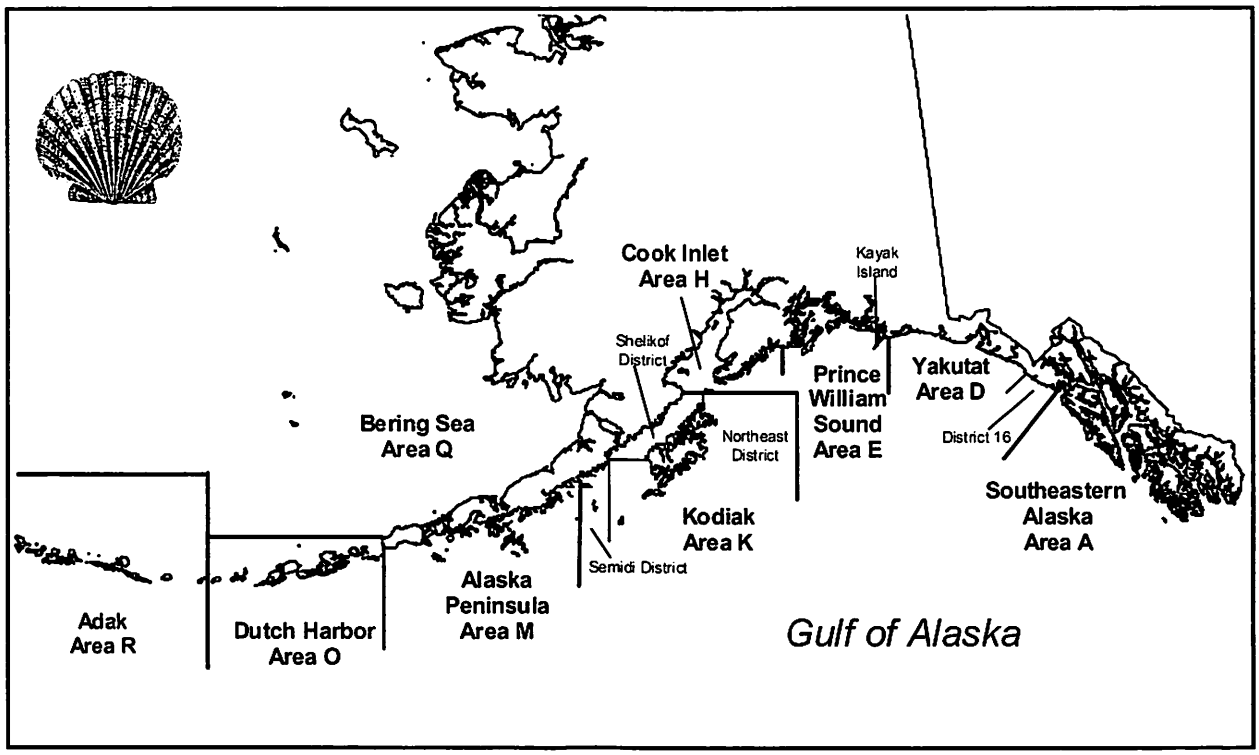
STOCK ASSESSMENT AND FISHERY EVALUATION REPORT

FOR THE WEATHERVANE SCALLOP

FISHERY OFF ALASKA



Compiled by

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

1.0 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 March 3, 2005 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 Jeff Barnhart (chair), Gregg Rosenkranz, Diana Stram, Gretchen Harrington, Scott Miller, 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 2003/2004 fishing year. New information which is included in this report since the previous report (NPFMC 2003) includes the following:

1) Updated catch and effort data through 2003/2004 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) Total catch statewide compared with MSY;
5) Additional descriptive information on the observer program and observer training manual;
6) List of Crab Bycatch Limits (CBLs) by area;
7) Revenue statistics for the fishery from 1967-2003;

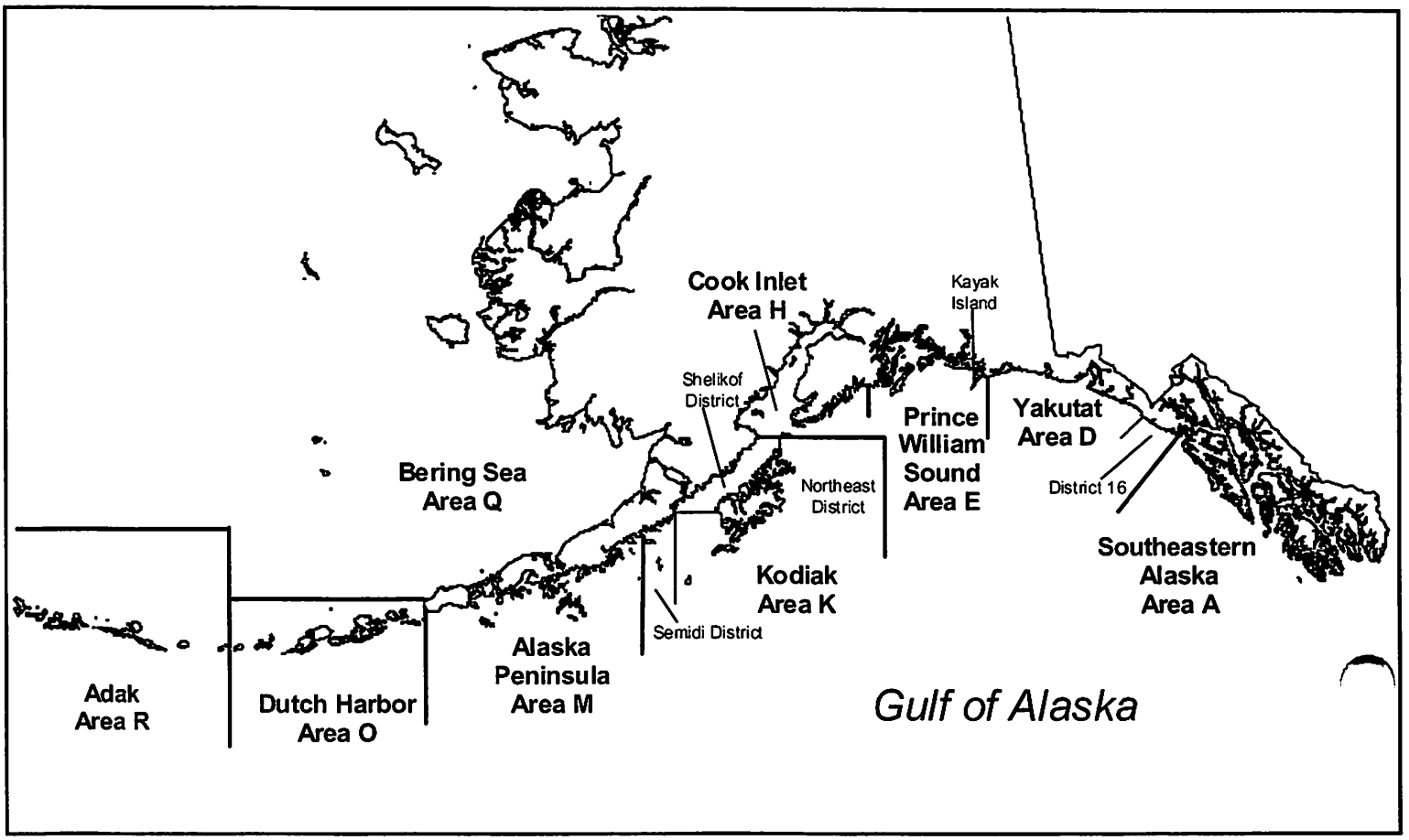

Figure 1. Alaska weathervane scallop fishing registration areas.

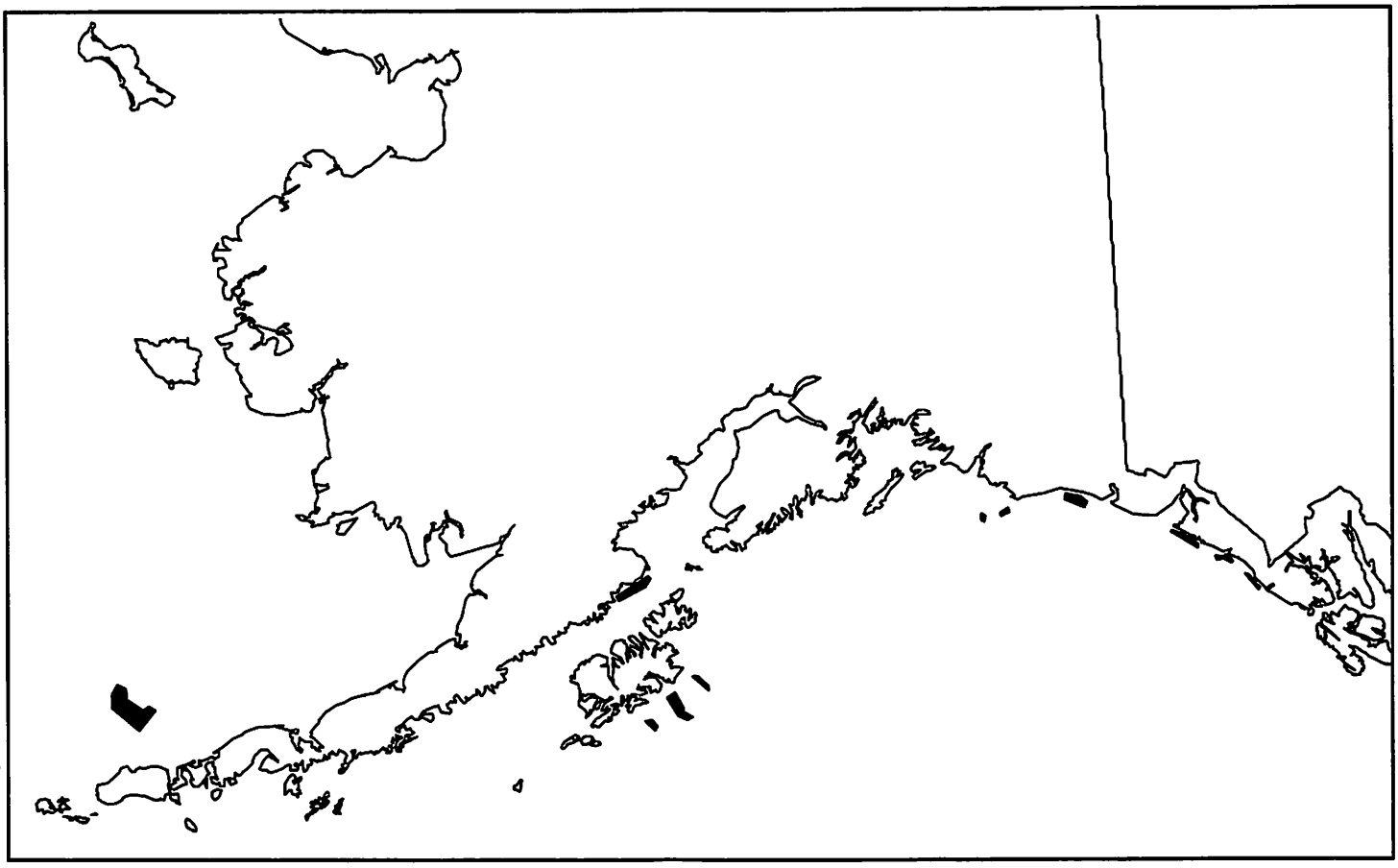

Figure 2. Scallop fishing locations (dark polygons) outside Cook Inlet during the 2003/04 season.

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 home-ported in Norfolk, Virginia 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. 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 during the qualifying period are limited to fishing a single 6-foot dredge, which was the existing gear restriction in Cook Inlet during the qualifying period. This gear restriction has recently been reevaluated by the Council (see section 7.2).

2.0 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 approximately 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 to a single dredge not more than 6 feet in width. Unless otherwise restricted by the LLP (see section 7.2), 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).

The State of Alaska Fishery Management Plan For Commercial Scallop Fisheries in Alaska, requires 100% onboard observer coverage. The primary purposes of the onboard observer program are to collect biological and fishery-based data, monitor bycatch, and provide for regulatory enforcement (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, due to expire July 1, 2004. During the 2002 legislative session, passage of HB206 resulted in changes to the state's limited entry statutes. These changes authorized use of a vessel-based limited entry program in the weathervane scallop fishery. However, vessel entry permits issued for the statewide weathervane scallop fishery will expire on December 31, 2008 unless statutory authority is extended. Prior to the July 1, 2004 expiration of the state vessel moratorium, a vessel permit limited entry system for the statewide weathervane scallop fishery was in place. Eight vessel owners received permits to fish for weathervane scallops in state waters.

Three vessels with LLP permits, including one limited by American Fisheries Act (AFA) sideboards, participate in the federal water portion of the fishery and harvest the majority of the scallop quota in the statewide fishery outside Cook Inlet. Three smaller vessels with LLP permits participate in the Cook Inlet fishery. Occasionally, one of the smaller vessels participates in the scallop fishery outside of Cook Inlet.

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.

Many areas along the Alaska coast are closed to scallop dredging (Figure 3). 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.

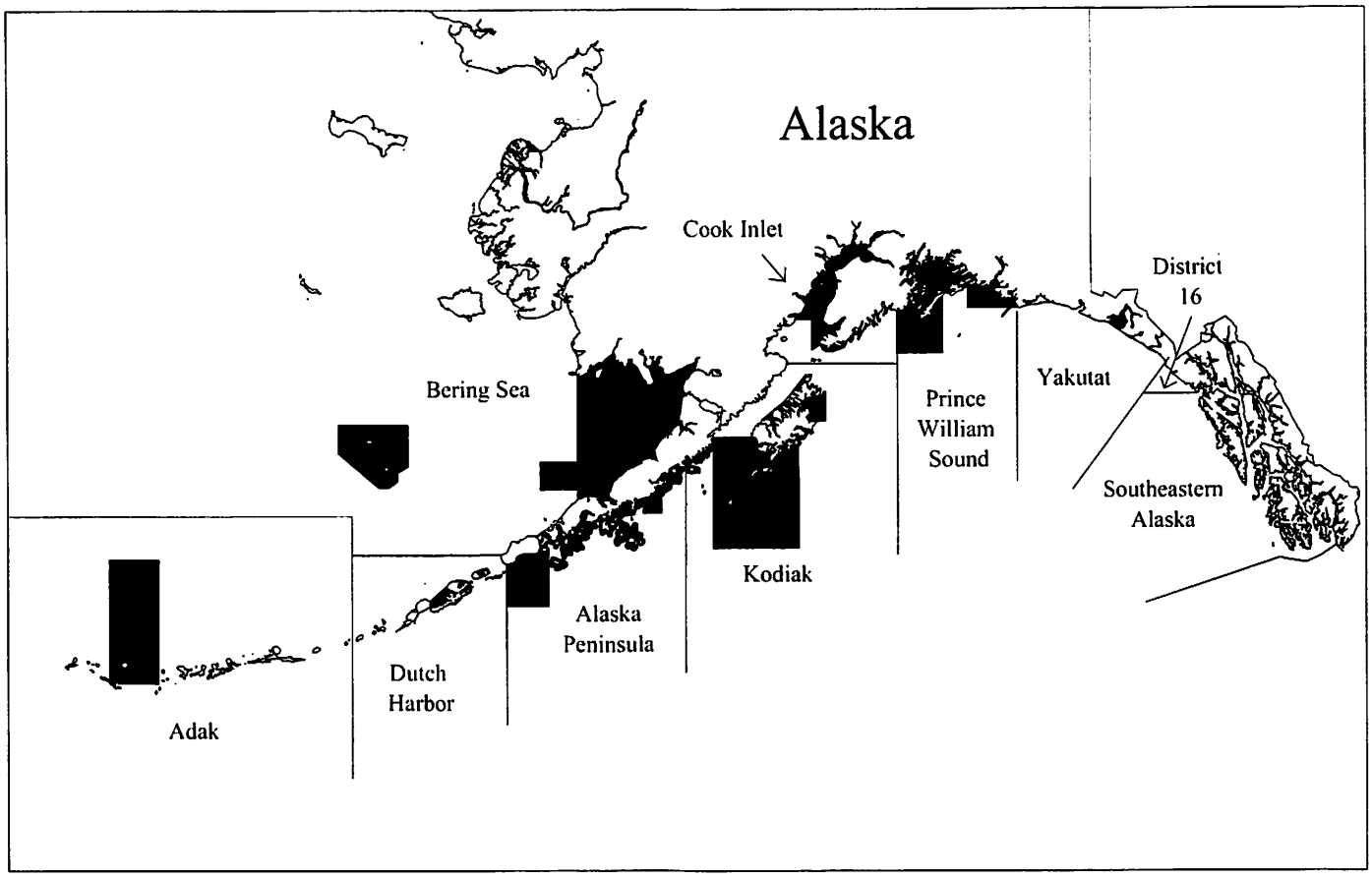

Figure 3. Alaska coastal areas closed to scallop fishing (shaded areas).

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 in-season 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. Regulatory decisions, in the absence of observer-collected data, may have had different outcomes. 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. 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. 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. The updated Observer Training Manual is attached as appendix A. 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 has the potential to provide these two vessels with an opportunity 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 preseason 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

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

[a]Fixed CBL

[b]Bycatch limit set to allow scallop fleet adequate opportunity to explore and harvest scallop stocks while protecting the crab resource.

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.

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 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 one area has closed due to crab bycatch.

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) utilizing two 15-foot dredges. Additionally, NMFS granted two vessels owners licenses to fish statewide utilizing a single 6-foot dredge. Following implementation by NMFS of Council action on Amendment 10 to the FMP, these two vessel owners licenses may be utilized for up to two 10-foot dredges statewide. Implementation if this amendment is anticipated in 2005 (see section 7.2). 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.

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 catch data inseason 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

3.0 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). 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 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 are 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 scallop observer program. These data consist of scallop catch and fishing effort, including total harvest, catch per unit effort (CPUE), fishing locations, size structure of the catch, and crab bycatch. Spatially explicit observer data that cannot be displayed in the SAFE report due to confidentiality requirements is examined in detail each year when GHRs are set. The observer program also provides management personnel with inseason summary reports. Areas may be closed 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 that are scheduled to begin 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 110,00 pounds, and in the Bering Sea from 600,000 to 400,000 pounds.

3.1 Yakutat Registration Area

GHRs for the 2003/04 season were set at 0–200,000 lbs of shucked meats for Yakutat Area D and 0–35,000 lbs for Yakutat District 16 (Tables 2–3, Figures 4 and 6). Two catcher-processors participated in the fishery and harvested 160,918 lbs from Area D and 1,072 lbs from District 16. Area D CPUE has remained stable at around 45 lbs meat/dredge hr over the past 4 seasons (Figure 4), while effort has been nearly negligible in District 16 during the past 2 seasons (Figure 6).

Several factors have contributed to reduced effort in the area. Formation of a vessel cooperative in 2000 reduced fishing capacity and led to slower harvest rates and longer seasons. At the same time, high scallop abundance off the east coast of Canada and the U.S. has held market prices down for smaller sizes of Alaskan scallops. Yakutat scallops have the slowest growth rate in the state (Jeff Barnhart, ADF&G, unpublished data) and tend to be the smallest that are commercially harvested. Fishing for larger scallops that are more commonly found in the vicinity of Kodiak Island and in the Bering Sea has become relatively more profitable and led to reduced effort in the Yakutat Area.

Yakutat Area D shell height (SH) distributions (Figures 5) indicate a relatively stable scallop population with periodic modest recruitment. In District 16 (Figure 7), strong recruitment observed during 1996-1998 has not recurred since. Insufficient data were available to create District 16 SH distribution plots for the most recent 2 seasons.

Table 2. Yakutat Area D scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours[a]	Catch[a] (lbs	CPUE (lbs per dredge
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

[a]Confidential data released by vessel operators.
[b]One additional vessel fished by waiver without an observer; data not included.
[c]Two additional vessels fished by waiver without observers; data not included.

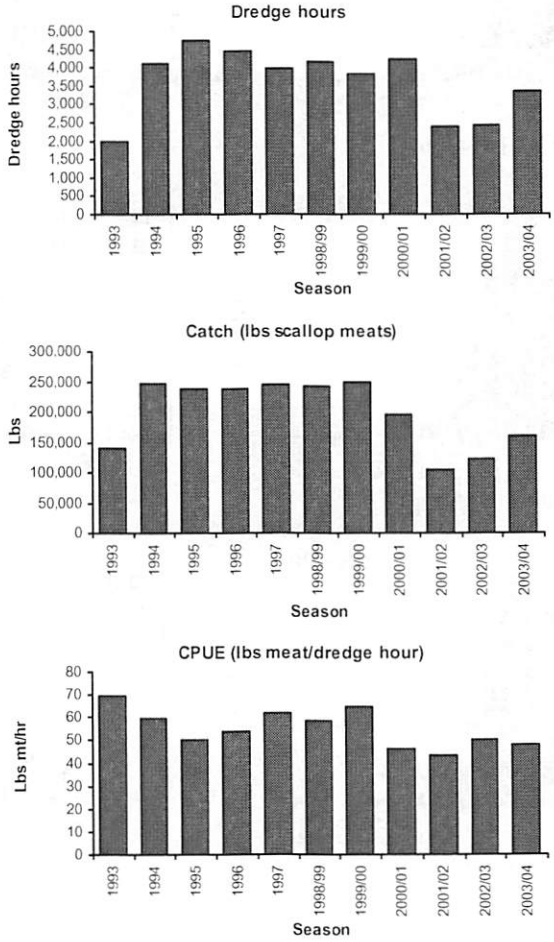

Figure 4. Barplots of Yakutat Area D scallop fishery statistics.

