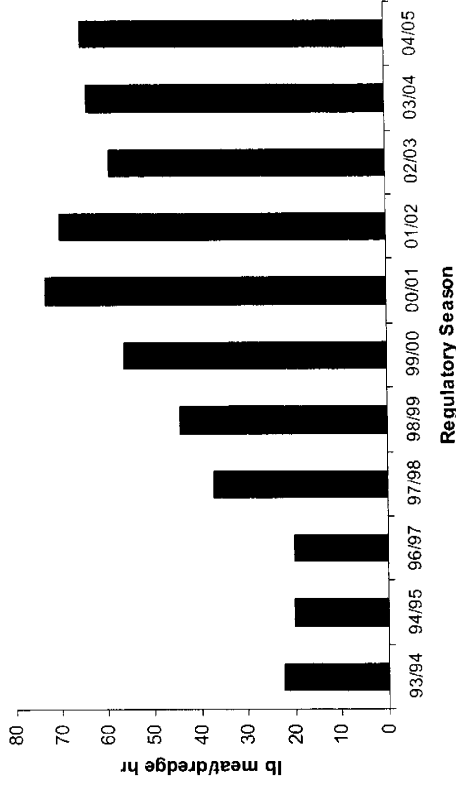


Figure 5.-Weathervanc scallop harvest by round weight, shucked meat weight, dredge hours, and CPUE, Northeast District, Kodiak Registration Area, 1993/94-2004/05.