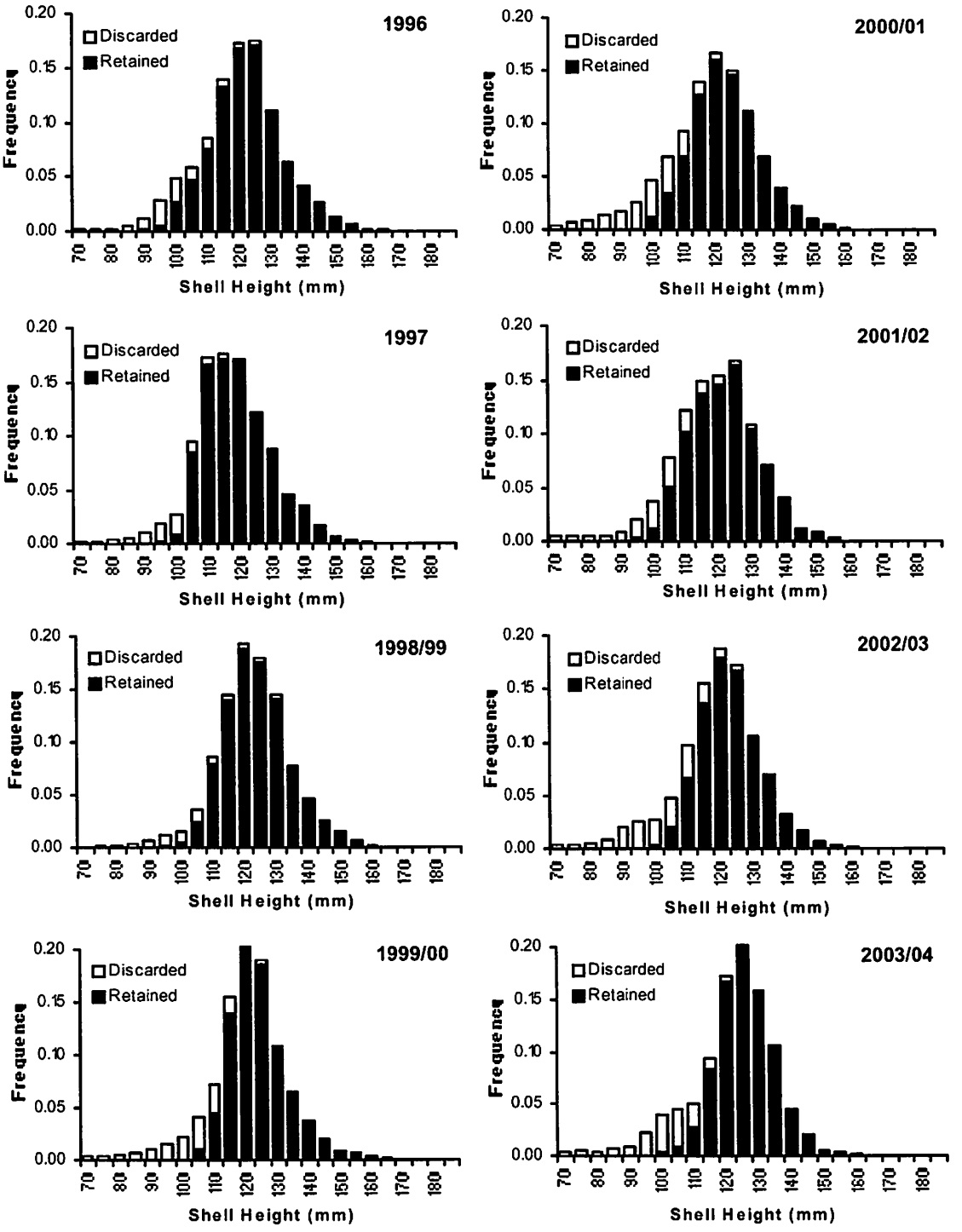

Figure 5. Shell height histograms from resampling Yakutat Area D observer data, 1996–2003/04 seasons.

Table 3. Yakutat District 16 scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours[a]	Catch[a] (lbs	CPUE (lbs per dredge
1993	1	35,000		confidenti	
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

[a]Confidential data released by vessel operators.

[b]One additional vessel fished by waiver without an observer; data not included.

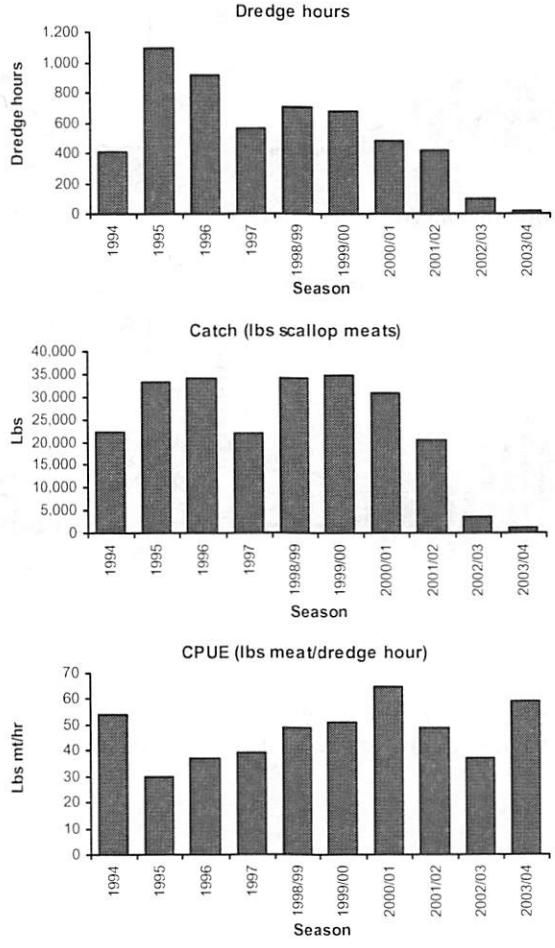

Figure 6. Barplots of Yakutat District 16 scallop fishery statistics.

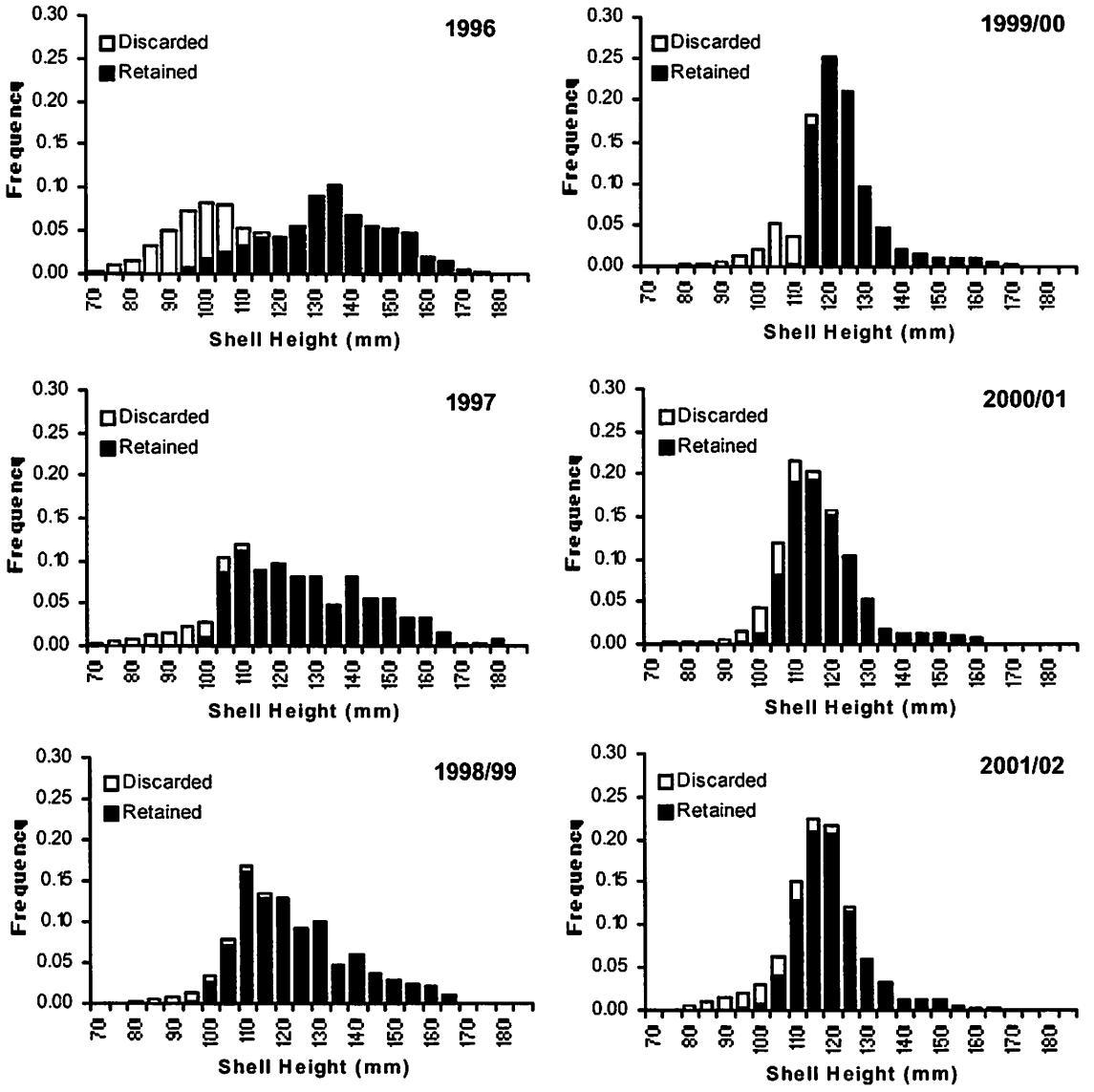

Figure 7. Shell height histograms from resampling Yakutat District 16 observer data, 1996–2001/02 seasons. Insufficient data were collected to produce plots for the 2002/03 and 2003/04 seasons.

3.2 Prince William Sound Registration Area

Scallop dredge surveys have been conducted biennially in Area E near Kayak Island (Figures 1 and 2) since 1996. Survey catches have varied considerably (Table 4), and some concerns have been raised about dredge efficiency and performance (William Bechtol, ADF&G, personal communication). The May 2004 survey produced a meat weight biomass estimate of over 750,000 lbs (Table 4), and small scallops that should recruit to the exploitable population during the next 2 years were detected (William Bechtol, ADF&G, unpublished data). The latest 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. GHRs are established by ADF&G Central Region staff based on conservative harvest rates and analysis of trends in recruitment and abundance.

Approximately 20,000 lbs of scallop meats were harvested from Area E during the 2003/04 season (Table 5). One catcher processor participated in the fishery and worked traditional grounds located on the east and southwest sides of Kayak Island (Figures 1 and 2). Seasonal CPUE (Table 5; Figure 8) remains the highest in the state, averaging over 100 lbs meat/dredge hr since 1997.

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. Catch but no effort data are available for the illegal fishing incident.

Plots of Prince William Sound SH distributions (Figure 9) show that small scallops began to appear in catches during the 2003/04 season.

Table 4. Summary statistics from Area E scallop dredge surveys.

Survey year	Number stations	Area surveyed (km^2)	Meat recovery (%)	Mean (lbs meat per km^2)	Estimated biomass (lbs meat)
1996	41	281.25	7.9	612	172,021
1998	34	233.23	7.6	1,386	323,359
2000	41	281.25	7.4	2,719	764,763
2002	22	150.92	7.2	1,348	203,396
2004	41	281.25	6.6	2,752	774,144

Table 5. Prince William Sound Area E scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours[a]	Catch[a] (lbs	CPUE (lbs per dredge
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

[a]Confidential data released by vessel operators.
[b]Poundage includes illegal fishing by one vessel; effort data not available.

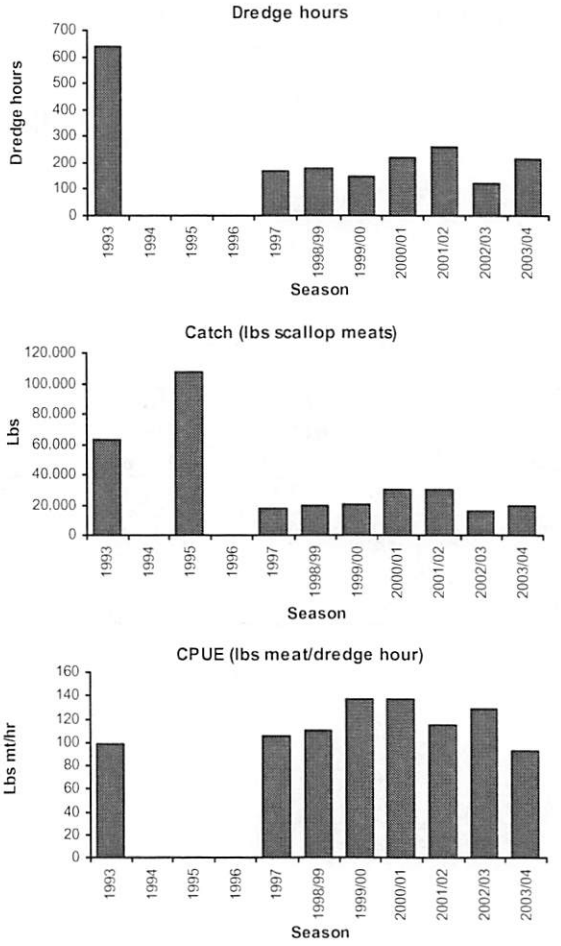

Figure. 8. Barplots of Area E scallop fishery statistics.

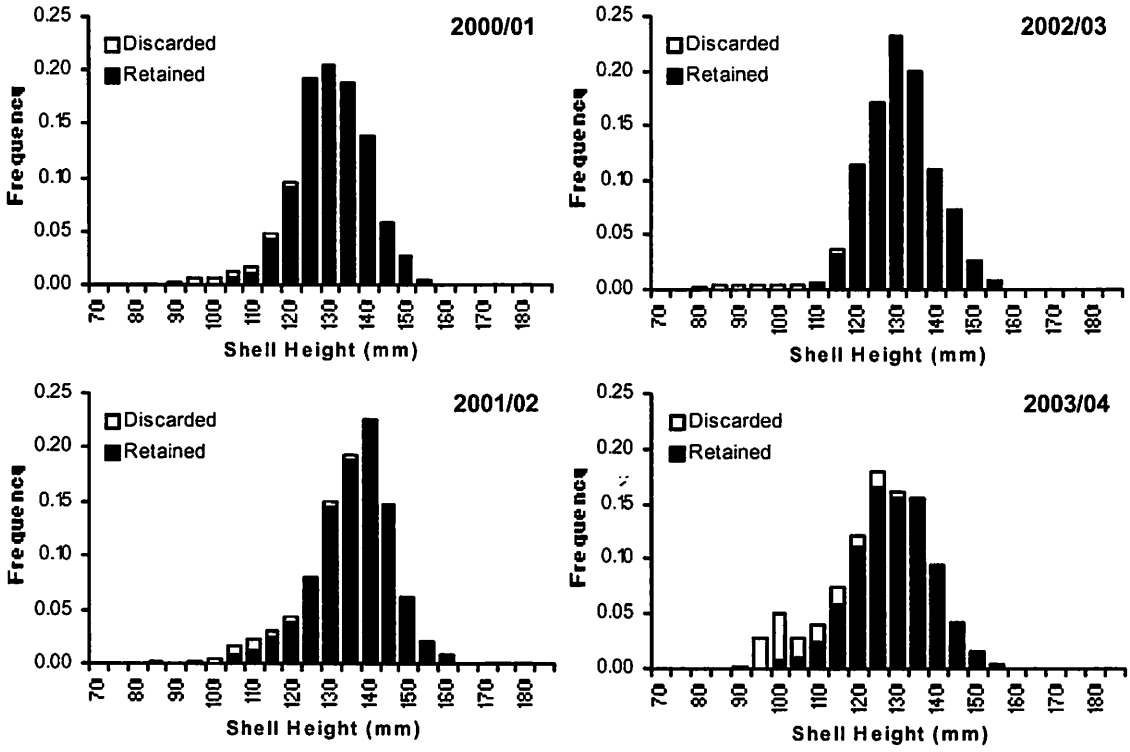

Figure. 9. Shell height histograms from resampling Area E observer data, 2000/01–2003/04. Insufficient data were collected to produce plots for earlier seasons.

3.3 Cook Inlet Registration Area, Kamishak District

The Cook Inlet scallop fishery is prosecuted in Kamishak Bay by vessels that are limited to one 6-foot dredge and are not required to carry onboard observers. Other areas of Cook Inlet were explored briefly but are not currently fished (Trowbridge and Bechtol 2003). Much of Cook Inlet is now closed to scallop dredging (Figure 3).

ADF&G conducted the first dredge survey of the Kamishak Bay scallop population in 1984, and regular biennial surveys began in 1996. Biomass estimates from these surveys (Table 6) have been relatively stable, ranging between 438,000 lbs and 612,000 lbs since 1996. Meat recovery percentages have declined over the same time period, and additional meat recovery experiments are planned in conjunction with a 2005 survey to be conducted in Kamishak Bay. Information on survey methodology as well as catch rates and size and age structure of the stock from earlier surveys are available in previously published reports (e.g., Bechtol and Gustafson 2002).

State regulations specify a maximum harvest of 20,000 lbs of scallop meats for the Kamishak Bay fishery (Table 7). During the 2003/04 season, 2 vessels participated in the fishery and harvest data are confidential (Table 7). Participation and CPUE in this small fishery vary widely (Table 7; Figure10).

Table 6. Summary statistics from Area H scallop dredge surveys.

Survey year	Number stations	Area surveyed (km^2)	Meat recovery (%)	Mean (lbs meat per km^2)	Estimated biomass (lbs meat)
1984	47	192.07	10.1	1,090	209,305
1996	26	178.36	8.5	2,621	467,500
1998	14	198.93	7.1	2,202	438,154
1999	28	198.93	6.6	3,075	611,650
2001	25	178.36	6.4	2,863	510,701
2003	20	288.11	6.8	1,915	551,670

Table 7. Cook Inlet, Kamishak District scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours	Catch[a] (lbs	CPUE (lbs per dredge
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	confidenti	
1999	3	20,000	333	20,315	61
2000	3	20,000	276	20,516	74
2001	2	20,000	406	confidenti	
2002	3	20,000	311	8,591	28
2003	2	20,000		confidenti	

[a] Includes estimated dead loss.

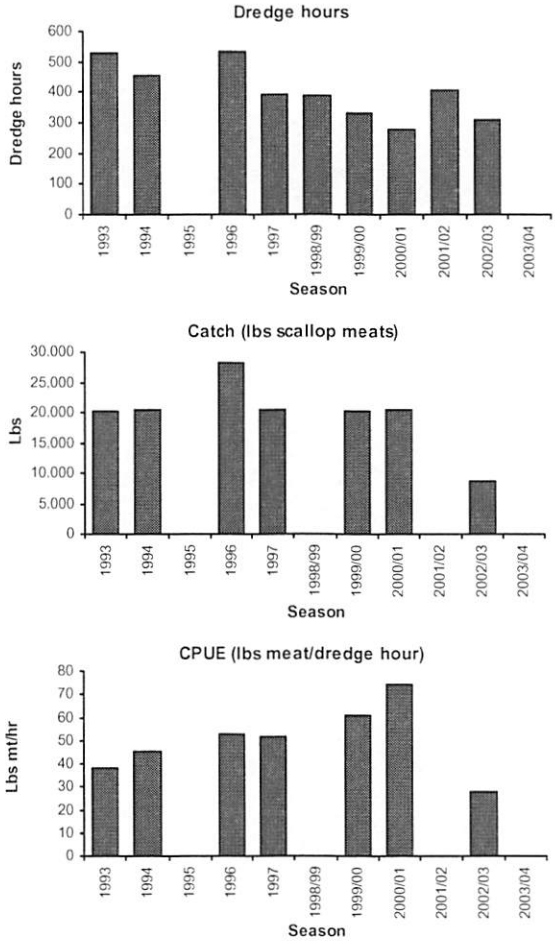

Figure. 10. Barplots of Cook Inlet scallop fishery statistics.

3.4 Kodiak Registration Area, Northeast District

Approximately 80,000 lbs of scallop meats were harvested by 2 vessels from the Northeast District of the Kodiak Management Area during the 2003/04 season (Table 8; Figure 11). Catch and effort have remained stable in the fishery since the 1999/2000 season, with CPUE ranging from 56–73 lbs meat/dredge hr.

SH histograms (Figure 12) indicate that a broad range of scallop sizes (and presumably ages) are harvested in the fishery. These data also suggest that recruitment to the Kodiak Northeast District scallop population occurs more regularly than in other areas of the state.

Large portions of the district known to contain scallops are closed to scallop dredging (Figure 3). These closures were recommended by ADF&G and adopted by the Alaska BOF nearly 30 years ago to protect red king crab and Tanner crab habitat and populations.

Table 8. Kodiak Northeast District scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours	Catch[a] (lbs	CPUE (lbs per dredge
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

[a]Confidential data released by vessel operators.

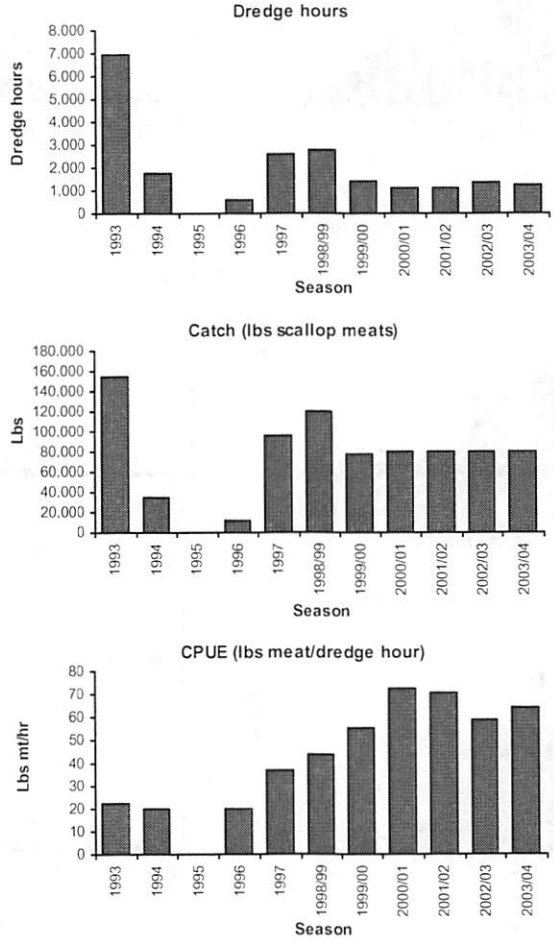

Figure 11. Barplots of Kodiak Northeast District scallop fishery statistics.

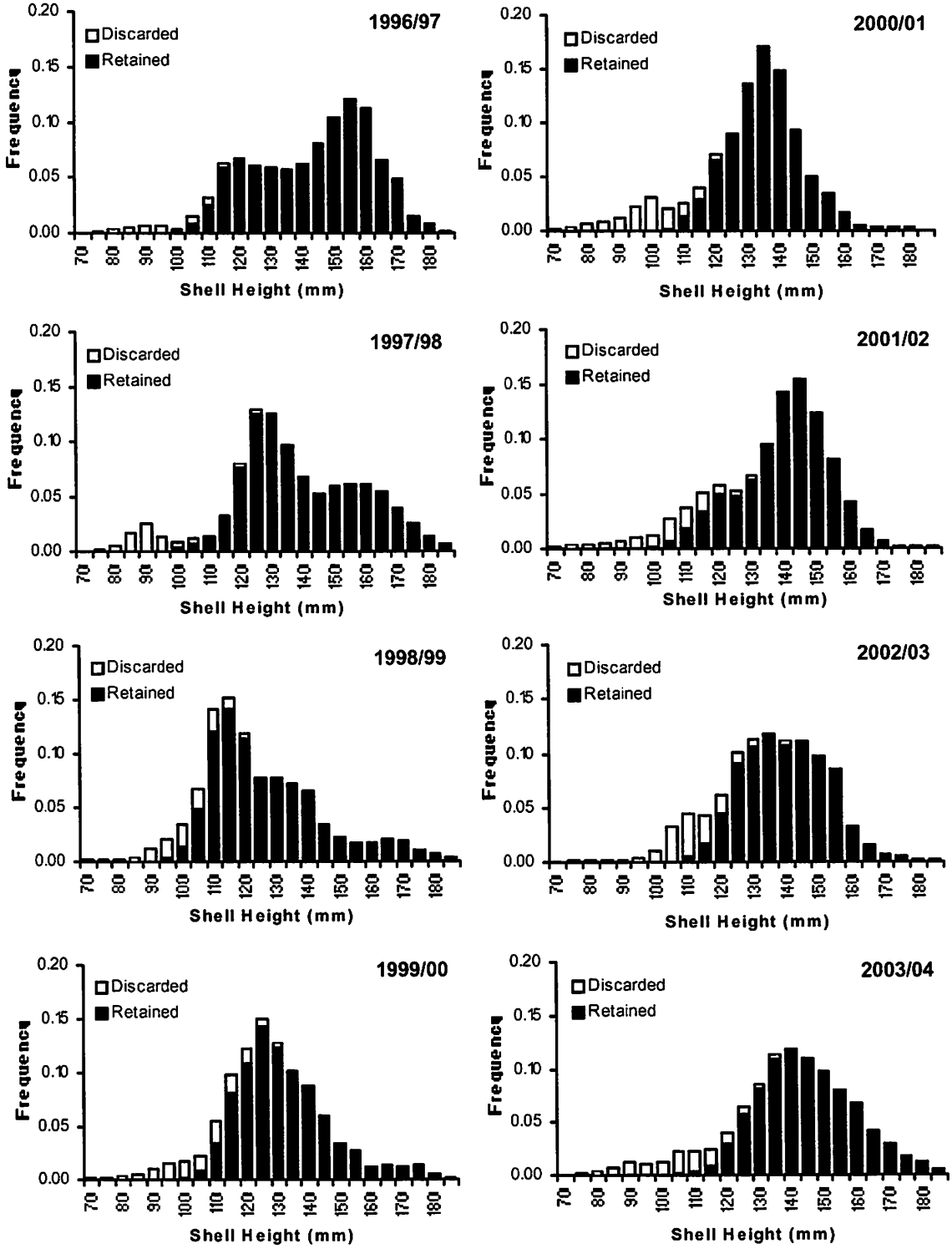

Figure 12. Shell height histograms from resampling Kodiak Northeast District scallop observer data, 1996/97–2003/04.

3.5 Kodiak Registration Area, Shelikof District

Scallop harvests in the Shelikof District of the Kodiak Area have remained near 180,000 lbs each season since 1998/99 (Table 9; Figure 13). CPUE has remained remarkably steady during this period, ranging from 44–62 lbs meat/dredge hr. The majority of the catch comes from a traditional scalloping area along the northwest shore of the strait south of Cape Douglas (Figures 1–2).

Scallop SH histograms (Figure 14) indicate continuing recruitment to the harvestable population in this area. Recent fishery performance and the SH data together suggest that the fishery is sustainable at the current harvest level. Portions of the district known to contain scallops are closed to dredging to protect red king and Tanner crab habitat and populations (Figure 3).

Table 9. Kodiak Shelikof District scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours	Catch[a] (lbs	CPUE (lbs per dredge
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

[a]Confidential data released by vessel operators.
[b]One additional vessel fished but data are not available.

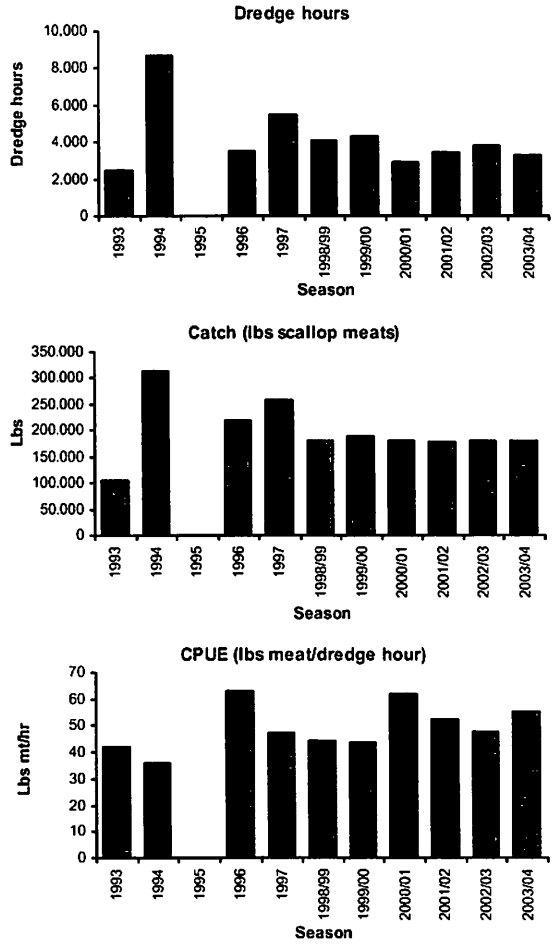

Figure 13. Barplots of Kodiak Shelikof District scallop fishery statistics.

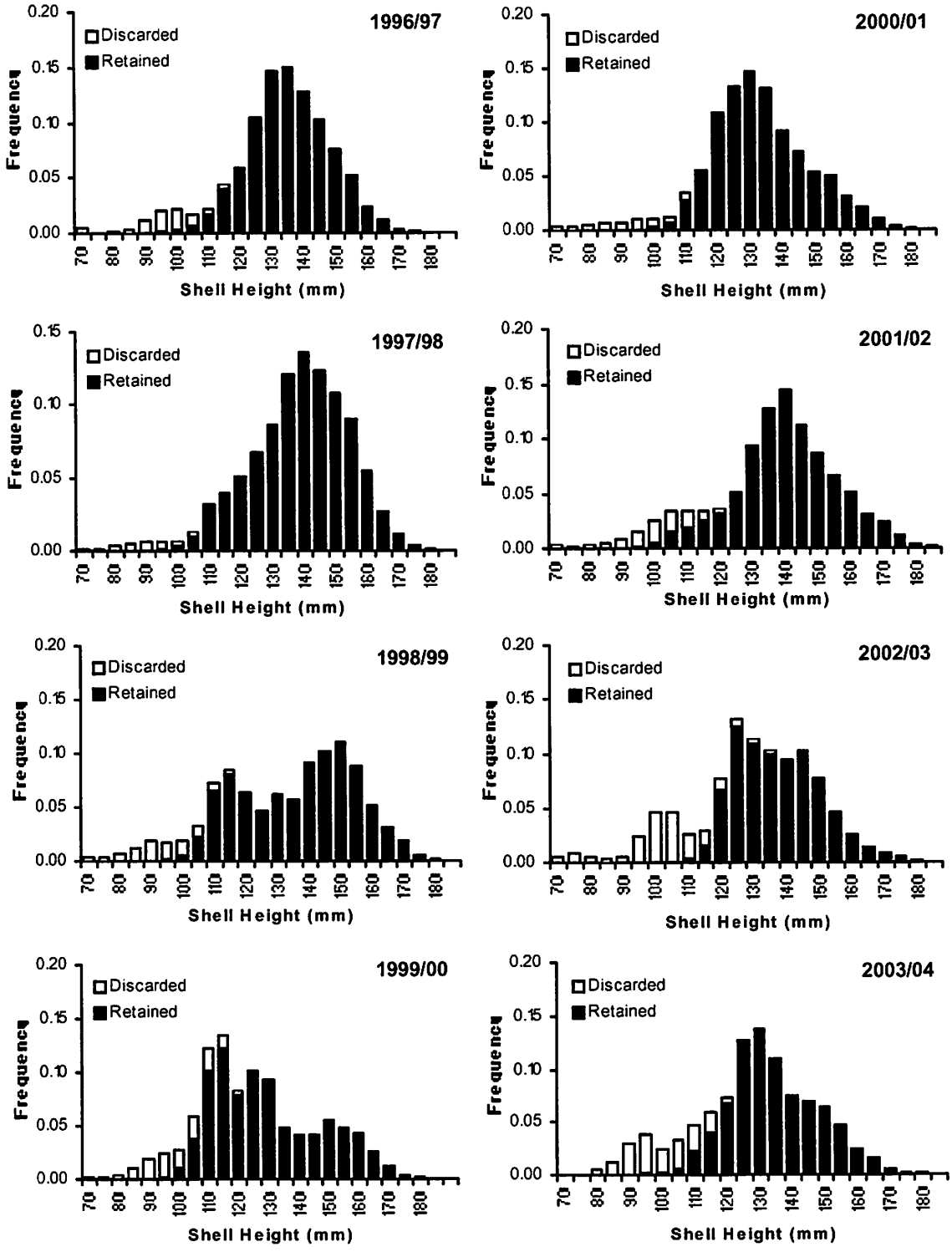

Figure 14. Shell height histograms from resampling Kodiak Shelikof District scallop observer data, 1996/97–2003/04.

3.6 Kodiak Registration Area, Semidi District

The most productive scallop fishing grounds of the Semidi District are located inside state waters that were closed to scallop dredging by the BOF in 2000 (Figure 3). Other parts of the district remain open to fishing, but no effort has occurred since the 1999/00 season (Table 10), as more profitable fishing opportunities are found by the fleet in other areas of the state.

Table 10. Kodiak Semidi District scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours[a]	Catch[a] (lbs	CPUE (lbs per dredge
1993/94	6[b]	NA	1,819	55,487	32
1994/95	2	NA	272		
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		

[a]Confidential data released by vessel operators.
[b]Two additional vessel fished but data are not available.

3.7 Alaska Peninsula Registration Area

The Alaska Peninsula Registration Area (Area M) scallop fishery has been closed since the 2000/01 season due to concerns about localized depletion. Effort was concentrated in 3 small beds near the Shumagin Islands, and exploratory tows in other parts of the area produced small catches; fishery managers concluded that harvest rates from the mid 1990s (Table 11; Figure 15) were not sustainable.

Alaska Peninsula SH histograms (Figure 16) suggest that most larger 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 to protect crab habitat and populations.

Table 11. Alaska Peninsula Area scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours[a]	Catch[a] (lbs	CPUE (lbs per dredge
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		closed			

[a]Confidential data released by vessel operators.

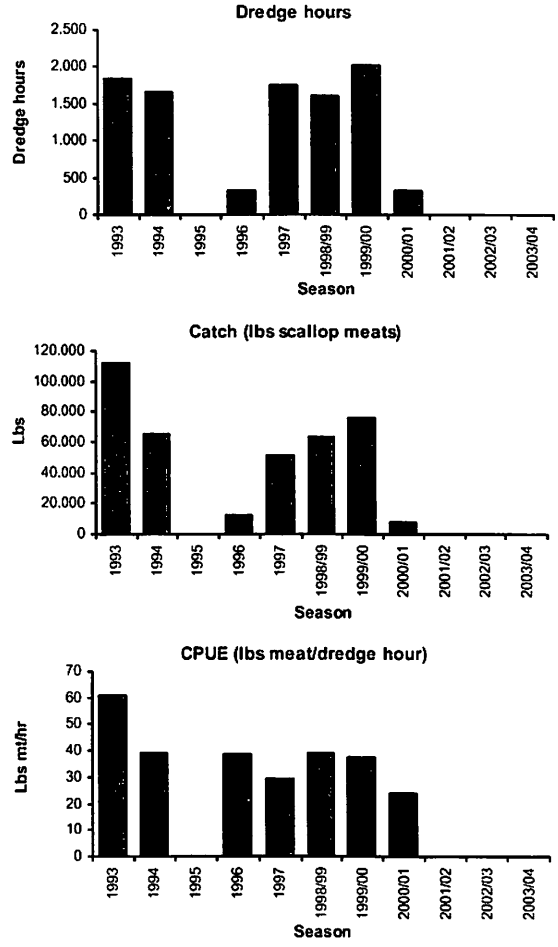

Figure 15. Barplots of Alaska Peninsula scallop fishery statistics.

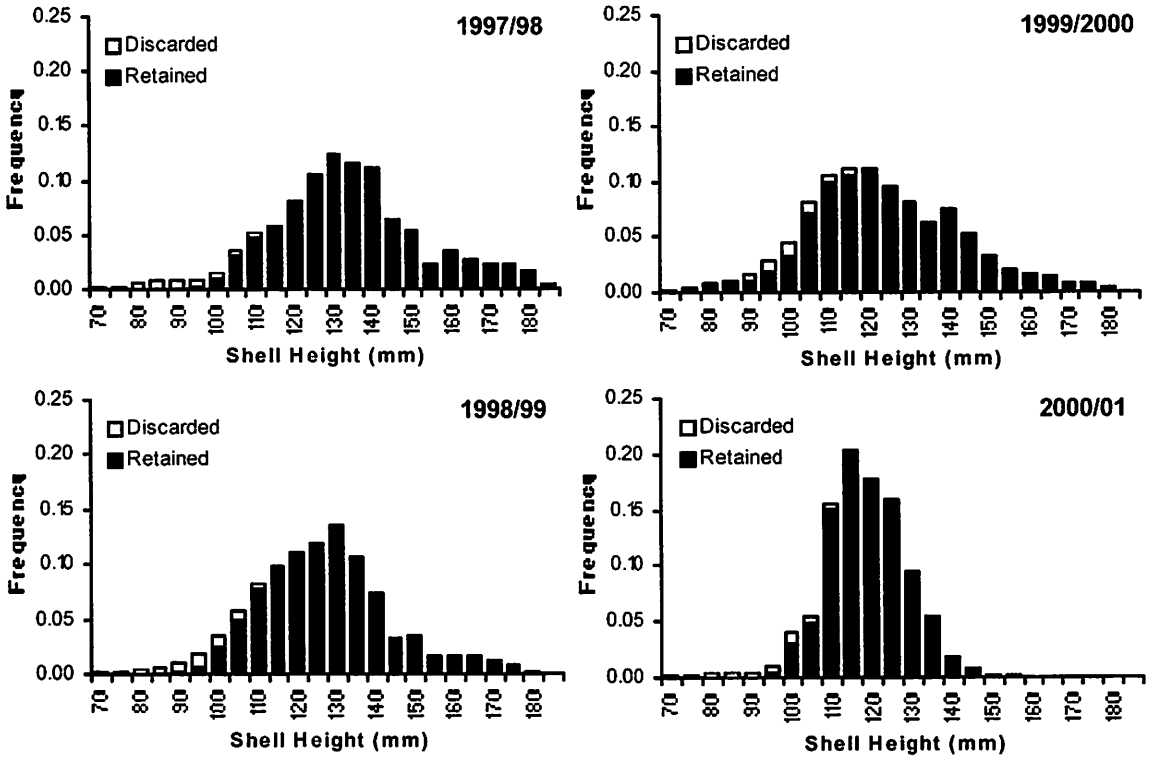

Figure 16. Shell height histograms from resampling Area M scallop observer data, 1997/98–2000/01.

3.8 Bering Sea Registration Area

Scallop fishing in the Bering Sea (Area Q) occurs north of Unimak Island (Figures 1 and 2), where the stock appears to be spread over a wide area at low densities. Two vessels participated in the 2003/04 fishery and harvested 42,590 lbs of shucked scallop meats (Table 12; Figure 17) before the season was closed due to manager's concerns about declining catch rates. Large catches taken during the early 1990s do not appear to be sustainable.

Bering Sea SH histograms (Figure 18) indicate that the last significant recruitment event occurred between the 1998/99 and 2000/01 seasons. Managers would like to see signs of renewed recruitment to the population in the fishery data before allowing harvests to return to levels taken between 1997/98 and 2002/03 (Table 12).

Large portions of the eastern Bering Sea shelf are closed to dredging to protect crab habitat (Figure 3).

Table 12. Bering Sea Area scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours[a]	Catch[a] (lbs	CPUE (lbs per dredge
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

[a]Confidential data released by vessel operators.

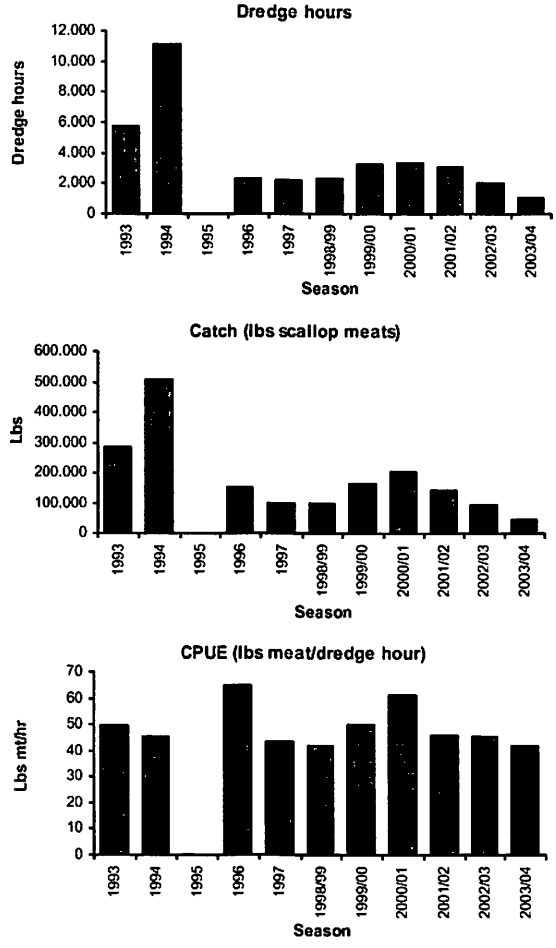

Figure 17. Barplots of Bering Sea scallop fishery statistics.

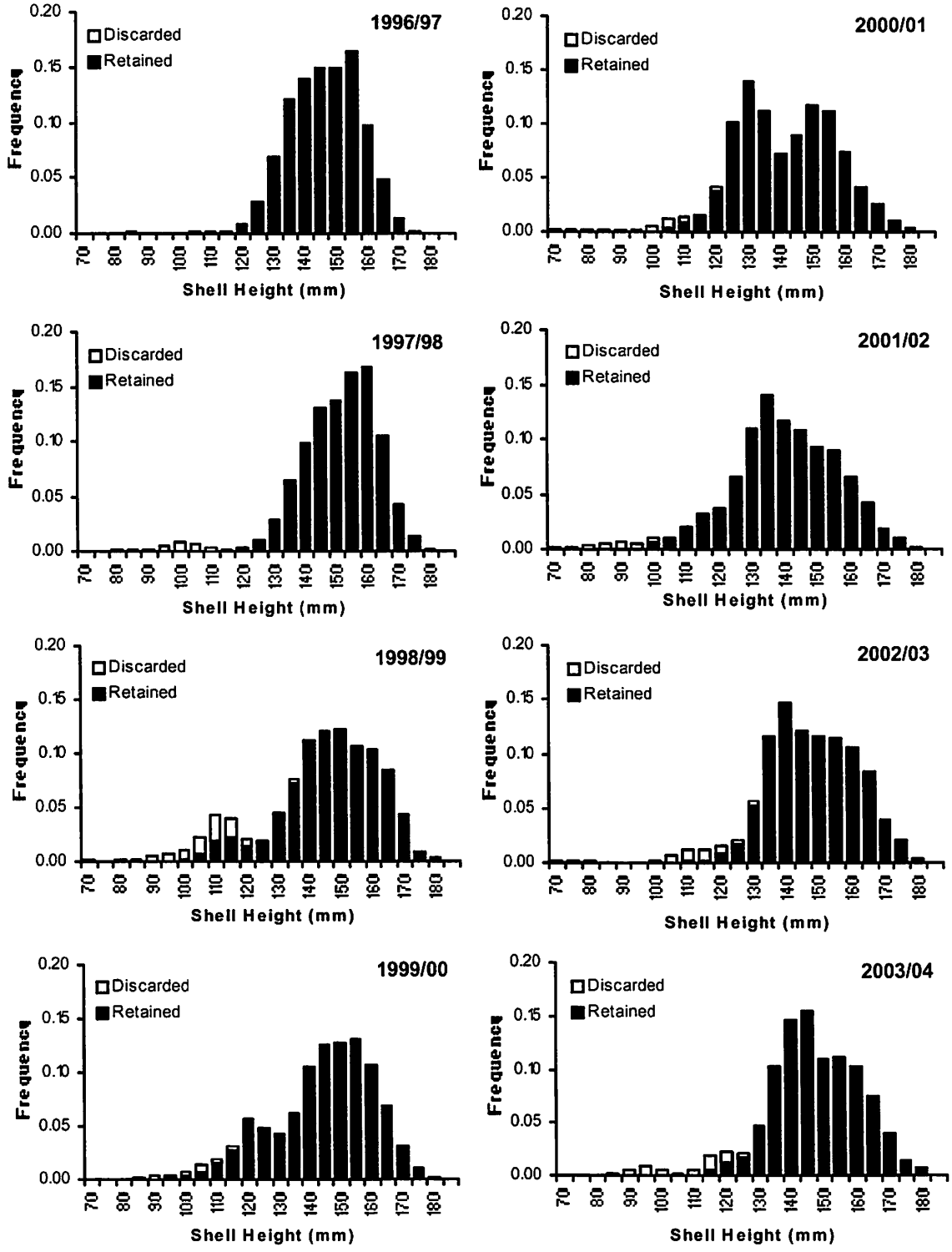

Figure 18. Shell height histograms from resampling Bering Sea scallop observer data, 1996/97–2003/04.

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 (Table 13; Figure 19), with CPUE that was low but comparable to that obtained in earlier seasons. Managers decided in 2003 to close the area for at least 3 additional years, primarily because effort was focused in a few small beds. Inshore areas that historically supported the fishery were closed to dredging in 1986 to protect crab habitat and juvenile crabs (Figure 3).