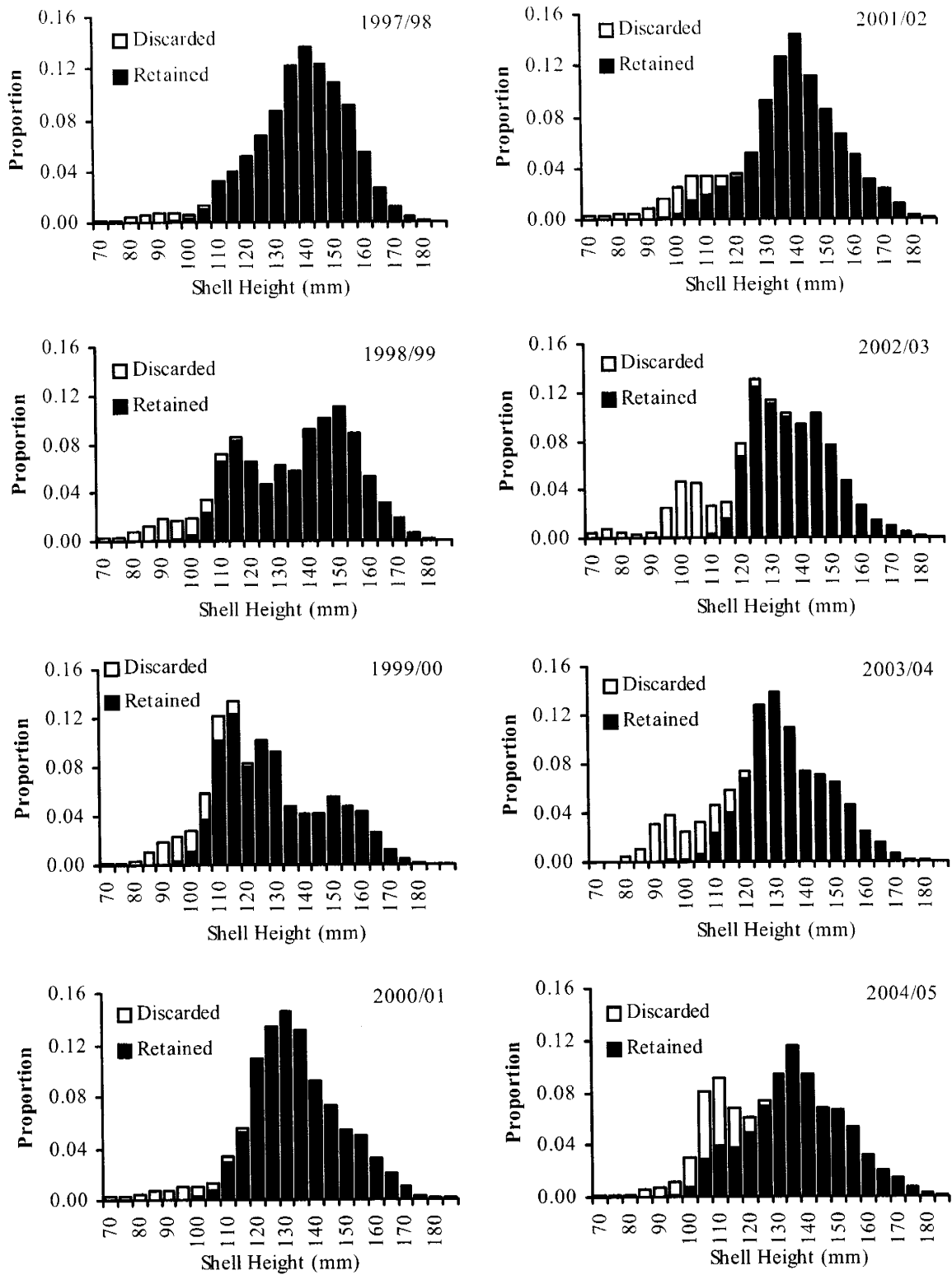


Figure 6-Kodiak Shelikof District scallop shell heights from resampling observer data, 1997/98-2004/05.

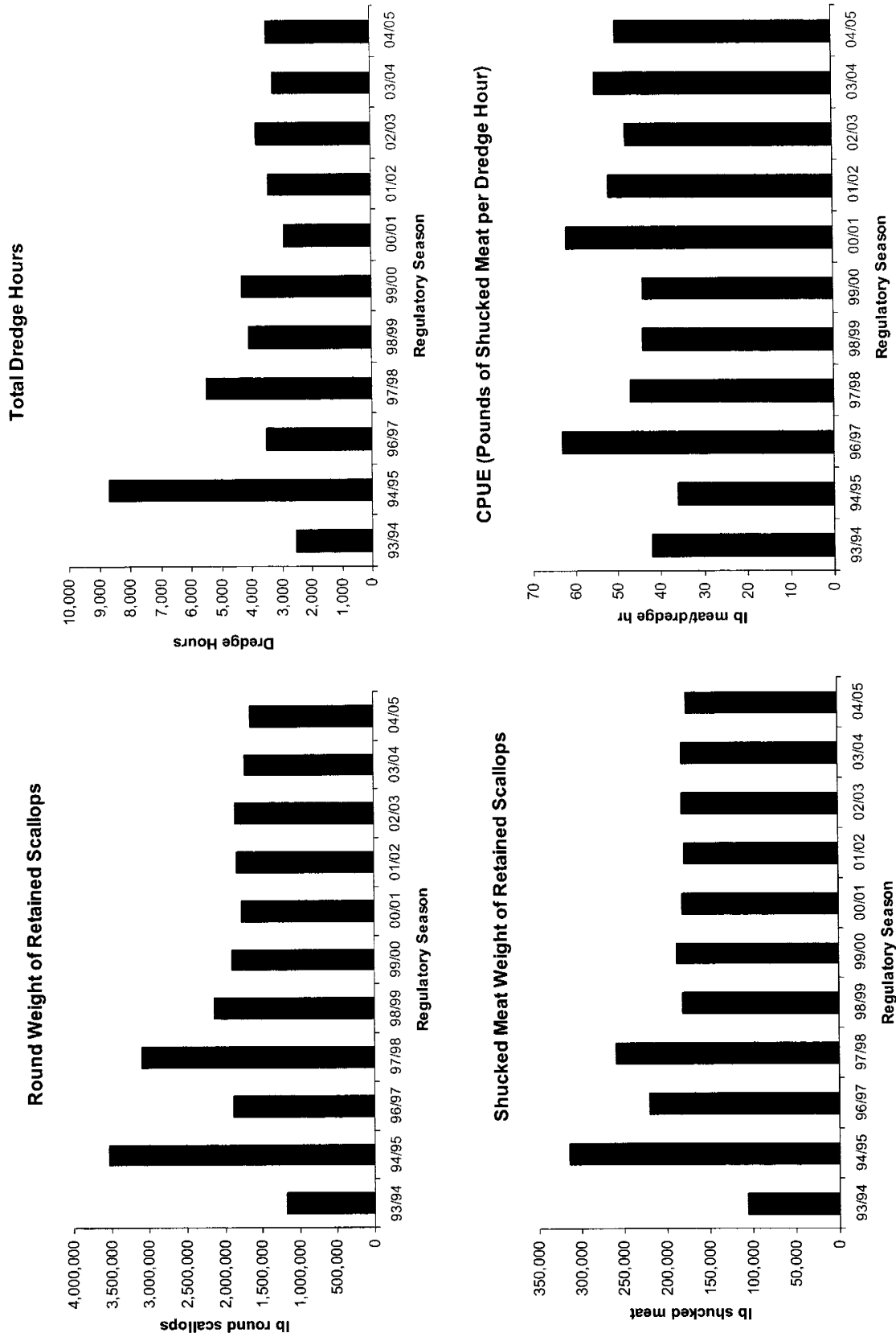


Figure 7.- Weathervane scallop harvest by round weight, shucked meat weight, dredge hours, and CPUE, Shelikof District, Kodiak Registration Area, 1993/94-2004/05.