Table 13. Dutch Harbor Area scallop fishery summary statistics.

Season	Number vessels	GHR (lbs	Dredge hours[a]	Catch[a] (lbs	CPUE (lbs per dredge
1993/94	2	170,000	838	confidenti	46
1994/95	3	170,000	81	1,931	24
1995/96	1	170,000	1,047	26,950	26
1996/97		170,000	0		
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			

[a]Confidential data released by vessel operators.

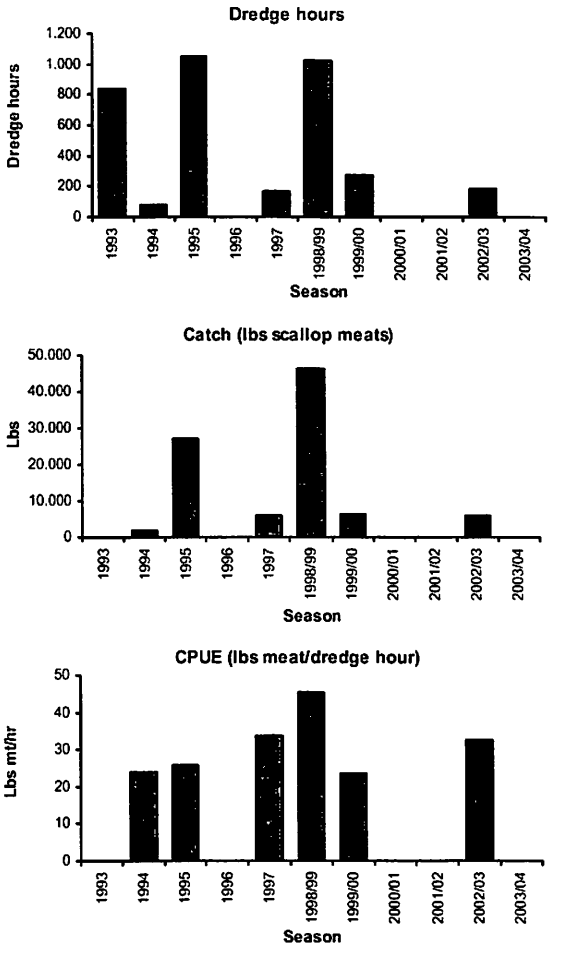

Figure 19. Barplots of Dutch Harbor Area scallop fishery statistics.

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.

4.0 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 $F_{overfishing} = M = 0.13$ (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 20 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 20).

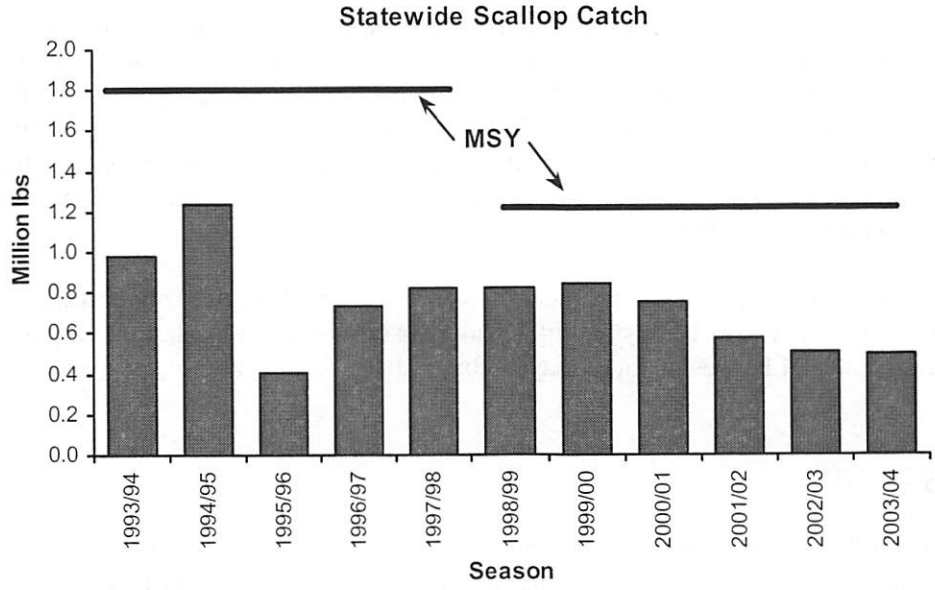

Figure 20. Statewide scallop harvest (pounds shucked scallop meats) and MSY levels from the FMP.

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. This appears to represent a disconnect between discrete scallop beds and fishing areas and the statewide overfishing definition. 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. 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.

5.0 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 3).

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

6.0 Bycatch

The scallop fishery has 100% observer coverage that provides excellent bycatch data. 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*), Dungeness crab (*Cancer magister*), 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).

7.0 Recent Regulatory Actions

7.1 Update on Amendment 10 to the Federal Scallop FMP

In October 2004, the Council took final action on the EA/RIR/IRFA for amendment 10 to the FMP. This amendment package evaluated alternatives for modifying the existing gear restriction endorsement on 2 of the 9 licenses under the Federal LLP. The Council selected alternative 3 as its preferred alternative. This alternative modified the gear restriction endorsement on those two licenses such that the vessels with the current endorsement would be allowed to utilize two 10ft dredges (or two dredges with a combined width of no more than 20 ft) when fishing in Federal waters outside of Cook Inlet. This amendment package has been forwarded to the Secretary of Commerce for approval. Regulations are expected to be promulgated in the summer of 2005. More information on this amendment can be obtained on the Council website at: http://www.fakr.noaa.gov/npfmc/analyses/analyses.htm

7.2 Update on State Vessel Based Limited Entry Program

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, due to expire July 1, 2004. During the 2002 legislative session, passage of HB206 resulted in changes to the state's limited entry statutes. These changes authorized use of a vessel-based limited entry program in the weathervane scallop fishery. However, vessel entry permits issued for the statewide weathervane scallop fishery will expire on December 31, 2008 unless statutory authority is extended. Prior to the July 1, 2004 expiration of the state vessel moratorium, a vessel permit limited entry system for the statewide weathervane scallop fishery was in place. Eight vessel owners received permits to fish for weathervane scallops in state waters.

8.0 Economic Overview of the Scallop Fishery

An overview of historic Alaska weathervane scallop harvest and wholesale revenue is presented in Table 14. This data is reprinted from Kruse et al. (in press). 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 lbs and 850,000 pounds each year. Vessel participation has been limited in recent years by the formation of the voluntary cooperative in May 2000 and 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 14 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 present day dollar values, after accounting for inflation. It is important to note that landed scallop meats have been processed (shucked) and frozen at sea. Thus, although landed price is often referred to as an ex-vessel price, 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 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.

Table 14: Historic Statewide Commercial Weathervane Scallop Revenue Statistics, 1967-2002/03

Year	Number of Vessels	Number of Landings[a]	Catch (lbs meats)[b]	Average Price/lb.	Inflation Factor	Adjusted Price	1st 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, 1978				No Effort			
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

Notes: 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: Harvest includes those taken by a single vessel outside the jurisdiction of the State of Alaska in excess of the allowable limit. e: January 1 through June 30

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WEATHERVANE SCALLOP OBSERVER MANUAL

Regional Information Report No. 4K04-39

Alaska Department of Fish and Game
Commercial Fisheries Division
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WEATHERVANE SCALLOP OBSERVER MANUAL

By

Jeffrey P. Barnhart
and
University of Alaska Anchorage
North Pacific Fisheries Observer Training Center

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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

TABLE OF CONTENTS (Cont.)

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

The Weathervane Scallop Observer Manual describes onboard observer duties and sampling methodology for observers participating in the Alaska Department of Fish and Game (ADF&G) Scallop Observer Program. This manual also serves as a reference, providing information about observer qualifications, training, certification, and safety as well as the responsibilities and requirements of independent contracting agents, vessel operators, vessel owners, and ADF&G.

PART I

INTRODUCTION

The Alaska Scallop Fishery Management Plan, established by the Alaska Department of Fish and Game (ADF&G) in 1993 and adopted by the Alaska Board of Fisheries (BOF) in 1994, includes a requirement for onboard observer coverage. The primary purposes of the Onboard Observer Program are to collect essential biological and fishery-based data, monitor bycatch and provide for regulatory enforcement. These data are necessary to achieve the requirements set out in 16 U.S.C. 1801-1883, the Magnuson-Stevens Fishery Conservation Act (Magnuson-Stevens Act) and the federal Fisheries Management Plan (FMP) and Amendments for the Scallop Fishery Off Alaska.

This manual, along with the scallop observer classroom training and a pretrip briefing, should adequately prepare onboard observers to carry out their duties. In the event observers are confronted with unanticipated sampling problems at sea not fully covered by the classroom training, they should reference this manual. Any deviation from the methods outlined in training or this manual should be discussed with ADF&G staff prior to implementation.

ONBOARD OBSERVER PROGRAM

A summary of regulations governing the Onboard Observer Program is located in the ADF&G Commercial Shellfish Fishing Regulations booklet. This booklet is provided as an informational guide only. Complete regulations are found in the State of Alaska Fish and Game Laws and Regulations Annotated, which contains Alaska Statutes (AS) and Alaska Administrative Codes (AAC).

Regulations governing the observer program include: (1) 5 AAC 39.141 Onboard Observer Program, (2) 5 AAC 39.142 Conflict of Interest Standards For Onboard Observers and Independent Contracting Agents, (3) 5 AAC 39.143 Onboard Observer Certification and Decertification, (4) 5 AAC 39.144 Onboard Observer Independent Contracting Agent Certification and Decertification, (5) 5 AAC 39.146 Onboard Observer Briefing and Debriefing, (6) 5 AAC 39.645 Shellfish Onboard Observer Program, (7) 5 AAC 39.646 Shellfish Onboard Observer Trainee Program Qualifications and Requirements, and (8) 5 AAC 38.076 Alaska Scallop Fishery Management Plan.

Alaska Board of Fisheries findings and regulations in 5 AAC 39.141 (a)-(g) relevant to the scallop observer program are as follows:

> (a) The Board of Fisheries finds that in particular fisheries observers on board fishing vessels would greatly enhance management primarily by facilitating information gathering, and by improving regulatory compliance. Onboard observers may be the only practical

fishery monitoring, data gathering, or enforcement mechanism in some Alaska fisheries where a large component of vessels, such as catcher-processors and floating processors, rarely or never enter Alaskan ports.

(b) Every onboard observer shall have free and unobstructed access to inspect the catch, equipment, gear, or operations of the fishing vessel or tender to which the observer is assigned.

(c) Onboard observers must be as unintrusive to vessel operations as practicable and must make the scope of their activities as predictable as possible in the performance of their assigned observer duties.

(d) Onboard observers are not required to obtain criminal or administrative search warrants to conduct their duties.

(e) Onboard observers shall carry out such scientific and other duties as deemed necessary or appropriate to manage, protect, maintain, improve, and extend the fish and aquatic plant resources of the state.

(f) Onboard observers shall have free and unobstructed access to loran or GPS coordinates, at random, at least twice in each 24-hour period. However, an observer shall have access to loran or GPS coordinates at any time if the observer suspects illegal activities. These loran or GPS observations are not to interfere with normal operations of the vessel.

(g) Every independent contracting agent, and their office personnel and business agents while employed by the independent contracting agent and for six months after terminating that employment, may not work as an onboard observer.

PROGRAM RESPONSIBILITIES

Vessel Owners and Operators

The responsibilities of vessel owners and operators are described in 5 AAC 39.645 (i) and 5AAC 39.645 (l):

(1) contract and pay for observers through an independent contracting agent, unless the onboard observer is provided by the department;

(2) provide at least 48 hours advance notice to the contracting agent of an observer's arrival at a department area office for debriefing;

(3) when carrying an observer trainee and within sufficient time to allow for debriefing before expiration of the trainee permit, ensure that the trainee is returned to the

port where the department office responsible for management of the fishery the observer's assigned vessel participates in;

(4) provide adequate food and accommodations for the observer that are equal to those provided for the vessel's crew;

(5) provide to the observer daily catch information, including the areas fished, number and pounds of scallops landed, number of hauls by statistical area, and other information as specified by the department;

(6) provide a safe work area, necessary gear, opportunity, and sufficient time to allow the observer to adequately sample catch as specified by the department;

(7) ensure that the transfer of an observer between vessels is conducted in a timely manner, under safe conditions, and with agreement of the observer involved;

(8) assure observer access to single side band (SSB) radio, fax, telex, or telephone so that catch reports from observers are received at the area management office as specified by the department;

(9) notify the observer before scallops are brought on board to allow sampling unless the observer specifically requests not to be notified; and

(10) provide proof of compliance with U.S. Coast Guard vessel safety requirements;

Pursuant to 5 AAC 39.645 (l) the vessel owner, owner's agent or operator may not:

(1) impede or interfere with an observer carrying out observer duties;

(2) interfere with or bias the sampling procedure employed by an observer, including physical or mechanical interference, or sorting or discarding of catch before sampling;

(3) tamper with, destroy, or discard an observer's collected samples, equipment, records, photographic film, papers or personal effects without the express consent of the observer; or

(4) harass an observer by conduct that has sexual connotations, and has the purpose or effect of interfering with the observer's work performance, or by conduct that otherwise creates an intimidating, hostile, or offensive environment.

Independent Contracting Agent

Responsibilities of the independent contracting agent are described in 5 AAC 39.645 (j):

(1) employ observers in compliance with all applicable state and federal laws and provide all necessary administrative and payroll functions for the observer employees;

(2) secure contracts directly with vessel owners and operators;

(3) provide the department with a certification training program plan and qualifications of instructors for department approval no less than 30 days before implementation;

(4) provide the department with complete and legible transcripts, resumes, and other work history documents to qualify observer candidates no less than 30 days before training;

(5) provide observer training to meet certification requirements contained in 5 AAC 39.143;

(6) coordinate with the department to schedule observer certification examinations and provide observer sampling equipment for use at the examinations;

(7) provide all logistical support for observers, including room and board, travel to and from vessels, travel to and from department examinations, and briefings and debriefings;

(8) assign observers to vessels without regard to requests from vessel owners and operators for, or for exclusion of, a specific observer; any requests for, or for exclusion of, a specific observer shall be reported to the department by the contracting agent;

(9) provide, for each observer deployment, a complete set of all necessary observer sampling equipment as specified, in writing, by the department for an observer to complete a trip assignment;

(10) provide the department with no less than 48 hour advance notice of an observer's scheduled arrival at the port where the department office responsible for management of the fishery the observer's assigned vessel participates in for briefings and debriefings;

(11) schedule all observer briefing and debriefing appointments directly with the department;

(12) maintain records of observer's scheduled briefing and debriefing dates, and observer's time on board a vessel to ensure compliance with maximum trip limits for trainee observers as specified in 5 AAC 39.143 (c), and fully certified observers as specified in 5 AAC 39.142 (a)(8);

(13) ensure that no less than 65 percent of observer deployment days per year per contractor are performed by certified observers;

Alaska Department of Fish and Game

Responsibilities of the Alaska Department of Fish and Game include the following:

1. establish standards for observer and contractor conflict of interest;

2. establish certification, decertification, suspension, and probation criteria for observers and contractors;

3. certify, suspend, and decertify observers and contractors;

4. establish appeal procedures for suspended and decertified observers and contractors.

5. establish, administer, and score observer certification tests;

6. maintain a list of certified observers and contractors;

7. provide a list of certified observers to contractors upon request;

8. provide a list of certified contractors to observers, industry and the public;

9. determine observer sampling procedures;

10. maintain a list (for ADF&G use) of observer briefing and debriefing dates, and observer and vessel activities for verification of compliance with the 36, 90, 180, 270 and 365 day deployment rules;

11. approve all observer vessel assignments;

12. brief and debrief observers only in the ADF&G office responsible for the management of the specific fishery, unless ADF&G authorizes otherwise;

13. provide observers with appropriate sampling gear and equipment as listed in the section Observer Sampling Gear and Equipment, provided by ADF&G;

14. monitor observer data gathering performance;

15. analyze observer data;

16. prepare reports;

17. review observer candidate's qualifications based on their college transcripts, resumes, and other work history documents to assure program compliance; and

18. approve an observer training course.

CONFLICT OF INTEREST STANDARDS FOR ONBOARD OBSERVERS

Pursuant to 5 AAC 39.142 (a) a department approved fisheries onboard observer

(1) must be employed by

(A) an independent contracting agent who has been certified by the department; or

(B) the department;

(2) may not have a financial interest in the observed fishery;

(3) may not have a personal interest in the vessel to which he or she is assigned;

(4) may not serve as a crew member or processing worker on the vessel to which he or she is assigned;

(5) may not solicit, accept, or receive, directly or indirectly, a gift, whether in the form of money, service, loan, travel, entertainment, hospitality, employment, promise, or in any other form, that is a benefit to the observer's personal or financial interests, under circumstances in which it could be reasonably inferred that the gift is intended to influence the performance of official duties, actions, or judgment;

(6) may not have been convicted of a misdemeanor or felony involving fraud dishonesty, an "offense against the person" in violation of AS 11.41, arson under AS 11.46.400, or a fish and game misdemeanor or fish and game infraction with a penalty in excess of $300 for a period of seven years preceding application to the onboard observer program;

(7) may not have a personal or financial interest, other than that of the observer's employee relationship in the contracting agent who serves as the observer's employer;

(8) may not spend more than 90 days on board any one vessel in 12 consecutive months, unless the 90 day limitation is waived by the department for good cause;

(9) may be assigned to a vessel only upon approval by the department.

"Financial interest" and "personal interest" are defined in 5 AAC 39.142 (c) as noted under the heading "Conflict Of Interest Standards For Contractors".

CONFLICT OF INTEREST STANDARDS FOR CONTRACTORS

Pursuant to 5 AAC 39.142 (b) duties and restrictions relative to conflict of interest standards for an independent contracting agent who provides onboard observers are as follows:

(1) May not be an individual, partnership, or corporation with a personal or direct financial interest in the proceeds of any vessel licensed to process or harvest in the affected fishery other than the provision of observers;

(2) Shall assign observers to vessels without regard to requests from vessel owners or operators for a specific individual;

(3) Repealed 12/26/97;

(4) May not knowingly or negligently hire as an observer an individual who has a personal or financial interest, other than that of the observer's employee relationship, with the contracting agent;

(5) May not hire an onboard observer on a commission basis;

(6) Shall, for each observer assignment to a vessel, submit to the department, upon request, a written statement, signed by the contracting agent under oath and subject to applicable criminal penalties, stating that the contracting agent does not have a personal interest and does not have a direct or subsidiary financial interest in the vessel or in fishing activities of the vessel;

(7) Shall obtain and submit to the department, upon request, for each observer assignment to a vessel, a written statement, signed by the vessel owner, operator, or owner's agent, under oath and subject to applicable criminal penalties, stating that the vessel owner or operator does not have a personal interest and does not have a direct or subsidiary financial interest in the contracting agent.

Relative to the conflict of interest standards "financial interests" and "personal interests" are defined in 5 AAC 39.142 (c):

(1) "financial interest" means any source of income to, or a capital investment held by, an individual or the individual's spouse or blood relation up to and including the second degree of kindred.

(2) "personal interest" means an interest held or involvement by an individual, partnership, or corporation, or an individual's immediate family member or parent,

including membership in any organization from which, or as a result of which, a person or organization receives a benefit.

GENERAL PROGRAM OVERVIEW

Scallop Observer Candidate Requirements

To qualify as a candidate for the Scallop Observer Program an individual must have the following education or work experience as described in 5 AAC 39.646:

(1) a Bachelor degree in the sciences of biology, any branch of biology, or limnology; or

(2) a valid National Marine Fisheries Service observer certification; or

(3) other fisheries related education or work experience approved by the department.

Trainee Permit

All scallop observer candidates who complete the approved training and orientation specified by the department and who pass an exam administered by the department with a score of at least 90 percent, will be issued a trainee permit. Trainee requirements are set forth in 5 AAC 39.143 and 5 AAC 39.646. Under 5 AAC 39.646 an onboard scallop observer trainee must

(1) have the ability to use a radio for communications; and

(2) be physically able to carry out the duties of an observer and not be incapacitated by chronic or debilitating seasickness.

Under 5 AAC 39.143 (c) (2), a scallop trainee permit expires if 36 days pass between trainee briefing and debriefing for an observer trip or, if after 180 days from the time a scallop trainee permit was issued, the observer fails to gain full scallop observer certification. However, if a scallop trainee observer was deployed at least once during the first 180 days after the trainee permit was issued, the trainee permit may be extended up to 270 days at the discretion of the department.

Full Certification

As described in 5 AAC 39.143 (f) the department shall certify as a scallop onboard observer a trainee who

(1) has a valid scallop observer trainee permit;

(2) has satisfactorily completed all observer trainee trip assigned tasks specified in writing by the department;

(3) has not engaged in behavior described in 5 AAC 39.143 (j);

(4) has completed the number of observer trips that the department, in it's discretion, determines from debriefing the trainee are necessary to prepare the trainee to perform as a scallop onboard observer; and

(5) is not the subject of revocation proceedings under 5 AAC 39.143.

Observer Decertification

ADF&G reserves the right of decertification, with grounds for decertification outlined in 5 AAC 39.143 (j):

(1) Significant or consistent failure to satisfactorily complete observer trip assigned tasks specified in writing by the department;

(2) impairment of the observer's ability to complete assigned tasks due to the use of alcohol or a controlled substance;

(3) engaging in violent or criminal behavior that could endanger a person or property on the assigned vessel or that prevents the observer from performing tasks according to the standards of the onboard observer manual;

(4) soliciting or accepting items or services, other than the basic life necessities, from an operator, owner, or crew member of a vessel to which the observer is assigned;

(5) failure to report known criminal behavior or cooperate with the investigation or prosecution of criminal behavior arising from fishing operations of the vessel to which the observer is assigned;

(6) engaging in emotional or sexual relations with a person on board the assigned vessel in a manner that interferes with the observer's ability to perform according to the standards of the onboard observer manual;

(7) exhibiting poor judgment or unprofessional behavior that significantly interferes with the observer's ability to perform assigned tasks or results in a breach of confidentially, lack of observer coverage, or other actions detrimental to the observer program.

Disciplinary Trainee Status

Provisions under which a certified observer may be demoted to trainee status are detailed in 5 AAC 39.143 (k): "A certified onboard observer may be demoted to trainee status for failure to satisfactorily perform assigned tasks specified in writing by the department, if the failure occurs after the department has notified the onboard observer in writing that the onboard observer's performance for the assigned tasks has been deficient".

Recertification

A fully certified observer's certification expires when that observer fails to participate as on onboard observer for a period of 12 consecutive months. Recertification is provided for under 5 AAC 39.143 (e) and (i). Recertification requires an observer candidate to complete retraining and reorientation specified by the department and repass, with a score of at least 90 percent, an exam administered by the department. Candidates who successfully complete observer training, reorientation, and testing achieve trainee status. To become recertified a trainee must meet the criteria set forth in 5 AAC 39.143 (f).

Briefing

Briefing requirements are described in 5 AAC 39.146. After assignment to a vessel by the contractor the observer must attend a pretrip briefing. Unless ADF&G authorizes otherwise, all observers will be briefed and debriefed at the ADF&G office responsible for the management of the fishery in which the vessel participates. All observer briefing and debriefing appointments will be made by the representative contractor. Briefings must be scheduled at least 48 hours in advance.

The observer MUST bring all required sampling equipment, as listed in the section of this manual entitled "Observer Sampling Gear and Equipment Provided by Contractor" to the briefing for visual confirmation by ADF&G. During the briefing, observers will be given state-owned equipment for which they are responsible, as well as the necessary forms, paperwork, and fishery specific information for the observer trip. Each observer will be issued a scallop observer manual containing a unique set of confidential codes for encoding catch reports sent to ADF&G.

Observers are encouraged to contact ADF&G if questions arise while at sea. A situation or sampling challenge that was not covered in the briefing or during training may arise. Observers should have the scallop observer manual and the Commercial Shellfish Fishing Regulations book readily available when contacting ADF&G as questions will likely be answered by referring to those publications.

Debriefing

Debriefing requirements are described in 5 AAC 39.146. All scallop observers must be debriefed immediately after completion of the assigned trip.

Observers must give ADF&G area staff immediate notice of their departure from the assigned vessel. After departure observers shall return directly to the ADF&G office at which the briefing occurred unless otherwise permitted by ADF&G. Debriefings are conducted at the ADF&G office responsible for management of the fishery in which the vessel participated, unless the department authorizes a different location. Contractors shall schedule debriefings with the department as least 48 hours in advance.

Observer debriefings are required by regulation. Observers are expected to have all forms and required reports completed and organized prior to arrival at the ADF&G office. At the debriefing observers will (1) submit their completed paperwork and shell collections, (2) answer questions that might arise from a review of their data forms, (3) return all department issued materials and equipment, and (4) submit evidence to a Alaska Bureau of Wildlife Enforcement (ABWE) officer if potential violations were observed during the trip. ADF&G personnel will check all data forms for accuracy and completeness. Observers may be required to correct any and all data errors prior to subsequent deployments.

If an observer's vessel returns to a port of briefing for any reason, the observer MUST contact ADF&G. At the discretion of ADF&G, a midtrip debriefing may be scheduled, which will allow a preliminary data check and provide ADF&G an opportunity to resolve sampling problems or answer observer questions. The vessel operator should contact the observer's contracting agent to schedule the midtrip debrief with the department at least 48 hours in advance.

Confidentiality of Data

Observers will not discuss <u>any</u> aspect of fishing activity on their assigned vessel including catch or fishing location information, with contracting agents, other observers, or industry representatives. All observer-collected data will be turned in to ADF&G only. No copies will be made. Upon request of the vessel operator, observers are permitted to verbally provide sampling information pertaining to haul composition, crab bycatch, discarded scallops, retained scallops, and halibut length and condition. <u>ALL OTHER OBSERVER COLLECTED DATA INCLUDING THE OBSERVER'S LOGBOOK, WEEKLY TRIP SUMMARIES, AND RADIO REPORTS ARE CONFIDENTIAL.</u> Vessel operators may submit a written request to ADF&G requesting photocopies or electronic copies of their personal fishing records, including non-confidential observer collected data.

Living and Working at Sea

Once the observer has successfully completed the initial briefing requirements with ADF&G, they should immediately proceed to their assigned vessel.

1. If a conflict or problem (with the crew, equipment, etc.) occurs that affects an observer's ability to sample as directed by ADF&G, the situation should be reported to a vessel operator immediately. If the vessel operator is unable or unwilling to correct the problem the observer should notify ADF&G immediately.

2. Do not interpret the regulations. Interpretation of regulation will be done by ADF&G staff or ABWE.

3. Observer sampling activities should be as unobtrusive to vessel fishing and processing operations as possible (5 AAC 39.141 (c)). However, **SAMPLING DUTIES ASSIGNED BY ADF&G ARE MANDATORY**. Any actions on the part of the vessel's crew or employees to deny an observer space, equipment, or opportunity to conduct their normal sampling activities should be recorded in the observer's logbook and reported at once to the vessel operator. If the vessel operator is unable or unwilling to correct the problem the observer should notify ADF&G immediately.

4. Observers should remember their actions reflect on ADF&G, their contractor, other observers, and the entire observer program. Avoid becoming involved in boat politics. Observers should follow vessel rules and be sensitive to restrictions such as wearing rain gear or rubber boots in the galley or sleeping quarters. Observers should feel free to ask the vessel master or crew any questions about boat policies.

Observer Duties

The observer's duty is to observe both fishing and processing operations and collect data as directed by ADF&G. As described in 5 AAC 39.141 (b) "every onboard observer shall have free and unobstructed access to inspect the catch, equipment, gear, or operations of the fishing vessel or tender to which the observer is assigned". **Observers are not enforcement agents and have no enforcement authority**. However, observers are expected to document all violations. The ABWE, USCG or NOAA office of law enforcement, will take appropriate enforcement action on information provided by the observer. Observers may be required to testify in court or submit written statements as necessary for prosecution.

Observer Sampling Duties

When conducting biological or legal sampling, onboard observers will take representative and unbiased samples, and do so with a maximum amount of precision.

Sampling duties of onboard scallop fishery observers may include the following; exact duties may vary by deployment and will be assigned during the briefing.

1. Obtaining representative samples of height, weight, and sex frequencies from the retained and /or discarded scallop catch;

2. recording daily catch rates including pounds of retained scallops and the number of hauls made;

3. collecting representative live weights of scallops, crab, or other species;

4. recording bycatch numbers, size, sex, and condition for all species of crabs and fish as directed by ADF&G;

5. documenting handling procedures, time on deck, and retention of prohibited species;

6. retaining biological samples and enforcement evidence;

7. carrying out additional duties as directed by ADF&G; and

8. reporting vessel and sampling activity to ADF&G via SSB radio or mobile satellite communications or other methods as directed by ADF&G staff.

During fishing operations, compliance with all regulations including closed water areas should be observed. Instances where possible violations are observed should be documented in the observer's logbook and subsequently discussed with ADF&G staff upon returning to port.

OBSERVER SAMPLING GEAR AND EQUIPMENT

Provided By Contractor

The following items will be provided by the contractor:

1. two 300 mm stainless vernier calipers (ADF&G approved);
2. one 35-mm waterproof camera capable of taking good quality close-up photos in low light situations;
3. spare batteries for camera (one complete set);
4. two cassette tape recorders using standard or micro cassettes (must be as small as possible, battery operated and able to operate in cold and/or damp environments);
5. two sets of batteries for tape recorder;
6. two clipboards for 8 ½ x 11 paper;
7. small can of spray rust preventative (for caliper lubrication and cleaning);
8. a minimum of 12 #2 pencils with erasers;
9. a minimum of 2 #2 red pencils with erasers;

10. one pencil sharpener;
11. small calculator (battery operated);
12. spare batteries for calculator (one complete set);
13. two thumb counters;
14. calendar;
15. watch;
16. black indelible marking pens;
17. two scallop knives;
18. hand magnifying lens;
19. personal flotation device (PFD) to be worn at all times when the observer is on deck;
20. hard hat;
21. 100-pound spring scale, capable of weighing scallop samples in one (1) pound increments. The scale must be in good working order and of a type approved by ADF&G.
22. "Alaska's Saltwater Fishes" by Doyne W. Kessler or similar type reference book approved by the ADF&G statewide scallop observer program coordinator;
23. "Biological Field Techniques for Chionoecetes Crabs" by Jadamec et.al.
24. two large briefcases, one must be of a locking type, large enough to hold all contractor issues sampling equipment, and all department issued data forms, equipment and supplies.

Provided By Vessel

The vessel must provide the observer with a minimum of 6 plastic bushel-sized baskets. The baskets must be available to the observer at all times for sampling activities. Baskets must be onboard the vessel prior to departing port.

Provided By ADF&G

ADF&G will provide the observer with the following:

1. observer manual;
2 radio reporting codes;
3 Rite-in-the-Rain notebooks;
4 35-mm film;
5. cassette tapes;
6. current Commercial Shellfish Fishing Regulation Booklet;
7. ADF&G statistical area charts;
8. all required data forms;
9. muslin bags for shell collections; and
10. other materials and supplies as required.

PERSONAL GEAR

Provided By Contractor, Observer, or Vessel

The following are necessary items that may be provided by the contractor, observer, or vessel:

1. Survival suit with whistle, approved light, and name of vessel or individual written on the suit;
2. rain gear;
3. waterproof deck boots; and
4. rubber gloves, two (2) pair minimum

Provided by Observer

The observer is responsible for providing the following:

1. personal clothing, adequate for anticipated length of time at sea and season of the year; and
2. personal articles (e.g. towels, medications, and toothpaste).

PART II

GENERAL FORM INSTRUCTIONS

All data forms completed by observers are processed and entered by department staff. It is not possible to change the computer format to accommodate an observer's creative method of data collection or recording. Therefore, all forms must be completed following prescribed methodology. This manual contains specific instructions and examples for completing each type of form. If it becomes necessary to alert ADF&G about some aspect of data collection or recording, write a note on the form and discuss the circumstances with ADF&G at the debriefing.

All forms should be neat. All numbers should be precisely printed in conventional Arabic numbers so they are legible. Sloppy forms multiply the number of data entry errors and are time consuming to interpret. Use a sharp pencil, not a pen, to fill out all forms. Erasures should be neat if changes are necessary.

All forms must be filled out **DAILY** and should be double checked for completion and readability as soon as possible. All forms (completed and blank) should be kept locked in the observers briefcase when not in use.

Time records should be in military format reflecting either standard time or daylight-savings time when appropriate.

NOTEBOOK ENTRIES

ADF&G will provide a Rite-in-the-Rain notebook to each observer. The observer notebook is intended to be a record of data and pertinent information not noted on data forms. The notebook should document the crew list, vessel diagram, all sampling activities, sampling difficulties and all perceived regulatory violations. The notebook is a confidential record of your activities. NO ONE should have access to the notebook except the observer and ADF&G.

ALL sampling activity MUST be documented, including sampling time, activity, results and difficulties. Document any unmet sampling goals and the reasons for it in a clear and concise manner in your Rite-in-the-Rain notebook.

Notebooks should not contain personal references, unprofessional characteristics of vessel personnel, etc. Notebooks become property of ADF&G at the conclusion of each deployment and may be used as evidence in future court cases if violations occur. Observer should keep this in mind and maintain professional documentation.

Collecting Evidence

All potential violations witnessed by an observer **MUST** be documented in detail in the observer's notebook as soon as possible after the incident. The longer you wait to record the incident the greater the chance you will forget the details. Observers are often questioned weeks, months, and sometimes years after the event, so document thoroughly. Details should include the exact nature of the suspected violation, location on the vessel where the violation occurred, time of day, vessel name, and names of crew involved. Detail all conversations with the captain and crew members regarding the violation. When documenting potential violations, remember the four W's (who, what, where, and when). Documentation of potential violations should be kept separate from other notebook entries. Be sure to allow for a blank page prior to and following any violation documentation in your notebook. Document removal of species other than weathervane scallops from the catch for consumption on board or kept (homepacks) by the captain or crew. Other potential violations may include illegal gear, marine pollution (MARPOL) violations, and harassment.

To substantiate information recorded in the observer notebook and on data forms, it is important to take pictures of potential violations. When taking photographs of prohibited species or MARPOL violations position the animal or material in such a way that identification is obvious. Depending upon the illegal activity, include as much of the activity as possible in the photographs and document them thoroughly in your observer notebook. Take a blank photo or two prior to and following the evidence photographs. This will keep the evidence photos separate from other photos.

All photographs should be documented in the daily observer notebook entries. A photo log should be kept in the observer notebook. Be sure to indicate the frame number, the date it was taken, and what is shown in each frame.

All notes, journals, photos, or any other information collected by scallop observers while deployed in the capacity of a shellfish observer are subject to subpoena by the court for whatever it thinks might be relevant to an investigation or case. The court does not have to distinguish between what is personal property and what is state property.

All fisheries information and data collected in notes, journals, other written materials, photos, videos, and sound recordings by shellfish observers while deployed in the capacity of a scallop observer are CONFIDENTIAL AND PROPERTY OF ADF&G.

SAMPLING ON SCALLOP VESSELS

After boarding the vessel, observers should remember that their safety and the safety of others is of primary importance. The commercial fishing industry is considered one of the most dangerous industries in the nation. **OBSERVERS SHOULD BE AWARE OF THEIR SURROUNDINGS AND WHAT IS HAPPENING AROUND THEM AT ALL TIMES.** Observers are urged to familiarize themselves with their personal safety equipment including

their survival suit and PFD. Observers should determine where the vessel's safety equipment is stored and pay special attention to vessel emergency drills. Observers should request a detailed safety briefing and ship tour from the captain prior to leaving port.

Observers should establish a sampling plan with the vessel master and crew, which will include a general description of observer sampling activities. Each vessel and crew will present the observer with a unique sampling situation.

Prior to collecting any information, the fishing and sorting operation should be observed to determine the safest and least disruptive sampling location. Sampling procedures should begin following the initial observation period.

Observers should not cause UNREASONABLE interference with the operation of the vessel and its processing lines, but sampling activities are **MANDATORY** and the vessel **MUST** make he necessary space, time and equipment available. This will require communication with the vessel master and crew. Any actions on the part of the vessel's crew or employees to deny an observer space, equipment or opportunity to conduct his or her normal sampling activities should be recorded in the observer's logbook and reported at once to the vessel operator. If the vessel operator is unable or unwilling to correct the problem the observer should notify ADF&G immediately.

Observers should check with the vessel captain or mate to be sure they will have access to at least six (6) baskets at all times for use in sampling activities. Do not leave port without adequate equipment. If problems arise contact the local ADF&G office.

Determine what method the vessel captain will use to determine the daily estimates of retained scallop catch (in pounds of shucked meat). The observer is required to record, on a daily basis, independent data as a cross check of the operators catch and effort reporting. The observer-collected data will likely consist of a daily box or bag count of scallop meats, multiplied by the average weight of the box or bag, yielding an estimate of scallops, in pounds, retained each day.

On a daily basis, determine the pounds of scallop meats retained and the number of hauls completed for each statistical area fished. Area and effort information may be obtained from the Fishing Log for Alaska Scallops. Do not copy catch information from the vessel operators completed fish tickets and do not supply catch information to the operator for completing fish tickets.

Randomly select hauls for species composition and bycatch/scallop discard monitoring. Do not sample the same time periods each day. Sample hauls should be selected throughout the period of fishing activity. All times of the day and night and all distinctly different fishing areas should be represented. Sample pre-selected hauls regardless of gear performance, catch composition, or volume.

Maintain the ADF&G reporting schedule established by the area biologist at the time of the briefing. Observers are required to maintain the reporting schedule even if no fishing occurred or the boat is tied to the dock. In this case, report Item 5 only on your radio report.

Prior to a mid-trip or final debriefing collect the original copy of the Fishing Log For Alaska Scallops from the captain or mate, unless directed otherwise by ADF&G. Observers will submit the log along with other data forms at each mid-trip and the final trip debriefing.

DATA FORM INSTRUCTIONS

General Header Information--All Forms

All forms have a header block at the top of the page typically containing space for recording the vessel name, ADF&G number, trip number, observer name, date, fishery code, and haul number. The header information is necessary to identify data associated with each vessel and trip and should be completely filled out on each form.

ADF&G will assign a **trip number** at the time of the observer briefing. A trip is defined as the period of time between observer briefing and debriefing. Trip numbers do not change with mid-trip debriefs. For example, if the vessel returned to port but planned to continue to fish in the same registration area with the same observer then the trip number would not change. Changing registration areas or observers requires an observer debriefing and briefing; therefore a new trip number is necessary. Trip numbers start over annually with this state-wide numbering system.

The 5-digit **ADF&G number** is issued by the Commercial Fishery Entry Commission. The number is required to be display in one foot high digits in a contrasting color, on both sides of the vessel wheelhouse.

Each haul, including unsuccessful hauls, is assigned a sequential **haul number** starting with #1 at the beginning of each trip. The skipper will record all hauls in the ADF&G Fishing Log for Alaska Scallops. At least twice per day observers should verify that haul numbers are recorded consecutively; i.e., no duplicates and no skipped haul numbers.

The reporting week begins on Monday at 00:01 hours and ends on Sunday at 00:00 hours.

The **fishery code** consists of the letter code designation for the registration area, followed by the letter "S" (designating scallops) and the last two digits of the regulatory year. For example, if a scallop vessel fished in the Kodiak Registration Area during the 2004 season, the fishery code designation would be KS04.

Letter Codes for Statewide Scallop Registration Areas

Use the following codes to designate the scallop registration areas:

A= Southeastern Alaska	H = Cook Inlet	O = Dutch Harbor
D = Yakutat	K = Kodiak	Q = Bering Sea
E = Prince William Sound	M = Alaska Peninsula	R = Adak

Fishing Log for Alaska Scallops

The **FISHING LOG FOR ALASKA SCALLOPS** (Appendix A.1.) should be completed by the vessel operator, with the exception of the 'Haul sampled' column, which will be completed by the observer. **Data recorded on this form are extremely important and the observer should check twice daily, at a minimum, to be sure all information is recorded accurately, legibly, and in a timely manner**. The logbook must be legible to be of use to the department.

Refer to Appendix A.1. for examples of completing the Fishing Log for Alaska Scallops. Detailed information necessary for completing data fields that are not self-explanatory is provided below.

ADF&G will assign a **trip number** at the time of observer briefing.

Observers will designate **sampled hauls** with a "1" and **unsampled hauls** with a "2". This includes sampling for either bycatch/scallop discard or haul composition. In addition, indicate haul composition samples with the designation "HC" in the left page margin adjacent to the haul sampled column.

Vessel operators will record the total combined **dredge width** to the nearest foot. For example, if two 15-foot dredges were fished, they will record "30".

The captain will determine if the **gear performance** was satisfactory, unsatisfactory, or partially satisfactory.

Hauls should be numbered sequentially starting with **haul number** 1 at the beginning of each trip. All hauls must be recorded regardless of gear performance. A trip is defined as the period of time between observer briefing and debriefing. Mid-trip debriefs have no effect on the sequential haul numbering; haul numbers do not start over with number 1 after a mid-trip debrief.

The **set position** should be recorded in degrees, minutes, and hundredths of a minute (decimal minutes to 2 decimal places) and E/W of 180° longitude.

Fishing times should be recorded in Alaska local time; either standard time or daylight-savings time when appropriate. The military time designation will be used. Midnight is recorded as 0000 hours.

The **fishing duration** should include the minutes the gear was fishing as described in the ADF&G Fishing Log for Alaska Scallops. Hang-up time should not be included.

The **catch** column refers to the retained catch. Operators will record number of **bushels** and **estimated round weight** of scallops in pounds. If requested, the observer can help the captain determine the average weight of a bushel of scallops retained by the crew.

Operators will record the estimated round weight (in pounds) of **discarded scallop catch** due to size or shell condition. This column may be neglected by vessel operators. Observers should insure this column is completed.

Record the 6-digit (5-digit in the Yakutat area) **ADF&G statistical area** fished. The set position will be considered the area fished. Statistical area charts can be obtained from ADF&G.

Weekly Summary Form

The **WEEKLY SUMMARY FORM** (Appendix A.2.) is used to record the daily information from each statistical area fished including (1) pounds of scallop meats retained by the vessel, (2) number of hauls fished, (3) number of hauls sampled by observer for bycatch (4) the number of Dungeness, and Tanner crab counted in bycatch sampled hauls and the **total number of king crab caught in all tows, not just sampled tows. The number of bycatch sampled hauls includes only those hauls sampled for prohibited species bycatch and not those sampled for haul (species) composition**. Daily data is summarized by utilizing the fishing log for Alaska scallops, observer collected data, and the record of scallop meat weights. The top portion of the Weekly Summary Form details daily data by statistical area, whereas the bottom section provides a weekly data summary for each statistical area fished. The 'other Tanner' column in both the top and bottom sections serves a dual purpose. It is used to record combined opilio and hybrid crab in the Bering Sea Registration Area and Dungeness crab in all other registration areas. For the purposes of observer data collection, hauls set prior to midnight but sampled after midnight are attributed to the set day. The weekly reporting period is defined as Monday through Sunday.

The typical scallop catcher-processor in Alaska fishes two dredges simultaneously. Occasionally, due to a mechanical problem or for gear maintenance purposes, only one dredge will be fished. When completing this form it is important to report single dredge tows separately from normal two-dredge tows. Use a separate row to record daily single dredge tows by statistical area and identify those tows by writing 'SD' in the margin to the left of the row. Follow this same procedure when completing the weekly summary section at the bottom of the form. Smaller catcher-processors or catcher vessels may be limited to fishing only one dredge, due to vessel size or regulatory constraints. In this scenario, it is not necessary to use the single dredge designation.

For each statistical area fished, observers must determine the pounds of scallop meats retained by the vessel. If fishing is limited to one statistical area for the day, the pounds of retained scallop meats is determined by simply adding together the pounds from that statistical area. If

more than one statistical area is fished, the pounds of scallop meats will need to be proportioned between statistical areas. A designated crew member is assigned to keep record of the scallop meat pounds produced per shift. Typically, during a work shift, scallop meats are put into five-pound boxes and frozen in a plate or blast freezer. At the end of the shift, six of these boxes are put into a case. The resulting 30 pound cases are tallied and put into the freezer hold. The case tally is recorded on a marking board in the case-up area and a paper copy is retained by the vessel operator. Because the very nature of observer work is to provide an independent assessment, try to verify the number of cases that are put in the freezer hold at the end of each shift. It will help with vessel relations if you do this in a non-obtrusive manner. Also, work with the crew to obtain the "five-pound" box weights. On some vessels, each five-pound box of scallops is weighed independently, while on other vessels, box weights are spot-checked. The easiest way to collect this data is to be present when the five-pound boxes are weighed. Record the five-pound box weights and collection times in your logbook. Discuss any weight discrepancies with Fish and Game the next time you are in port.