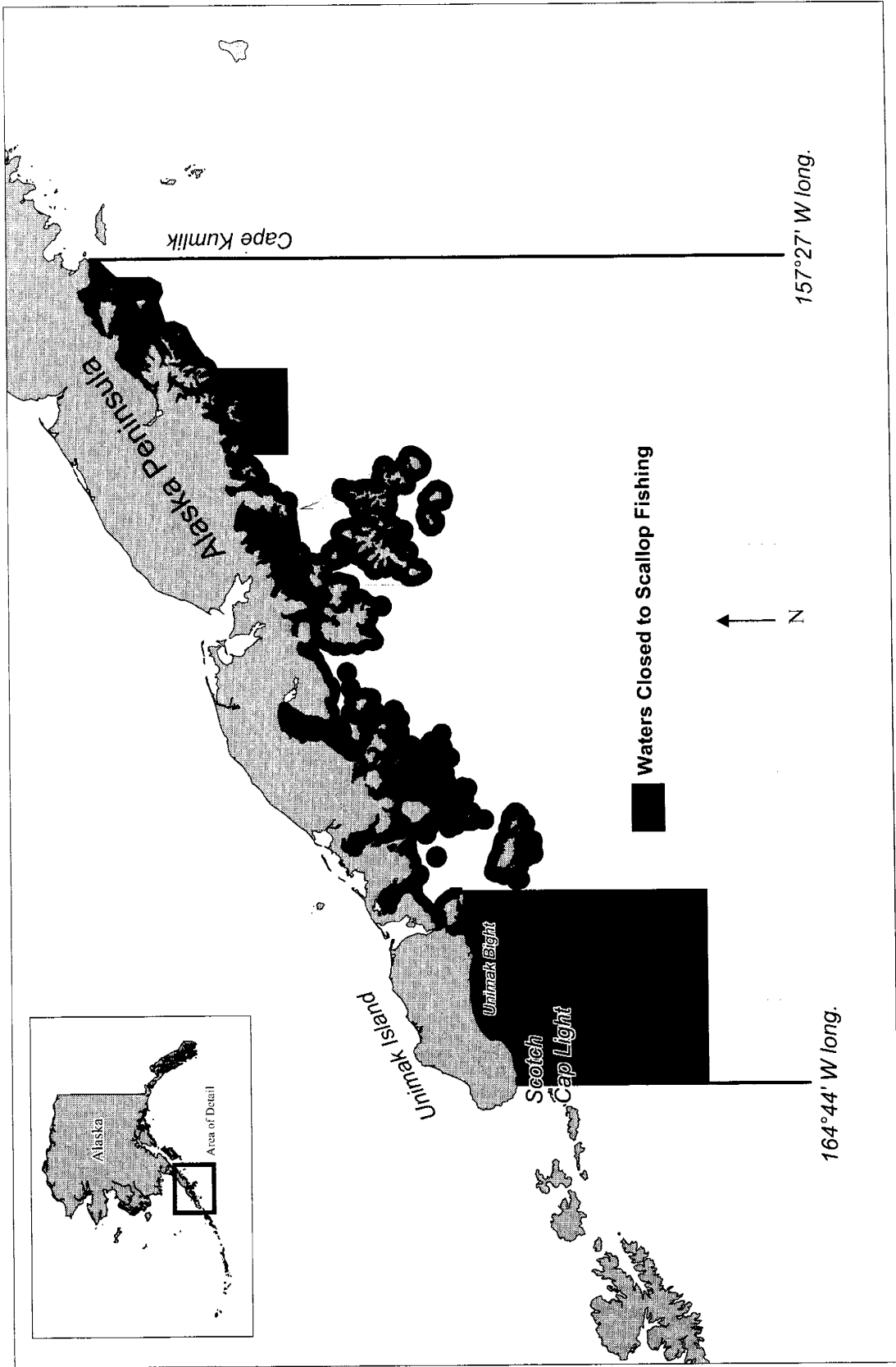


Figure 8.-Alaska Peninsula weathervane scallop fishing registration area and closed waters.

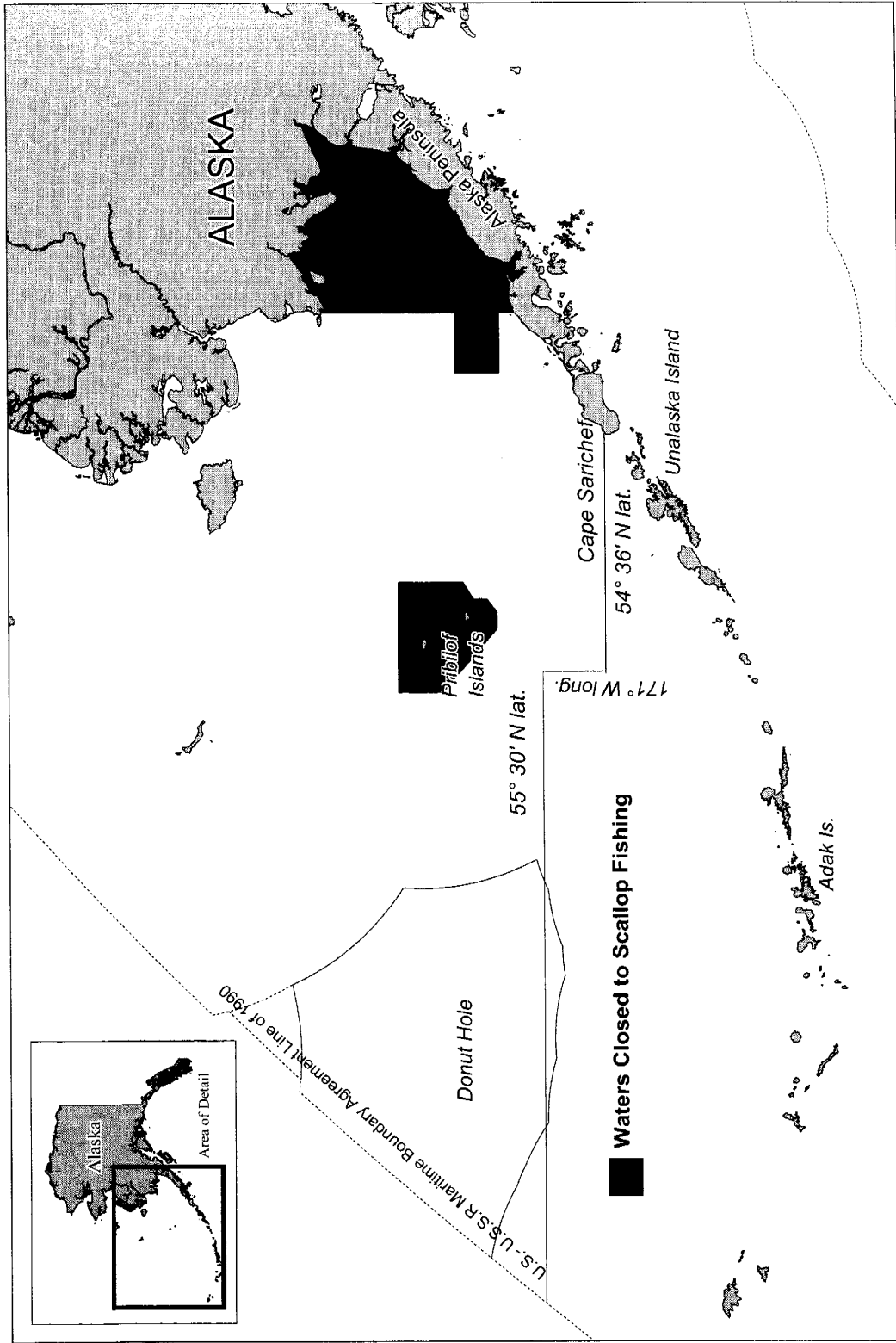


Figure 9.-Bering Sea weatherervane scallop fishing registration area and closed waters.