The most accurate and straight forward method to attribute scallop meat weights to multiple statistical areas is to sum the number of bushels of scallops, as recorded on the Fishing Log for Alaska Scallops, harvested from each statistical area for the day, and divide each sum by the total number of bushels harvested for that day. Multiplying the resulting percentage attributed to each statistical area by the pounds of scallop meats retained for the day will yield the number of pounds of scallop meats retained in each statistical area for the day.

Example Calculations

Vessel Daily Production Data = Number of Cases (83) x Case Weight (30 lbs/each) = 2,490 pounds of scallop meats.

Number of bushels and percent of catch (round weight) per statistical area:

Statistical Area	Bushels of Scallops	Percent of Catch (Round Weight) per Statistical Area	Pounds of Scallop Meats per Statistical Area
445931	270	270 ÷ 498 = 0.54216	0.54216x 2,490 lbs = 1,350
445932	135	135 ÷ 498 = 0.27108	0.27108 x 2,490 lbs = 675
435931	93	93 ÷ 498 = 0.18674	0.18674 x 2,490 lbs = 465
	498 (Total)		

Haul Composition Form

The **HAUL COMPOSITION FORM** (Appendix A.3.) is used to record the catch composition by weight in the scallop dredge including scallops, other commercial and non-commercial species, and debris. Unless otherwise directed at the time of briefing, the observer will sample one haul per day for catch composition. Only one dredge per haul will be sampled to determine catch composition. All sampled hauls must be selected randomly with the decision to sample a haul made prior to seeing its contents. **CRAB AND HALIBUT FROM HAUL COMPOSITION SAMPLING ARE NOT ENTERED ON THE CRAB SIZE AND INJURY**

FORM, THE HALIBUT LENGTH AND CONDITION FORM, OR THE BYCATCH AND SCALLOP DISCARD FORM.

Before the dredges break the water's surface, the observer should decide to sample either the port or starboard dredge. After the dredge is brought aboard, dumped and reset, the crew will begin sorting the retained scallop catch. Before any sorting begins, notify the crew of your intent to sample and then monitor the sorting to ensure there is no presorting of your sample. Normally, two or three crew will sort the catch, and put the retained scallops into baskets that are moved into the shucking house. During this time, stand-by and wait for the crew to finish sorting the retained catch from the discarded catch. After the retained scallops are removed from the deck by the crew, the observer will sort and weigh the remaining dredge contents by species. The haul composition sample is a record of species composition by weight. Small quantities of each species are weighed entirely, whereas large amounts may be subsampled to estimate weight. Weigh small quantities of species separately and record the weight to the nearest whole pound in column 7, "Weight in Sampled Dredge." In rare cases, you may not have the time or resources to identify all animals to species. In this situation, species groups may be recorded together; use the unidentified code i.e. snails unidentified, starfish unidentified etc.

If the haul contains a large volume of a single species (other than scallops) observers may estimate the total weight by first calculating an average basket weight of the species (record in column 6) and then multiplying that average weight by the visually estimated volume (or actual basket count) of the species or item contained in the catch. Record the resulting total weight in column 7.

To estimate the total weight of scallops in the haul, first weigh three baskets of scallops (retained by the crew) and calculate the average weight. Record this number in column 6, "Average Basket Weight". Multiply the average basket weight by the total number of baskets retained by the crew. Add to the resulting figure, the weight of all discarded scallops and record the grand total weight (to the nearest whole pound) in column 7. All calculations must be shown in the page margin to the right of column 7. Scallop and other bivalve shells must be sorted, weighed and recorded separately in the appropriate row on the form. See Appendix A.3. for examples.

Pacific Halibut should be sampled and quickly returned to the sea. Measure in a straight line, the fork length of the fish and convert length to weight using the conversion table (Appendix A.4.). Enter all halibut lengths in the halibut worksheet space provided on the form. Enter the sum of the halibut weights from the worksheet into column 7 of the Haul Composition Form.

Two species of Tanner crab are commonly taken as bycatch in the weathervane scallop fishery. Both are of the genus *Chionoecetes.* Within Alaska waters, *Chionoecetes bairdi* is found in the Gulf of Alaska, Aleutian Islands, and Bering Sea, whereas *C. opilio* occur only in the Bering Sea. There is also a hybrid of these two species, which can display a wide range of mixed characteristics.

Identify all crabs to species prior to weighing them. Tanner Crab (*C. bairdi*) are recorded as species code 68560. *C. opilio* and hybrids are combined together into *Chionoecetes* sp. and recorded as species code 68541. Crabs from Haul Composition sampling are not included in the

crab count from bycatch sampled tows and therefore will not be included in the weekly summary form, radio report form or crab size and injury form.

There are three species of king crab commonly harvested commercially in Alaska. However, the red king crab (*Paralithodes camtschaticus*), is the king crab species most likely encountered with the scallop dredge throughout the state.

Weathervane scallops *Patinopecten caurinus,* and scallops of the genus *Chlamys* have historically been fished commercially in Alaska. Identifying characteristics of both species are shown in Appendix A.5.

Use the blank rows in the species column for recording all species of invertebrates and vertebrates found during haul composition sampling that are not preprinted on the form. Each species recorded on the Haul Composition Form must be associated with a 5-digit code from the National Marine Fisheries Service, species codebook provided by ADF&G. Skates and skate egg cases will be divided into three categories (1) Big skate, *Raja binoculata* (species code 00420) and big skate egg cases (species code 00421), (2) longnose skate, *Raja rhina* (species code 00440) and long nose skate egg cases (species code 00441) and, (3) all other skate species will be grouped together as *Bathyraja* sp. (species code 00405) and *Bathyraja* egg case (species code 00402). Reference books provide by the independent contracting agent and/or reference material supplied by ADF&G or the Observer Training Center should be used to identify skates.

Preprinted items and associated codes at the bottom of the form include natural debris items, scallop "clappers" and man-made debris items. Natural debris, such as kelp, wood, rocks, etc. is added together and recorded as a single weight. The weight of large wood pieces or rocks too large to weigh directly, may be estimated. Scallop clappers are scallops that were obviously not killed in the current tow (previously dead), typically with little of no soft tissue remaining in the shell, with both valves still connected by the black ligament at the hinge. Count the clappers and break them apart before discarding overboard. Clappers represent natural and fishing mortality because scallops that are shucked by the processing crews are broken apart prior to discarding overboard. Man-made debris items are sorted by category type, weighed and counted.

If a dredge comes up empty i.e. flipped or simply no contents, complete the header information on the Haul Composition Form and *write "Empty Dredge" at the top of the form.* Put a zero in column 7 for weathervane scallops.

If a dredge comes up nearly empty or without any scallops, proceed with normal sampling and put a zero in column 7 for weathervane scallops.

If any part of the sample is lost or forgotten i.e. washed overboard or accidentally thrown overboard prior to sampling, *record one pound in the appropriate location(s) on the form and note the reason for the data loss on the form.*

Bycatch and Scallop Discard Form

One dredge from each of five hauls will be sampled daily for both retained and discarded weathervane scallop catch and prohibited species bycatch. Scallop C/Ps fish around the clock and normally make 15-21 tows/day. To the extent possible, sampling should be spread throughout each day so that it represents a cross-section of oceanographic and habitat characteristics in those areas commercially fished for weathervane scallops. There are four distinct goals associated with each bycatch sampled haul: (1) scallop discard assessment, (2) retained scallop assessment, (3) crab size, injury, and enumeration, and (4) Pacific halibut length and condition assessment.

AFTER the dredge has been emptied on the deck and the crew has removed the retained scallop catch from the dredge contents, observers should collect all remaining whole and broken weathervane scallops (discarded scallop catch) from the deck. Discarded scallops should be cleaned of heavy mud before they are weighed. Select one full basket for subsampling. Do not bias your sample selection by shape, size, or position of the scallops. All other baskets of discarded scallop catch should be temporarily set aside. Sort scallops from the subsample basket into two other baskets, one for broken (including crushed) scallops the second for intact scallops. When counting broken/crushed scallops there will be numerous pieces of scallops in the sample. If a scallop shell has 50% or more of the soft tissue attached to it, count it as one scallop. If it has less than 50% of the soft tissue attached, it should be discarded from the sample. Weigh the basket of **intact** discarded scallops and count the individuals. Record the number and weight (to the nearest whole pound), in the row indicated by condition code 1 on the **Bycatch and Scallop Discard Form** (Appendix A.6.). Measure the shell height (SH) of 20 scallops from the basket of intact discarded scallops. The 20-scallop sample will be selected by dividing the number of intact scallops by 20 and measuring every n^{th} scallop. For example, 100 intact scallops, divided by 20 equals 5; so every 5^{th} scallop in the sample would be measured. Scallop shell heights are measured to the nearest millimeter, the straight line distance from the umbo to the outer shell margin, perpendicular to the hinge (Appendix A.7.). Record the measurements in the column indicated as sample type 3, on the **Scallop Size Frequency Form** (Appendix A.8.). Sampling of scallops from the retained catch (Sample Type 2) is addressed in the Scallop Size Frequency Form section of this manual.

Weigh the basket of **broken/crushed** discarded scallops and count the individuals. Record the number and weight (to the nearest whole pound), in the row indicated by condition code 2 on the Bycatch and Scallop Discard Form.

Weigh each of the remaining unsample baskets of discarded scallops (remainder of discard) that were set aside from earlier sampling and sum the weights before returning the scallops to the sea. Record the sum in the row indicated by condition code 3 on the Bycatch and Scallop Discard Form.

Count all the scallop clappers in the sampled dredge and break the shells apart before discarding them overboard. Record the number of clappers in the row indicated by condition code 5 on the Bycatch and Scallop Discard Form.

If a dredge comes up empty i.e. flipped or simply no contents, complete the header information on the Bycatch and Scallop Discard Form and *write "Empty Dredge" at the top of the form.* For condition codes 1 through 5, put zeros in the "Number of Animals" and "Weight" columns. It is not necessary to record any information on the Crab Size and Injury Form, Scallop Size Frequency Form or Halibut Length and Condition Form.

If a dredge comes up nearly empty proceed with normal sampling.

If any part of the sample is lost or forgotten i.e. washed overboard or accidentally thrown overboard, *put a null (-0-) designator in the appropriate location(s) on the form and note the reason for the data loss on the form.*

Scallop Size Frequency Form

The **SCALLOP SIZE FREQUENCY FORM** (Appendix A.8.) is used to record scallop SH measurements from two sample types; retained scallop catch (sample type 2) and discarded scallop catch (sample type 3). Methodology for selecting intact discard samples (type 3) for measuring is described in detail in the Bycatch and Scallop Discard Section of this manual.

For sample type 2, twenty scallops from the **retained catch** in each of the five hauls sampled daily for bycatch will be measured. Scallops will be selected from the baskets of retained scallops collected by the crew. Do not bias your sample selection by shape, size, or position of the scallops. Collect the 20 scallops from the retained catch prior to conducting other sampling duties, because if there is a small amount of retained scallop catch, there is likely probability that all the scallops will be processed, and therefore unavailable to you, by the time you are finished with your other sampling duties. Record the SH under the column designated as sample type 2. Place the 20 whole scallops in the clean plastic container provided by ADF&G and weigh them to the nearest tenth of a pound, on the ship's scale. Be sure to subtract out the weight of the plastic container. Do not tare the plastic container on the ship's scale. It is calibrated for their product. Everything that is taken into the processing area must be very clean and dry including the plastic container of scallops. Do not, under any circumstances, wear your rain jacket or gloves into this area. When you are done weighing the scallops, the area should be spotless. **Record the weight on the condition code 4 line of the Bycatch and Scallop Discard Form** (Appendix A.6.).

Shell Collections

Observers will collect the dorsal (left) valve of every tenth shell examined from the retained scallop samples (those coded as sample type 2 on the **Scallop Size Frequency Form)** as indicated by the shell sampling protocol (Table 1). Record the haul number and corresponding shell number from the Scallop Size Frequency Form, as well as the statistical area number, vessel ADF&G number, and date on the inside of the shell with a permanent marker. The haul number will be indicated by the prefix **H** followed by the number. The shell number will be indicated by the prefix **S** followed by the number. When the shells are wet or damp the inside of the shell can be easily written on with a lead pencil. After the shells are dry, use a permanent

marker to replace the pencil label. Collected scallop shells must be cleaned of all meat, barnacles, and other fouling organisms. Failure to do so will result in very odoriferous shells; and dried on silt, barnacles, etc., obscure growth rings important for visual shell-aging. Shells will be cleaned with a brush provided by the department. Use the minimum amount of pressure necessary to remove fouling organisms. Do not use a wire brush. Handle shells to avoid chipping the shell margin. Store dried shells in muslin bags provided by the department. Each muslin bag should contain only the shells collected during one week from one registration area or district. Shells should not be separated by statistical area. If, for example, a vessel fishes in both the Shelikof District and the Northeast District in the same week, shells will be divided into two bags, one containing Shelikof District shells and one containing Northeast District shells, both with the same beginning and ending week dates written on the bag. A permanent marker should be used to write the beginning and ending dates of the week on the outside of each bag along with the vessel name, ADF&G number, trip number, fishery code, district (where applicable), and observer's name.

The shell sampling protocol schedule indicates which shells to measure on any given day. For example, on Sunday, the observer will collect shell numbers 3 and 13 (every tenth shell) from each of the five hauls. On Wednesday, collect shell numbers 8 and 18.

Table 1. Shell sampling protocol schedule.

	DAY OF THE WEEK						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Starting Number	3	2	5	8	7	1	4

Crab Size and Injury Form

Crab measured and examined during bycatch sampling are recorded on the CRAB SIZE AND INJURY FORM (Appendix A.9.). This form is used to detail crab catches observed during bycatch monitoring. Codes for species, sex, shell condition, and mortality are listed at the bottom of the form.

The sampling goal is to measure, if available, 20 each of Tanner (combined *Chionecetes* spp.), king, and Dungeness crab per sampled dredge. If the dredge is judged to contain more than 20 crabs of a single type, Tanner for example, measure and speciate the first 20, then count and speciate the remainder. Observers should collect the first 20 crabs encountered by species, from the discarded catch, for detailed examination. Observers should alternate between starting at the forward, middle and aft of the discard catch pile. Take time to sort the bycatch pile carefully, **avoiding size bias** when collecting the first 20 crabs. Be aware, the tendency is to select the larger crabs while overlooking smaller ones. Be sure to enter the total number of crab captured in the dredge on the **Bycatch and Scallop Discard Form** (Appendix A.6.).

The form has columns for species code, size (mm), sex, shell condition, and mortality. If the carapace is crushed so that size or sex cannot be determined, insert a null (-0-) in the corresponding space on the form. Do not leave blank.

Crab Mortality

If a sampled crab appears to be moribund or dead, record mortality as 1. Any injury that breaches the carapace and soft tissue underneath will kill the crab because its vital organs are exposed to the environment. Crabs may survive a leg injury so long as it is distal from the coxa, because it may autotomize the injured leg. Crabs with a crushed carapace will likely die and should be recorded as mortality code 1.

Crab Measurement

All crabs are measured following previously developed biological standards. The biological measurement for king crab and horsehair crab is the carapace **LENGTH** (Appendix A.10.). Carapace length is described as the straight line measurement from the posterior margin of the right eye orbit of the carapace to the center of the posterior carapace margin as measured with a vernier calipers. Carapace length is recorded to the nearest whole millimeter.

The biological measurement for Tanner crab is the carapace **WIDTH**. Carapace width (CW) is the greatest straight line distance across the carapace, EXCLUDING SPINES, at a right angle to an imaginary line midway between the eyes to the mid-point of the posterior portion of the carapace. Carapace width is recorded to the nearest whole millimeter.

The biological measurement for Dungeness crab is the carapace **WIDTH** as measured inside the tenth antero-lateral spine or tooth.

Crab Sex Determination

Male and female crabs can be identified by looking at the shape of the abdominal flap on the ventral side of the crab (Appendix A.11.). Juvenile and adult male Chionoecetes crabs have an abdominal flap that is nearly triangular in shape and rounded at the anterior end. Juvenile females have a rectangular shaped abdominal flap that is rounded at the anterior end. A hand lens may be helpful when determining the sex of Chionoecetes crabs less than 25 mm CW.

Crab Shell-Aging

For each Tanner or king crab sampled during the bycatch monitoring, a shell-age determination must be made. Shell-age is an estimate of elapsed time since the last molt. The observer should keep in mind the subjective nature of this determination. Only by looking at many crabs from a similar area can a relatively accurate assessment of shell age be made. The time of year and type of seabed where the crabs reside will cause crabs to "age" at seemingly different rates. It is helpful to examine several areas on the crab, especially the ventral side and dactyls, to determine shell-age. The amount of scratches and the color on the ventral surface of the exoskeleton,

combined with spine wear, are clues used to determine shell-age. The more hands-on experience with the aging techniques, the more confident and accurate each observer will become.

Shell-Age Characteristics

Red king crab and Tanner crab are shell-aged by examining the color and amount of scratches on the ventral surfaces, in combination with the presence of epifauna on the carapace.

Soft-shell crabs of all species are crabs that have recently molted. They are very pliable, and the legs will not support the weight of the body without bending. The exoskeleton is like skin. The soft-shell phase is short, typically less than 2 weeks, because the exoskeleton hardens quickly. This classification should not be confused with crabs several months after a molt that exhibit hardened exoskeletons, but which can be compressed due to the lack of meat within the shell.

New-shell king crab exhibit white ventral surfaces with relatively few scratches or abrasions. Shells are normally 2 weeks to 12-months old. Old-shell king crab have a yellowish ventral surface with a number of dark stained scratches. The shells are typically 13 to 24-months old. Very-old-shell king crab have a yellowish ventral surface, darkened by several years of accumulated scratches and abrasions. Scratches are also present on the carapace. Carapace spines and dactyl ends are worn. Epifauna is often apparent. Shells are more than 24 months old.

New-shell Tanner crab exhibit a pinkish colored ventral surface with limited scratches. The carapace is pink to brownish-red with sharp spines. Shells are normally 3 weeks to 12-months old. Old-shell Tanner crab exhibit a ventral surface with numerous scratches and abrasions. The exoskeleton is brown with worn spines. Epifauna may be present. Shells are 13 to 24- months old. Very-old-shell Tanner crab typically have numerous scratches and abrasions on the ventral surface. The exoskeleton is dark brown to blackish with very worn spines. Epifauna is almost always present. Shells are more than 24 months old.

Halibut Length and Condition

Halibut sampled during bycatch sampling are recorded on the HALIBUT LENGTH AND CONDITION FORM (Appendix A.12.).

Halibut are measured to the nearest centimeter (cm) from the tip of the closed lower jaw to the end of the central rays of the caudal fin (fork length). Care should be exercised to obtain the straight line distance and avoid any bias by laying the measuring tape on top of the fish. Large fish may require assistance for accurate measuring.

Halibut condition codes are listed at the bottom of the form. Multiple hauls may be recorded on a single form.

Radio Report Form

The **RADIO REPORT FORM** (Appendix A.13.) is used to organize and encode observer data transmitted by radio or mobile satellite communication systems to ADF&G offices. Each observer will be issued an observer manual with a unique set of reporting codes. All reports, regardless of the reporting method used, must be sent in code. The radio report form should be completed prior to the assigned transmission time. This will facilitate a smooth and accurate radio message.

REPORT THE FOLLOWING ITEMS (IN CODE ONLY) FOR EACH STATISTICAL AREA FISHED:

ITEM 1. Statistical Area.
ITEM 2. Total minutes of all hauls.
ITEM 3. Total minutes of all bycatch sampled hauls.
ITEM 4. Total number of king crab in all hauls.
ITEM 5. Sampling condition.
ITEM 6. Number of *C. bairdi* Tanner crab in bycatch sampled hauls.
ITEM 7. Number of *C. opilio*/hybrid Tanner crab **or** Dungeness crab in bycatch sampled hauls. **(Use item 7 for reporting *C. opilio* and hybrid Tanner crab in the Bering Sea Management Area, Dungeness in all other Management Areas).**
ITEM 8. Pounds of scallop meats retained.
ITEM 9. Total number of hauls/number of bycatch sampled hauls. **(For example, if 36 hauls were made during the reporting period and 10 were sampled for bycatch, the entry would be 36/10).**

Radio Reporting Procedures

Historically, single side band (SSB) radio was the standard method of communications between scallop vessels and ADF&G offices. Radio communications has largely been replaced with mobile satellite communications. Most scallop boats use satellite communications to communicate with ADF&G offices via fax or email. Still, some of the smaller scallop boats have only radio communications, so it is important to know how to use the ship's radio. All transmissions must be in code to protect data confidentiality.

The reporting schedule will be established with the observer at the briefing. While radio reports may be required hourly, daily etc. the normal reporting schedule is tri-weekly; Monday, Wednesday, and Friday. The report on Monday covers fishing activities on Friday, Saturday and Sunday. Wednesday's report covers fishing activities on Monday and Tuesday. Friday's report covers fishing activities on Wednesday and Thursday. ADF&G office locations, radio call signs, fax numbers, phone numbers, and email addresses will be provided to the observer at the briefing.

A separate radio report is required for each statistical area fished during a reporting period. So, if three statistical areas were fished during a reporting period, an observer would submit three reports for that period.

Observers are responsible for transmitting the radio report. If the vessel operator prefers to transmit the information himself, the observer should be present at the time it is transmitted in case any questions arise or special instructions are sent to the observer from ADF&G.

Observers must submit a report on the designated reporting day and time even if no fishing or processing took place during the reporting period. In this case, report only Sampling Condition, Item 5.

The radio is extremely busy at times, so keep the radio use to a minimum. Be prompt, accurate, and courteous with all radio communications. Speak slowly enough to allow your report to be copied accurately. Be sure to state your vessel name and coded information as: "ITEM ONE:_____", "ITEM TWO: _____ , "ITEM THREE: _____", and so forth. Stay on the radio for confirmation that your report was copied.

Phonetic Alphabet

Use the phonetic alphabet in your radio reports:

A - ALPHA	J - JULIET	S - SIERRA
B - BRAVO	K - KILO	T - TANGO
C - CHARLIE	L - LIMA	U - UNIFORM
D - DELTA	M - MIKE	V - VICTOR
E - ECHO	N - NOVEMBER	W - WHISKEY
F - FOX-TROT	O - OSCAR	X - X-RAY
G - GULF	P - PAPA	Y - YANKEE
H - HOTEL	Q - QUEBEC	Z - ZULU
I - INDIA	R - ROMEO	

Radio Codes

Appendix A.14. is an example of radio codes used to complete the scallop observer radio report form. At the time of briefing, each observer will be issued a manual with a unique set of codes for encoding observer data for transmission by radio or mobile satellite communications to ADF&G offices. Observers should not remove codes from their manual or allow anyone to see their code sheets. Codes are to be kept confidential and locked in the observer's briefcase when not in use. If someone other than the observer transmits the observer's report, they should be given the message to transmit in coded form only.

All nine items listed on the radio report form must be encoded, for each statistical area fished, before the observer enters the wheelhouse. The message will be typed into the computer in the following format: Boat name, Item 1, Item 2, Item 3, Item 4, Item 5, Item 6, Item7, Item 8, Item 9, STOP. Referencing Appendix A.13., the following is an example of the data string that would

be reported on Wednesday July, 7 : LUCKY DUCK, LR, WBMG, PAG, Y, XO, BU, C, CNWS, BY-J, STOP. Always use capital letters, never small letters.

PART III

SAFETY AND SEA SURVIVAL

Introduction

Commercial fishing in Alaska is a dangerous occupation. Alaska's harsh environment, the weather, and the nature of the gear and equipment being used on a rolling deck make commercial fishing a hazardous environment. You can greatly increase your level of safety and survival by considering safety in all that you do and preparing for emergencies ahead of time. You must take responsibility for your own safety and learn as much as you can before an emergency threatens your life. Most fishing vessels are operated by safety-minded skippers who realize the danger of their occupation. Use the knowledge and experience of the vessel's crew for guidance on safety on your vessel. They are certainly concerned about the safety of an observer, a guest on their vessel, and will make sure that the dangers for you are minimized. No matter how cautious the crew is, it is your responsibility to try to keep yourself safe and know how to react in emergency situations.

The information presented here, and in briefing and training, serves only as an introduction. You can learn much about sea safety and survival from the vessel personnel, who have years of sea experience between them. You must realize that the ultimate responsibility is upon you to survive. It is easy to think "this will never happen to me," but that thought may cost you your life. Take the time to learn as much as you can, and consider what your actions will be in emergencies. Your life is worth far more than any data you could collect in the fishery.

Safety on Deck of a Scalloper

The most important thing you can do on the deck of a scallop vessel is to always be aware of your surroundings. Keep your eyes and ears tuned to what is going on, and never turn your back on fishing gear that is in operation or otherwise not secure. A few points:

- Choose a work area that is clear of the recoil path of the warp cables.
- Do not sample on deck during haulback or setting operations.
- Never listen to music with headphones; equipment failures are often preceded by warnings from other crew or unusual noise from the equipment.
- Never leave clothing, tools, tape recorders, etc., hanging loose.
- Be extremely careful when near temporarily slack cables, avoid stepping over slack cables, and never step into the bight of a line.
- If you are tired or otherwise not feeling well, use extra caution because your judgment and reaction time may be impaired.
- Wear a PFD (Personal Flotation Device) and a hard-hat when on deck.
- Before you begin sampling, get to know the location and use of safety equipment onboard such as life rings, survival suits, life rafts, life vests, fire extinguishers, EPIRBS, exits, escape

routes, and your emergency station. Should an emergency occur, you may have only seconds to act. If you are prepared, those seconds may be the difference between life and death. It is up to you to learn as much as you can about the general emergency procedures for all vessels and the procedures particular to your assigned vessel.

Marine Safety

Most first-time observers have no previous experience at sea. You will learn about safety and survival procedures during training; but training alone will not be enough. It is up to you to learn as much as you can about marine safety and the procedures particular to your assigned vessel.

U.S. Coast Guard regulations require specific equipment, instructions, and drills aboard vessels that operate beyond the Boundary Line (an imaginary line that follows the shoreline, crossing from headland to headland at entrances to bays, inlets and rivers) or carry more than 16 individuals. These regulations are published in the Code of Federal Regulations.

Safety Orientation

When you board a vessel, you must receive a safety orientation. This may be as simple as showing you around, but may include watching videos, donning immersions suits, or conducting drills. An important item to find is the Commercial Fishing Vessel Safety Examination Decal (Figure 1). The U.S. Coast Guard operates a free vessel inspection program to assure that a vessel's safety equipment meets Coast Guard standards. Although the program is voluntary, Alaska state regulations, 5 AAC 39.645 (i)(10), mandate that any vessel required to carry an onboard observer will "provide proof of compliance with U.S. Coast Guard vessel safety requirements."

Upon successful completion of the exam, the vessel is issued the decal and paperwork that certifies compliance. The inspection is valid for two years from the date (month/year) indicated on the decal. The decal should be on a starboard side window of the wheelhouse. If the decal is missing, the vessel may have paperwork that verifies the inspection (they may have replaced a window, for example). If you board a vessel without a decal, or with an expired decal, you are to immediately disembark and then inform ADF&G and your employer.

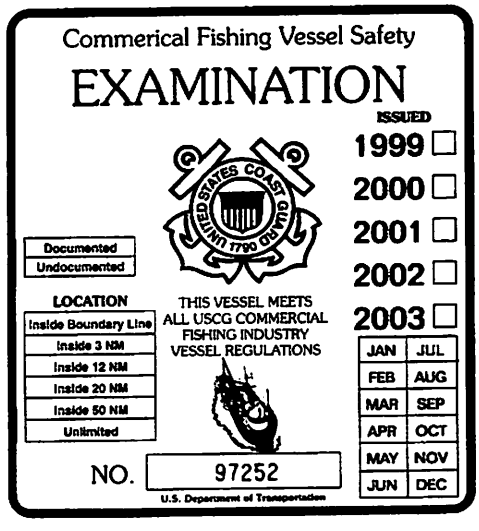


Figure 1. Safety examination decal.

It is important to remember that the safety decal is only an indicator of the vessel's safety at the time of inspection. The person ultimately responsible for your safety is you. Figure 2 is a list of the items to

bechecked prior to leaving port. Check these things before you leave port so the skipper has an opportunity to fix any problems. You also need to know about procedures and equipment before you are seasick--an emergency is possible at any time.

Figure 2. Safety checklist.

Vessel Safety Checklist

The following is a list of vessel safety equipment that is mandatory by the U.S. Coast Guard.

	mo. / yr.
Life Raft (rated for _____# persons)	
Service Due sticker	__ / __
Hydrostatic release (Is it configured properly?)...	__ / __
EPIRB	
NOAA Registration Decal with vessel name	__ / __
Battery sticker	__ / __
Hydrostatic release	__ / __
Flares	
3 smoke flares	__ / __, __ / __, __ / __
6 handheld flares	__ / __, __ / __, __ / __
	__ / __, __ / __, __ / __
3 parachute flares	__ / __, __ / __, __ / __
Fire Extinguishers	
Each exit in the wheelhouse	__ / __, __ / __, __ / __
Galley	__ / __
Engine Room	__ / __
Auxiliary rooms with machinery	__ / __, __ / __

Immersion Suit

The vessel must have a survival suit on board for EVERYONE, no exceptions. Inspect the suit issued to you for general condition and size.

Date and Time _____

Captain's Signature _____

Observer's Signature _____

A signature indicates that the observer and vessel operator have inspected and discussed all safety matters addressed above. This form must be completed prior to departure.

As stated in ADF&G Commercial Shellfish Fishing Regulations General Provisions 5 AAC 39.645 (10) (i) When a vessel is required to carry an onboard observer, the vessel owner, owner's agent, or operator shall provide proof of compliance with U.S. Coast Guard vessel safety requirements.

USCG regulations for all vessels carrying observers in 50 CFR Sec. 600.746 state 'a vessel is inadequate or unsafe for purposes of carrying an observer if it has not passed a USCG safety examination or inspection...' and applies to 'any fishing vessel required to carry an observer as part of a mandatory observer program or carrying an observer as part of a voluntary observer program under the Magnuson-Stevens Act or under any other U.S. law'.

Station Bills

Somewhere, in a prominent place, you will find the station bill (Figure 3). The station bill assigns duties to all on board in the event of an emergency. Familiarize yourself with your duties in emergency situations and ask for clarification if the station bill does not provide you with enough information.

Figure 3. Example of a station bill

	Man Overboard Signal: 3 long blasts repeated at least 4 times.	**Fire** Signal: 1 long blast not less than 10 seconds.	**Flooding** Signal: 1 long blast not less than 10 seconds.	**Abandon Ship** Signal: at least short blasts followed by 1 long blast.
Position	**Station/Duty/Bring**	**Station/Duty/Bring**	**Station/Duty/Bring**	**Station/Duty/Bring**
Captain	Wheelhouse, radio, maneuver vessel	Wheelhouse, radio, maneuver vessel	Wheelhouse, radio, maneuver vessel	Wheelhouse, radio, maneuver vessel
Mate	Throw ring, lookout	Fight fire	Plug hole, pump	Immersion suits, prepare life raft
Deck Boss	Emergency swimmer, don immersion suit and safety line	Assist fire fight	Assist plugging hole and pumping	Immersion suits, prepare life raft
Deckhand	Communicate, assist where needed	Communicate, boundary person, survival gear	Communicate, secure hatches, assist	Communicate, EPIRB, count crew
Observer	Wheelhouse	Debarkation station	Debarkation station	Debarkation station

Emergency Procedures

There may be other placards posted (Figure 4) that describe the procedures for specific emergencies. Required postings are the survival craft embarkation stations, fire and emergency signal, the abandon ship signal, the location of immersion suits and donning instructions, and the detailed instructions on how to make distress calls (MAYDAY). Regulations require that some instructions are *available*, so they may not be posted; but are in an accessible location. Be sure to ask for these and review them. There should be instructions available for fires, person overboard, crossing hazardous bars, rough weather, anchoring the vessel, and flooding.

Drills and Instruction

In addition to these required instructions, drills must be conducted involving each individual at least once a month. Participate in any drills that are conducted--you may contribute to the crew's knowledge besides learning more yourself. Drills are the most effective means to improve your chances of surviving an emergency.

ABANDON SHIP

●●●●●●● —

SIGNAL
AT LEAST 7 SHORT BLASTS FOLLOWED BY ONE LONG BLAST
ON SHIP'S WHISTLE AND GENERAL ALARM

1. Preparations should include the following as time and circumstances permit:
   a. General Alarm & Mayday.
   b. All personnel don survival suits/PFD's. Warm clothing if time permits.
   c. Prepare to launch liferaft. Attach sea painter to vessel.
   d. Assemble signal devices--EPIRB, flares, smokes, flashlights, handheld radios, etc.
   e. First Aid Kit.
   f. Water.
   g. Food.
2. Muster at embarkation station.
3. When sinking is imminent or remaining on board is inappropriate:
   a. Launch & board liferaft.
   b. Keep sea painter attached to vessel. Be prepared to cut sea painter immediately if there is risk of damage to liferaft or vessel sinks.
   c. Activate EPIRB & commence 7 Steps to Survival.

Figure 4. Emergency procedures.

Life Rafts

Any vessel that operates offshore must have enough life raft capacity for all aboard. Life rafts (Figure 5) are stored in canisters that allow them to float free and automatically inflate if the vessel sinks. Ideally, there will be time to manually launch and inflate the raft. Know where the rafts are stored, how to remove them from the cradle, where to launch them, and how to inflate them.

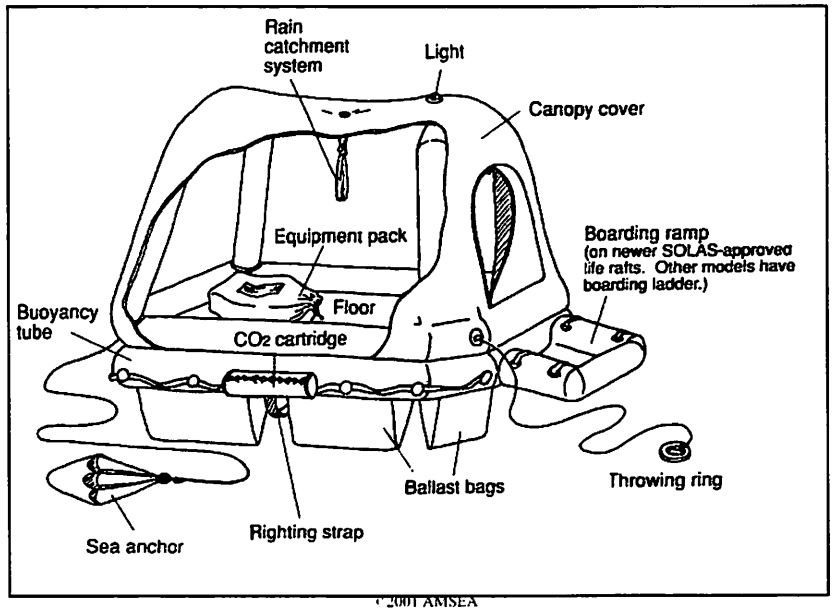


Figure 5. Typical life raft and equipment.

Pay special attention to the devices used to secure the life raft canister to the cradle. The most common type of hydrostatic release (Figure 6) is designed to cut through line when the water pressure rises (about 2 meters under water). The device cuts a loop of line that secures the retaining strap for the raft canister. This should set the canister free, while the painter line (attached to the raft and its inflation trigger) should stay attached to the boat by a weak link. The weak link is a low breaking strength material (red cord or soft metal) that will break before the sinking boat pulls the raft under. [Note: hydrostatic releases are not required if the canister is set to "float free".]

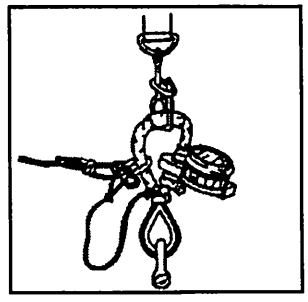


Figure 6. Hydrostatic release.

You need to determine if the release is correctly mounted and know how to release the raft manually. The release should be marked with an expiration date. If the function of the hydrostatic release and raft is not clear to you, ask for guidance. Usually, a "pelican hook" holds the retaining strap.

To launch a typical raft manually:

1) Release the pelican hook
2) If the raft is to be launched from another location on the vessel;
   a. Break or disconnect the weak link
   b. Carry the canister to the launching point
3) Tie off the painter line
4) Toss canister in water, and
5) Pull on painter until the inflation is triggered.

Personal Flotation Devices (PFD)

Personal flotation devices are an essential component of marine safety and survival. They provide flotation and thermal protection. The best PFDs are bright, highly visible colors to aid rescuers. You are required to have a PFD for your deployment. You may be issued one as part of your gear, or you may have one of your own. If purchasing a PFD, consider comfort to be a major consideration. The best PFD is the one that you will wear.

Figure 7. Heat escape lessening position.

PFDs provide thermal protection in their design (vest, jackets, etc.) and their function. Keeping the head and neck out of the water reduces the exposure of high heat loss areas to water, which can transfer heat much faster than air. If in the water, you should use the Heat Escape Lessening Position (HELP). The "HELP" position reduces the movement of water around the head, neck, sides, armpits, and groin (Figure 7).

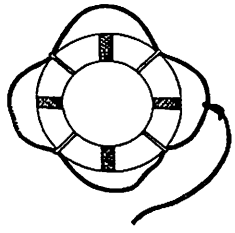


Figure 8. Life ring.

Life rings (Figure 8) are required and should be in logical locations to enable rescuing a man overboard. Life slings are devices used to lift a person from the water and are usually located near the block. A life sling is throwable and can be substituted for a life ring. Find the life rings on your vessel and be prepared to get one and throw it in a man overboard emergency. It will provide flotation, and can mark the position of the person in the water even if they cannot reach it.

Immersion suits

An immersion suit (Figure 9) is a shelter that is required by the safety regulations for everyone aboard a vessel that operates in cold water. There are different brands and styles, but all are made of neoprene rubber, and are generally a universal size. Either your assigned vessel will have enough aboard for the crew and you or one will be provided by your contractor or ADF&G. Be sure that you can find your suit and put on the suit in less than a minute, even in the dark. Know how to get to where the suits are stored in the dark. The suits must have a working zipper (add some wax to lubricate) and a signal device, such as a strobe light attached. They should be stored in an easily accessible place.

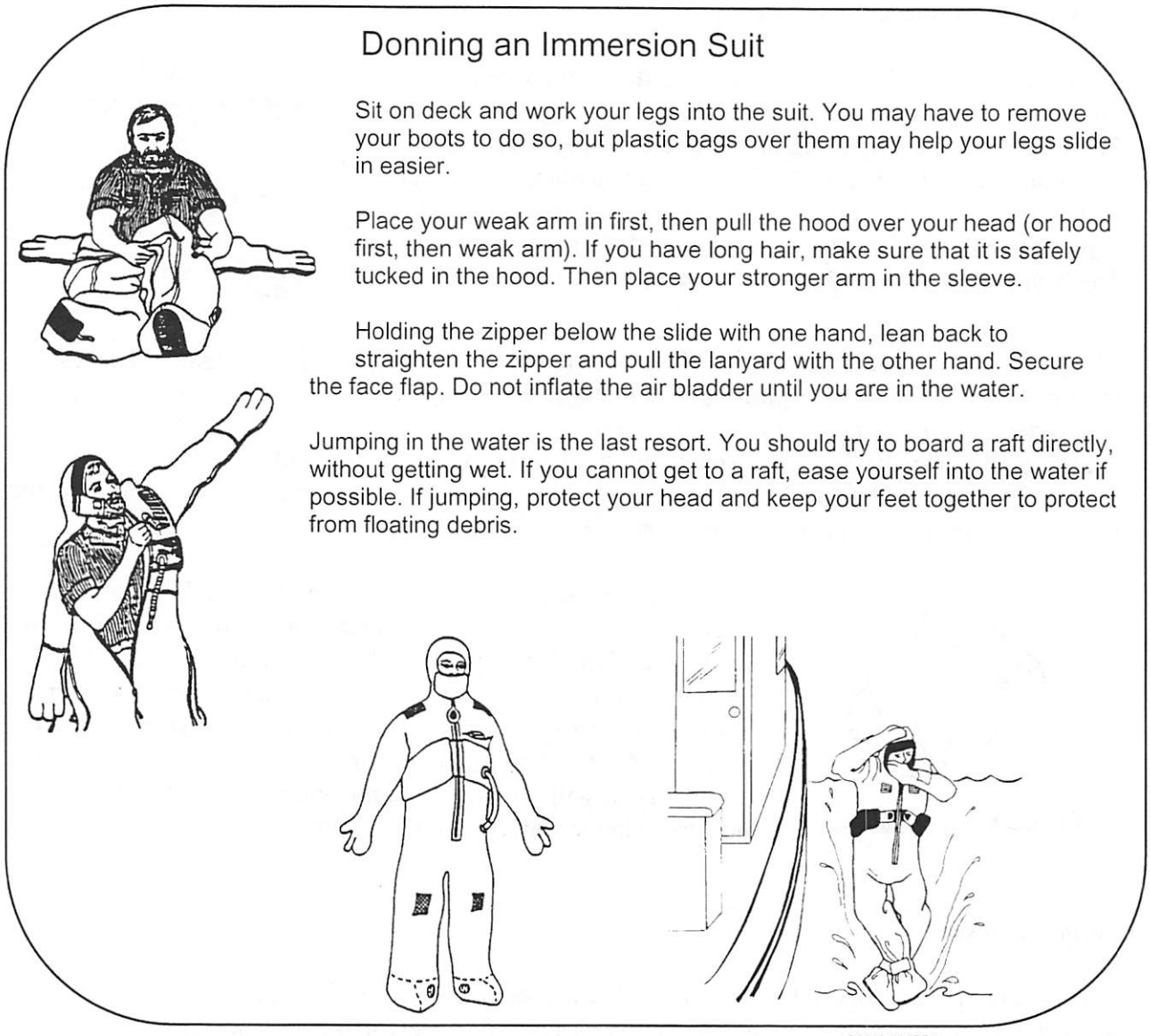


Figure 9. Donning an immersion suit and a "wet exit"

Emergency Position Indicating Radio Beacon (EPIRB)

The vessel will have at least one EPIRB mounted in a float-free bracket that will be automatically activated in the event of sinking. The signal is received by satellite and will identify the sender. It is important to know where the EPIRB is mounted and how to activate it manually. In case of an abandon ship emergency, it is an item you want to take with you. Someone should be assigned that duty on the station bill. Be sure to locate the EPIRB(S) on your vessel and read the directions on how to activate them. An EPIRB should be tested monthly.

Radios

The emergency frequencies are Channel 16 on VHF (Very High Frequency) radios and 2182 kHz or 4125 kHz on SSB (single side band radios). VHF radios are short range and SSB radios are for long range communications. Vessels are required to monitor the emergency frequencies at all times, and these frequencies are used by all vessels to relay navigation, hazard, and emergency. There will be a placard (or sticker) posted near the radio that describes how to make a MAYDAY call. Know what constitutes a proper MAYDAY call. If you hear a MAYDAY call on the radio, listen carefully and take notes. Inform the person on watch and be ready to respond to the call if the Coast Guard does not.

Flares

There will be flares and smoke signals aboard, most likely in the wheelhouse, but also in the life raft. Each type (hand held, rocket, smoke flares, etc.) will have instructions printed on its container. Each type has specific situations that it is best used. Flares are dangerous and should be treated as firearms. It is not legal to use a flare except for actual emergencies. If you see a flare launched at sea, inform the person on watch immediately.

Survival Kits

A personal survival kit can take up very little space in an immersion suit while greatly enhancing your ability to survive. The items to include in your kit should enhance your ability to address the issues of shelter, signals, fire and personal medical needs. Items such as a knife, dental floss (a strong multi-purpose line), plastic garbage bags, matches, signal mirrors, a compass, small flares, or a space blanket are small items that fit in a zip-lock bag and could save your life.

Comfort Kit: A comfort kit contains a more extensive inventory than a personal survival kit. The items in it should more broadly cover issues raised in the Seven Steps to Survival such as emergency water and food supplies, a first aid kit or a radio. Vessels may have an emergency bag stored and a person named in the station bill to bring it.

Fire Extinguishers

There are four classes of fire extinguishers, each for a specific source of fire. Appropriate extinguishers must be available and maintained. Know where the nearest extinguisher is to any place that you spend time, and be prepared to get backup extinguishers in the event of a fire. Fire extinguishers are approved for one or more specific Classes of fire:

Class A	Combustible solids - wood, paper, plastic (make **A**sh)
Class B	Oil, grease, and gas (they **B**oil)
Class C	Electrical (**C**ircuits)
Class D	Metals: flares are an example (they **D**ent)

The Seven Steps to Survival

1 Recognition 2 Inventory 3 Shelter
4 Signals 5 Water 6 Food 7 Play

The USCG assembled the Seven Steps to Survival from studies and personal accounts of those who survived, or did not survive, emergencies. The Seven Steps are arranged in order to guide you on priorities that will increase your chance of survival. Committing the seven steps to survival to memory should be one of your goals in learning how to survive emergencies at sea or on land. The Seven Steps should be started again each time the situation changes (e.g., boarding the raft).