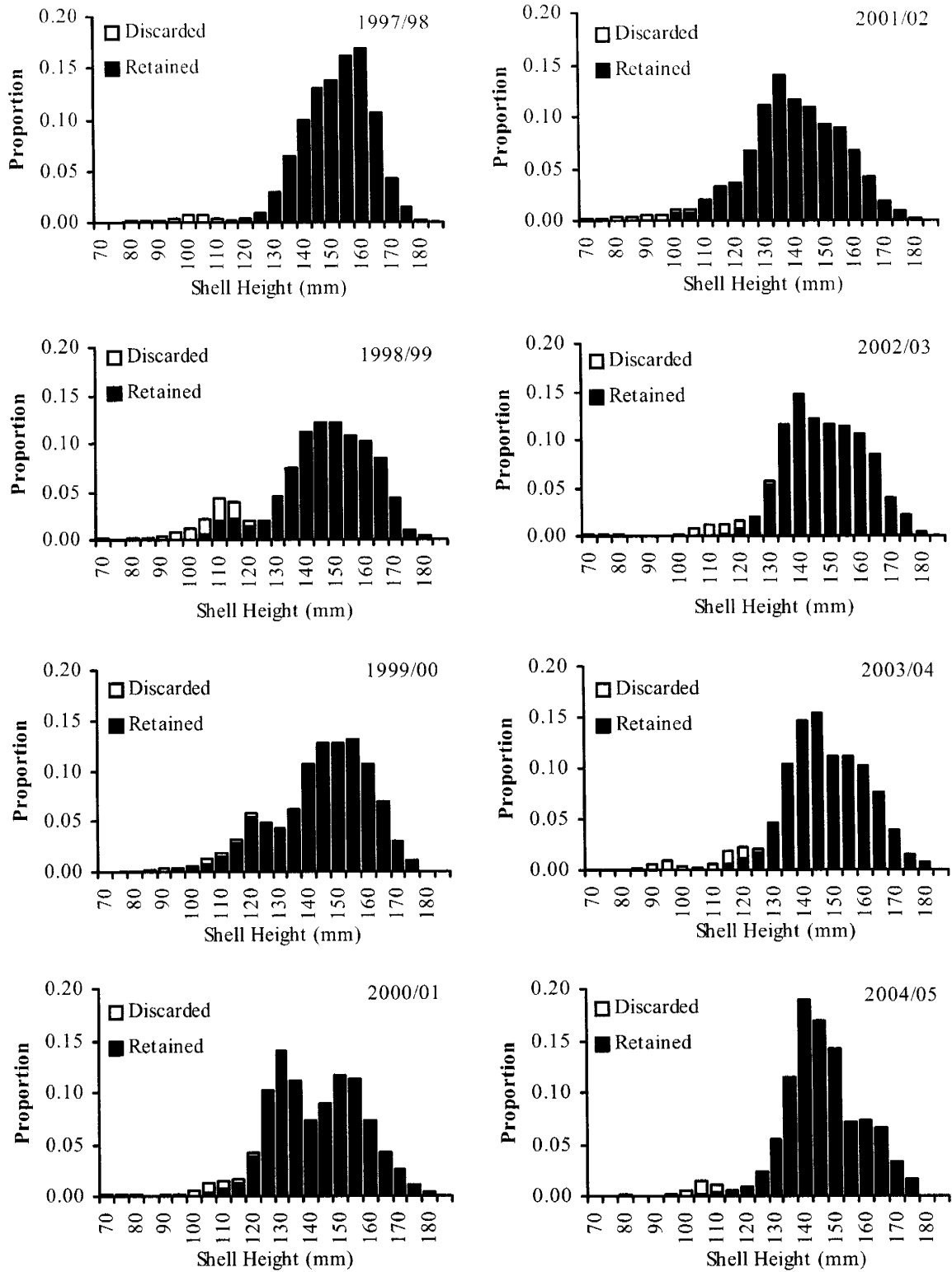


Figure 10.-Bering Sea Registration Area scallop shell heights from resampling observer data, 1997/98-2004/05.

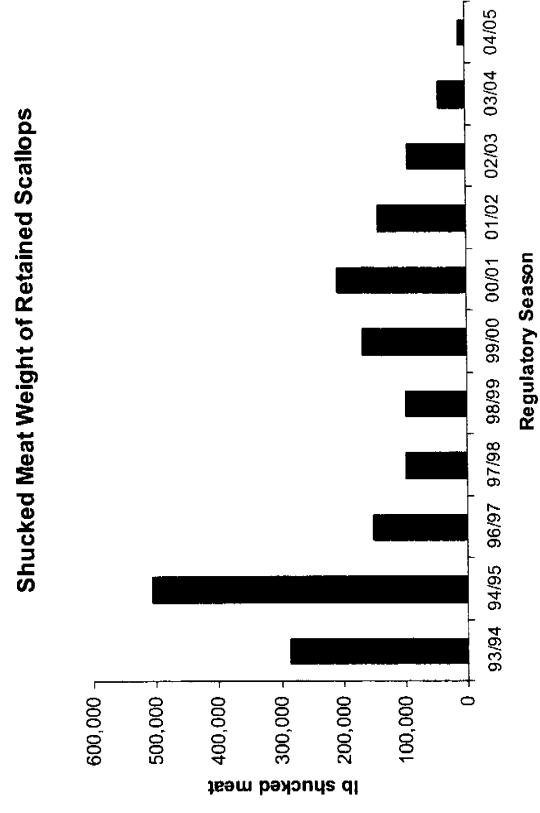
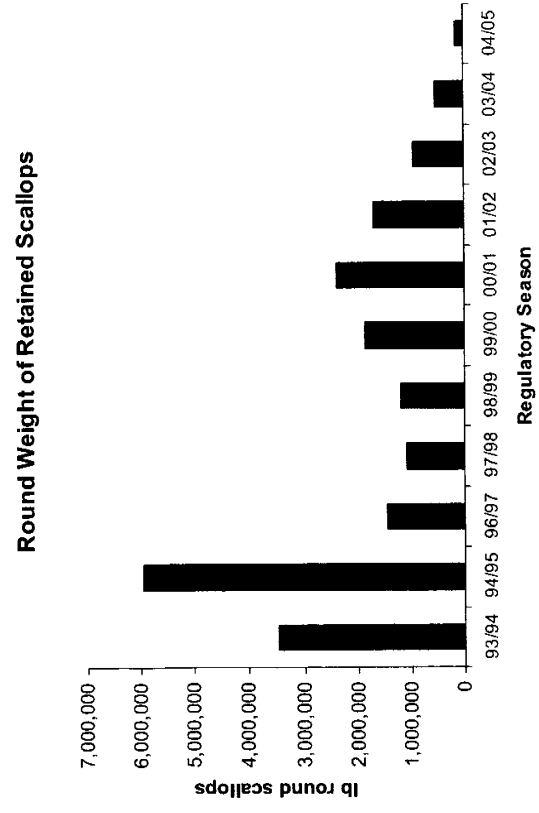
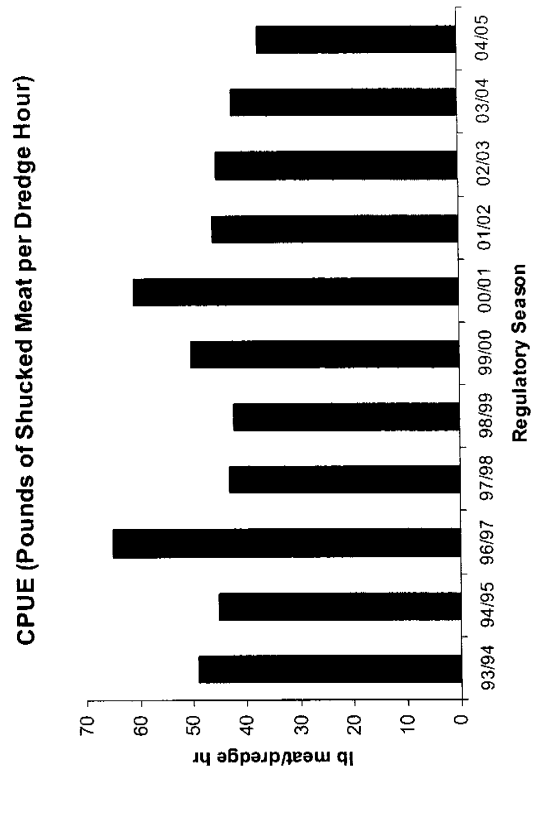
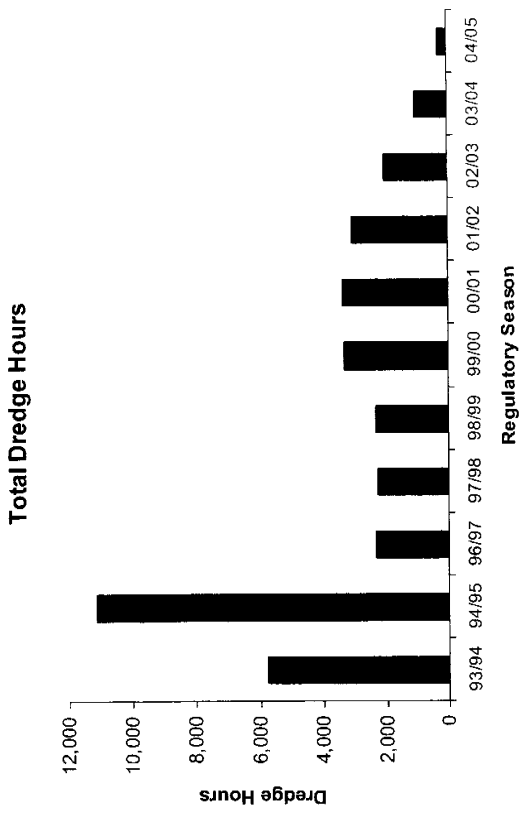


Figure 11.-Weathervane scallop harvest by round weight, shucked meat weight, dredge hours, and CPUE, Bering Sea Registration Area, 1993/94 - 2004/05.

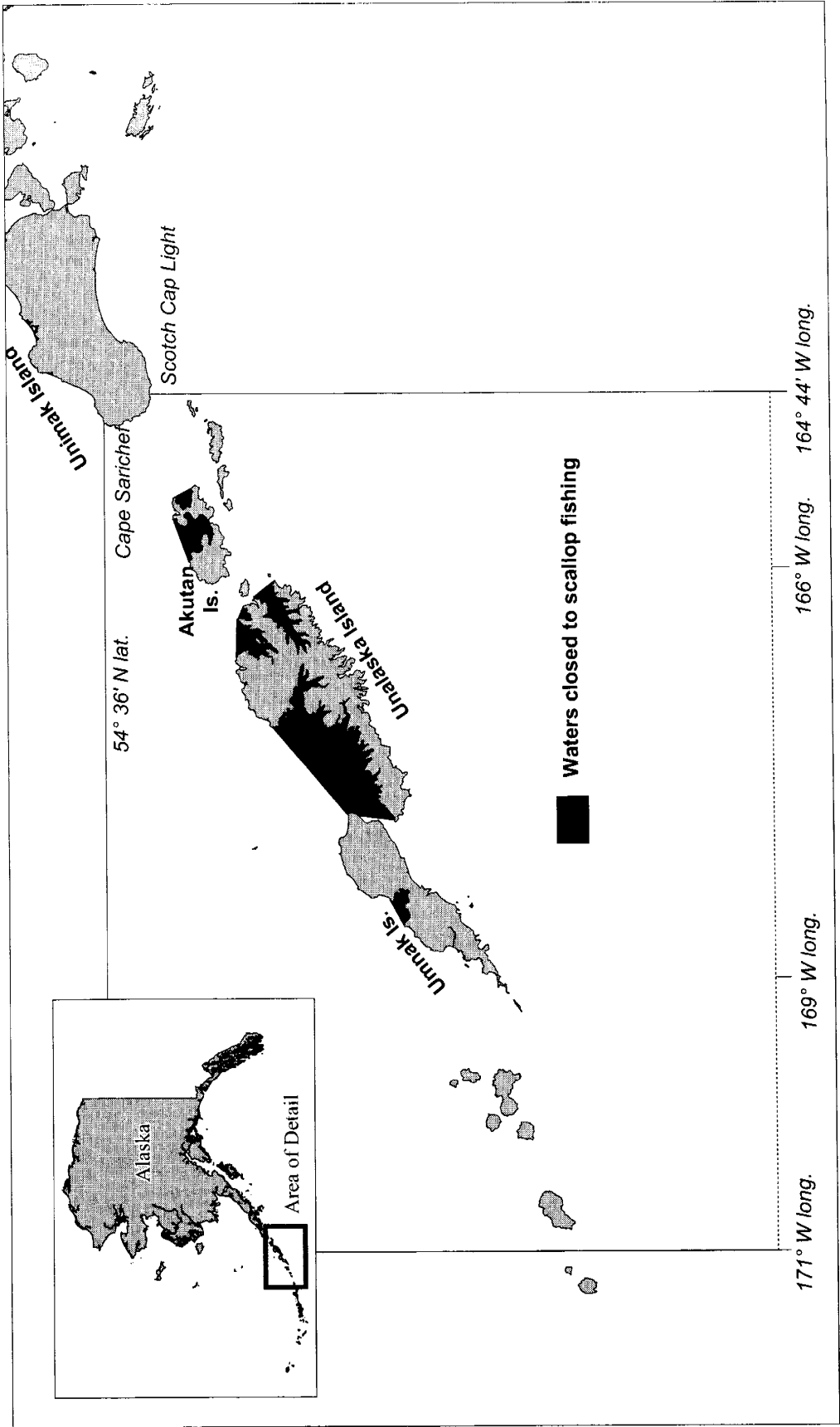


Figure 12.-Dutch Harbor weathervane scallop fishing registration area and closed waters.

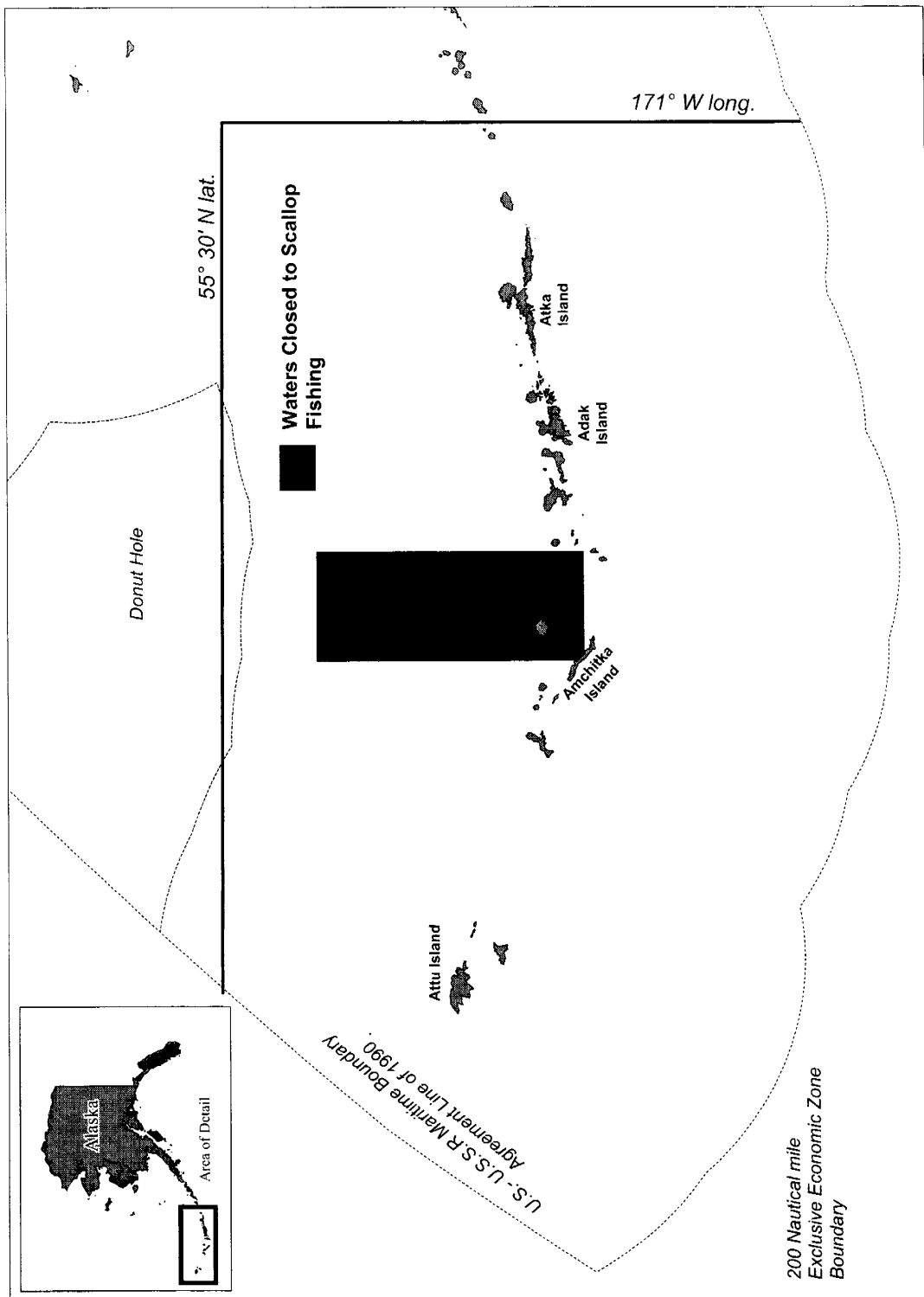


Figure 13.-Adak weathervane scallop fishing registration area and closed waters.