Recognition

This step should be taken the moment you board a vessel, because life on board a vessel is an inherently dangerous situation. Become familiar with normal operations on a vessel, and reassess dangers anytime the situation changes. In the event of an emergency, you must quickly recognize the seriousness of the situation and that your life is in danger. Hesitation or denial may cost your life, especially in the harsh environment of Alaska.

Inventory

Stop and assess the situation. Decide what will help you and what will hurt you. Inventory the equipment, weather, your skills, injuries, and your mental condition. Doing so will help you to make good decisions that will help you survive.

Shelter

Your biggest enemy in Alaska is the cold. Your primary shelter is your clothing. Secondary shelter is anything that further protects you against the loss of your body heat such as an immersion suit, a raft, or even an overturned vessel. Water can take heat away from your body much quicker than air, so shelter also helps you keep as dry as possible. High heat loss areas need to be protected most, and the added buoyancy of a PFD helps to keep your head and neck out of water. In a shore survival situation, shelter is critical. It takes hours to construct adequate shelter and you must do so as soon as possible.

Clothing: It is the air spaces between cloth fibers that provide insulation. Cotton cloth absorbs water and holds it in the interstitial spaces (between the fibers) rendering it useless as insulation. Therefore cotton, although very comfortable, offers little protection in a damp environment. In contrast, when wool or polyfiber clothes absorb water, the fibers hold the water and the interstitial spaces stay open to trap air, keeping the insulating value intact. Consider clothing made of wool, polar fleece, or polypropylene to wear at sea. Wool pants and sweaters that cost less than $5 at a thrift store could make the difference between life and death. If too warm for

work, keep them with your immersion suit. Polar fleece, polypropylene, and similar synthetics cost more, but dry quickly and are well suited for many outdoor pursuits beyond your work as an observer.

Signals

A good signal attracts attention and conveys a message for help. Radios, EPIRBS, and flares are signals carried by vessels. Other examples of signals are lights attached to immersions suits, or a signal mirror in your personal survival kit. If abandoning ship, anything that can be tossed overboard may help an aircraft to find you. Anything that makes you bigger or brighter is a signal. Three of anything (fires, buoys, immersions suits on the beach) is an internationally recognized distress signal that could be used in a shore survival situation.

Water

Humans require about two liters of water per day to stay healthy. You can live without water for only a few days, and will suffer dehydration from the stress of any emergency. Life rafts have limited rations of water, but it is advised to gather as much as possible before abandoning ship if time permits. Never drink seawater or urine.

Food

A person can go without food much longer than without water. Never eat food without water--your body must use water to digest food. Life rafts are supplied with limited food rations. In a shore survival situation, almost any animals or leafy green plants in the inter-tidal zone are edible. Avoid mussels or clams because they may cause paralytic shellfish poisoning.

Play

Studies have shown that mental attitude makes a positive difference in a survival situation. Play is anything that keeps you occupied and prevents your mind from dwelling on the difficulties you are facing. Play could be reading, telling jokes or stories, completing a task, improving your shelter--anything that keeps your mind active and focused.

LITREATURE CITED

(AMSEA) Alaska Marine Safety Education Association, 2001. Marine Safety Instructor Manual, 8th Edition. Edited by Jerry Dzugan and Shawn Newell. AMSEA, P.O. Box 2592, Sitka, Alaska, 99835.

APPENDIX

Appendix A.1. Fishing log for Alaska scallops.

ALASKA DEPARTMENT OF FISH AND GAME
FISHING LOG FOR ALASKA SCALLOPS

Captain's Name Black
Observer name Steve Dredge
Vessel Name Lucky Duck

Trip number	ADF&G #	Year	Fishery Code
1	96150	04	KSO4

	Haul sampled	Total dredge width	Gear performance	Date Mon.	Date Day	Haul No.	Set position Latitude (N)	E W	Longitude	Fishing times in AKT Dredge on bottom	Dredge off bottom	Fishing duration (minutes)	Average bottom depth (fms)	Average Speed in knots	CATCH Bushels	CATCH Round weight (pounds)	Discarded Catch round weight in pounds	ADF&G statistical area
	2	30	1	7	5	66	57 34.54	W	151 54.60	0100	0215	75	53	4.8	27	1566	100	515730
	2	30	1	7	5	67	57·35·40	W	151·55·40	0225	0325	60	55	4.8	18	1044	100	515730
	2	30	1	7	5	68	57·34·30	W	151·54·35	0335	0430	55	55	4.8	35	2030	150	515730
	1	30	1	7	5	69	57·33·68	W	151·53·65	0440	0540	60	53	4.8	30	1740	150	515730
	2	30	1	7	5	70	57·31·38	W	151·45·88	0555	0700	65	54	4.8	20	1160	100	515730
	2	30	1	7	5	71	57·31·18	W	151·46·39	0715	0825	70	54	4.8	20	1160	100	515730
	1	30	1	7	5	72	57·36·40	W	151·46·52	1315	1415	60	57	5.0	22	1276	100	515730
	2	30	1	7	5	73	57·35·94	W	151·45·10	1425	1530	65	56	4.8	20	1160	60	515730
	1	30	1	7	5	74	57·36·20	W	151·45.60	1545	1650	65	58	4.8	21	1218	80	515730
	2	30	1	7	5	75	57·35·93	W	151·44·30	1705	1805	60	57	4.4	20	1160	70	515730
	1	30	1	7	5	76	57·33·55	W	151·36·76	1820	1930	70	54	4.8	27	1566	110	515730
HC	1	30	1	7	5	77	57·33·51	W	151·39·37	1945	2050	65	58	4.9	35	2030	120	515730
	1	30	1	7	5	78	57·33·25	W	151·37·69	2115	2215	60	60	4.9	35	2030	140	515730
	2	30	1	7	6	79	57·33·35	W	151·36·93	0105	0205	60	62	4.8	24	1392	50	515730
	2	30	1	7	6	80	57·35·89	W	151·32·79	0220	0330	70	59	4.8	20	1160	50	515730
	2	30	1	7	6	81	57·36·73	W	151·38·68	0340	0440	60	53	4.8	18	1044	30	515730
	2	30	1	7	6	82	57·36·89	W	151·46·89	0455	0600	65	58	4.9	15	870	20	515730
	1	30	1	7	6	83	57·34·68	W	151·48·70	0610	0710	60	65	4.9	25	1450	60	515730
	2	30	1	7	6	84	57·32·59	W	151·48·70	0725	0830	65	64	4.8	35	2030	150	515730
	1	30	1	7	6	85	57·30·85	W	151·46·48	0840	0945	65	57	4.8	35	2030	200	515730

Haul sampled
1-yes
2-no

Gear performance
1-satisfactory (both dredges)
2-unsatisfactory (both dredges)
3-partially satisfactory (one dredge satisfactory and one dredge unsatisfactory)

Appendix A.2. Weekly summary: scallop catcher-processor.

ALASKA DEPARTMENT OF FISH AND GAME
WEEKLY SUMMARY: SCALLOP CATCHER PROCESSOR

Beginning Monday July 5, 2004 through Sunday July 11, 2004

Observer Steve Dredge
Vessel Lucky Duck

Trip Number	ADF&G #	Fishery Code
11	199615	KS04

Date fished month	Date fished day	Statistical Area	Pounds of meat	Number of hauls	# bycatch smpl'd hauls[a]	Number of king crab	# bairdi Tanner crab in bycatch sampled hauls	# other Tanner[b] in bycatch smpl'd hauls
07	05	515730	16500	13	5	0	23	2
07	06	515730	8600	7	2	0	5	0

WEEKLY TRIP SUMMARY

Stastical Area	Pounds of shucked meat	Number of hauls	Number bycatch sampled hauls	Number of king crab	Number of *C. bairdi* Tanner crab	Number of other Tanner crab
515730	25100	20	7	0	28	2
TOTALS	25100	20	7	0	28	2

[a] Number of bycatch sampled hauls: number of hauls sampled for prohibited species bycatch and retained/ discarded scallop catch.

[b] Record combined opilio/hybrid in the Bering Sea Registration Area, Dungeness in all other Registration Areas.

Appendix A.3. Haul composition form.

ALASKA DEPARTMENT OF FISH AND GAME
HAUL COMPOSITION FORM

Observer: Steve Dredge
Vessel: Lucky Duck
Date: 7-5-04
Sample time: 2055

Trip #	ADF&G #	Fishery Code	Haul #
	199615	K504	77

Number of dredges fished: 2

SPECIES	SPECIES CODE	Avg. Basket Weight (column 6)	Weight in Sampled Dredge (column 7)
Weathervane scallops	7412 0	58	1106
Scallop & other bivalve shells	9999 3		35
Chlamys sp. scallops	7410 4		
Octopus	7801 0		
Pacific Halibut	1012 0		104
Rock Sole	1026 0		
Flathead Sole	1013 0		
Arrowtooth Flounder	1011 0		
Tanner Crab *C. bairdi*	6856 0		4
Chionoecetes sp. (opilio/hybrids)	6854 1		
Dungeness crab	6802 0		
Bathyraja sp.	0040 5		54
Empty Gastropod shells	9999 4		26
Sunflower Sea Star	8016 0		75
Sea Anemone	4300 0		9
Basket Star	8302 0		13
Hairy Triton	7250 0		20
Rose Sea Star	8109 5		1
Northern Moon Snail	7158 0		2
DEBRIS kelp, wood, rocks, etc	9999 9		300
Clappers	7412 5		
MAN MADE DEBRIS			
plastics	9999 5		2
fishing gear (including rope)	9999 6		
cans	9999 7		
other man-made debris	9999 8		3

Avg. Basket weight
58
56
60
174 ÷ 3 = 58 lbs $\bar{x}$
58 lbs/bushel
17 bushels
986 pounds
120 pounds of discard
1106

HALIBUT WORKSHEET

LENGTH (cm)	WEIGHT (lbs)
139	80.9
94	22.7
TOTAL	103.6

(Column 8) Number of items in sampled dredge
4
1
1 Chunk of Metal

Notes:

1. Sample one dredge only for haul composition weights (including crab and halibut).
2. Record total weight of each species or item in column 7. See manual for further directions.
3. Pacific Halibut: Enter all halibut lengths on worksheet, use manual Appendix 11 to convert lengths to weights, enter the sum of the weights in column 7.
4. Clappers: Record the number of clappers in column 8.
5. MAN MADE DEBRIS: Record the weight in column 7 and number of items in column 8.

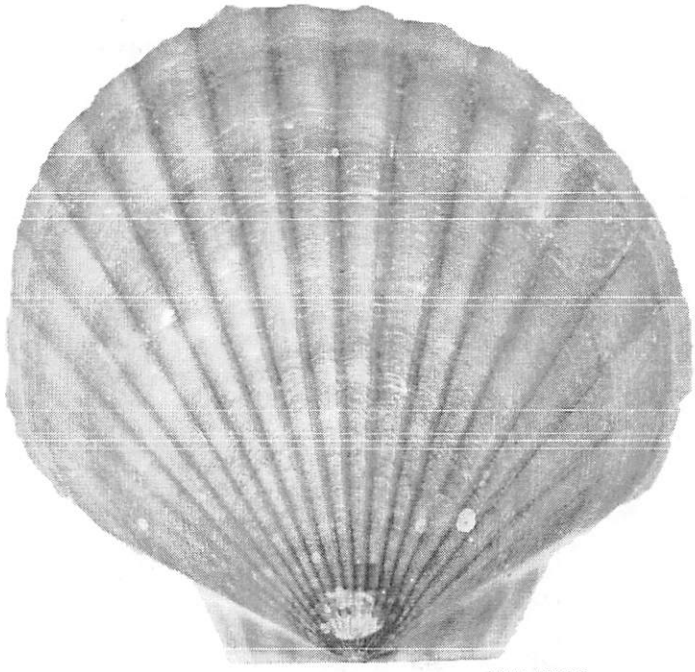
Appendix A.4. Halibut length-to-weight conversion table.

HALIBUT LENGTH-TO-WEIGHT CONVERSION TABLE

Length/Weight (cm)	(lbs)	Length/Weight (cm)	(lbs)	Length/Weight (cm)	(lbs)	Length/Weight (cm)	(lbs)
21	0.2	69	8.4	117	46.3	165	140.8
22	0.2	70	8.8	118	47.5	166	143.6
23	0.2	71	9.2	119	48.8	167	146.4
24	0.3	72	9.6	120	50.3	168	149.2
25	0.3	73	10.0	121	51.6	169	152.2
26	0.4	74	10.5	122	52.9	170	155.1
27	0.4	75	10.9	123	54.5	171	158.1
28	0.5	76	11.4	124	55.8	172	161.1
29	0.5	77	11.9	125	57.3	173	164.1
30	0.6	78	12.4	126	58.8	174	167.3
31	0.6	79	13.0	127	60.3	175	170.4
32	0.7	80	13.5	128	61.8	176	173.6
33	0.8	81	14.0	129	63.9	177	176.8
34	0.8	82	14.6	130	65.2	178	180.0
35	0.9	83	15.2	131	66.7	179	183.3
36	1.0	84	15.8	132	68.3	180	186.7
37	1.1	85	16.4	133	70.6	181	190.1
38	1.2	86	17.1	134	71.8	182	193.5
39	1.3	87	17.7	135	73.5	183	196.9
40	1.4	88	18.4	136	75.3	184	200.4
41	1.6	89	19.1	137	77.1	185	204.0
42	1.7	90	19.8	138	78.9	186	207.6
43	1.8	91	20.5	139	80.9	187	211.2
44	1.9	92	21.2	140	82.8	188	214.9
45	2.1	93	22.0	141	84.0	189	218.0
46	2.2	94	22.7	142	86.7	190	222.4
47	2.4	95	23.5	143	88.7	191	226.2
48	2.6	96	24.4	144	90.6	192	230.1
49	2.8	97	25.2	145	92.0	193	234.0
50	2.9	98	26.0	146	94.7	194	237.9
51	3.1	99	26.9	147	96.9	195	241.9
52	3.3	100	27.8	148	99.0	196	246.0
53	3.6	101	28.7	149	101.2	197	250.1
54	3.8	102	29.6	150	103.4	198	255.2
55	4.0	103	30.6	151	105.7	199	258.4
56	4.2	104	31.6	152	107.8	200	262.6
57	4.5	105	32.6	153	110.3	201	266.9
58	4.8	106	33.6	154	112.6	202	271.2
59	5.0	107	34.7	155	115.0	203	275.6
60	5.3	108	35.7	156	117.4	204	280.0
61	5.6	109	36.8	157	119.9	205	284.5
62	5.9	110	37.9	158	122.4	206	289.0
63	6.2	111	39.0	159	124.9	207	293.6
64	6.5	112	40.2	160	127.5	208	298.2
65	6.9	113	41.4	161	130.0	209	302.9
66	7.2	114	42.6	162	132.7		
67	7.6	115	43.8	163	135.4		
68	8.0	116	45.0	164	138.1		

Appendix A.5. Characteristics of Alaskan scallops.

There are two types of scallops that are commercially fished in Alaskan waters. The weathervane scallop, *Patinopecten caurinus*, is the primary scallop species harvested. This is a large scallop reaching a shell height of 12 inches. It's range in Alaska is from Dixon Entrance in southeast Alaska to the Aleutian Islands. The genus *Chlamys* is the other scallop that has been commercially harvested on an experimental basis in Alaska. These are small scallops that normally grow to less than three inches in shell height. *Chlamys* are found throughout Alaska from Dixon Entrance to the Bering Sea and Arctic Ocean.



Weathervane

Chlamys sp.

Weathervane scallop

A large scallop with prominent, heavy, widely spaced, smooth ribs. The valves are wider than long and slightly convex. The right valve is typically larger than the left valve, has less discrete color patterns, and flattened ridges. It is light brown to golden yellow in color. The left valve is typically dark brown in color and may have barnacles and other marine flora and fauna attached to it. The anterior and posterior ears are nearly equal.

Chlamys scallop

Small scallops with valves that are longer than wide and strongly convex. The ribs are narrow and prominent. May have prominent spines depending upon the species. Color ranges from pink to golden brown to white. Frequently they are covered with scallop sponge and/or other marine organisms. The anterior ears are longer than the posterior ears.

Appendix A.6. Bycatch and scallop discard form.

ALASKA DEPARTMENT OF FISH AND GAME
BYCATCH AND SCALLOP DISCARD FORM

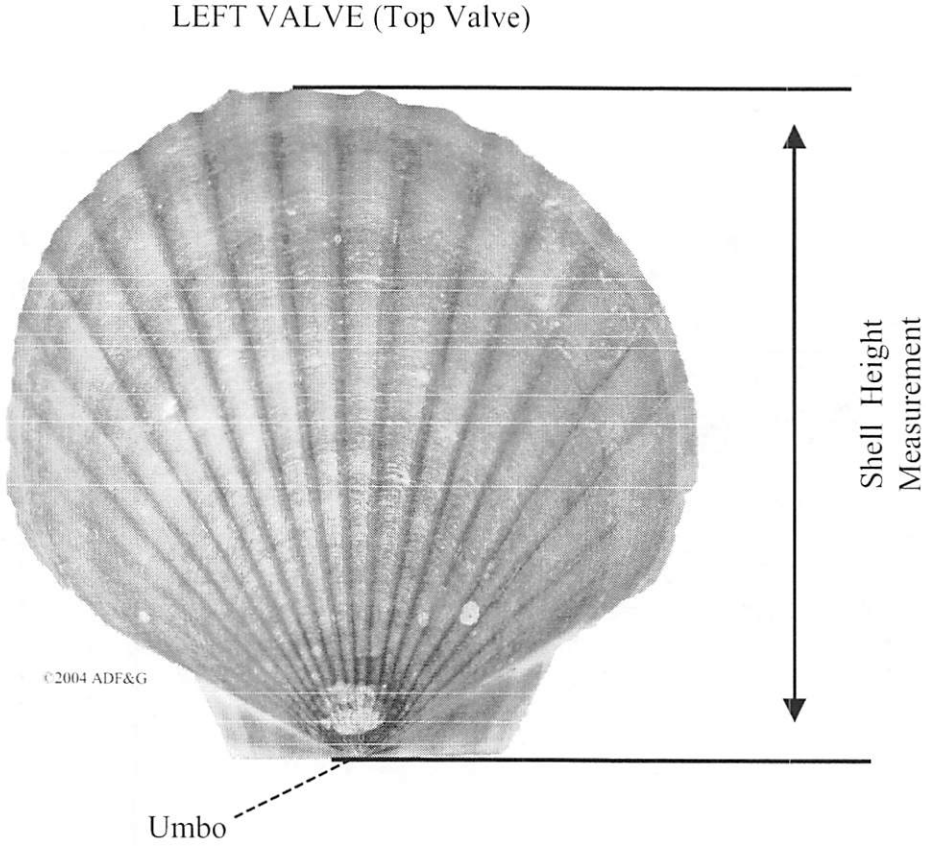
Observer Steve Dredge
Vessel Lucky Duck
Date 7-5-04
Sample time 0830

Trip #	ADF&G #	Fishery Code	Haul #
1	9 9 6 1 5	K S 0 4	7 1

Number of dredges fished 2

SPECIES	SPECIES CODE	Number of Animals	Condition Code	Weight
Weathervane scallops subsample (intact)	7 4 1 2 0	92	1	20
Weathervane scallops subsample (broken)	7 4 1 2 0	74	2	28
Weathervane scallops (remainder of discard)	7 4 1 2 0		3	103
Weathervane scallops (wt. of retained sample)	7 4 1 2 0		4	10.8
Weathervane scallops (number of clappers)	7 4 1 2 0	12	5	
Tanner crab (*C. bairdi*)	6 8 5 6 0	4		
Chionoecetes sp. (opilio/hybrids)	6 8 5 4 1			
Red King crab	6 9 3 2 2			
Blue King crab	6 9 3 2 3			
Golden King crab (*Lithodes aequispina*)	6 9 3 1 0			
Horsehair Crab	6 9 4 0 0			
Dungeness crab	6 8 0 2 0	2		
Halibut	1 0 1 2 0	1		

Appendix A.7. Scallop shell height measurement.



Scallop shell heights are measured to the nearest millimeter, the straight line distance from the umbo to the outer shell margin, perpendicular to the hinge. The right valve is typically larger than the left valve and it protrudes beyond the left shell's margin. Care should be given when measuring shell height so not to include the right valve.

Appendix A.8. Scallop size frequency form.

ALASKA DEPARTMENT OF FISH AND GAME
SCALLOP SIZE FREQUENCY FORM

Observer: Steve Dredge
Vessel: Lucky Duck
Date: 7-5-04

Trip #	ADF&G #	Fishery Code	Haul #
1	199615	KS04	71

Sample type 2

	Shell height (mm)	
1	125	
2	110	Shell Collection
3	132	
4	134	
5	155	
6	127	
7	133	
8	151	
9	143	
10	137	
11	127	
12	170	Shell Collection
13	159	
14	148	
15	153	
16	146	
17	140	
18	141	
19	139	
20	149	
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		

Sample type 3

	Shell height (mm)	
1	089	
2	085	
3	090	
4	083	
5	110	
6	095	
7	121	
8	077	
9	089	
10	099	
11	106	
12	119	
13	097	
14	087	
15	089	
16	065	
17	078	
18	103	
19	097	
20	081	
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		

Sample type
2-Retained catch
3-Discarded catch

Appendix A.9. Crab size and injury form.

ALASKA DEPARTMENT OF FISH AND GAME
CRAB SIZE AND INJURY FORM

Observer: Steve Dredge
Vessel: Lucky Duck
Date: 7-5-04

Trip #	ADF&G #	Fishery Code	Haul #
	199615	KS04	71

	Species Code	Size (mm)	sex	Shell Cond	mort?
1	6	51	2	2	2
2	6	53	2	1	2
3	6	69	1	1	1
4	6	80	2	2	2
5	9	102	2	-0-	2
6	9	170	1	-0-	2
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

	Species Code	Size (mm)	sex	Shell Cond.	mort?
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					

Species Codes
0=*Chionoecetes* sp. (opilio/hybrids)
1=Brown King Crab
2=Red King Crab
3=Blue King Crab
5=Hair Crab
6=*C.Bairdi*
9=Dungeness crab

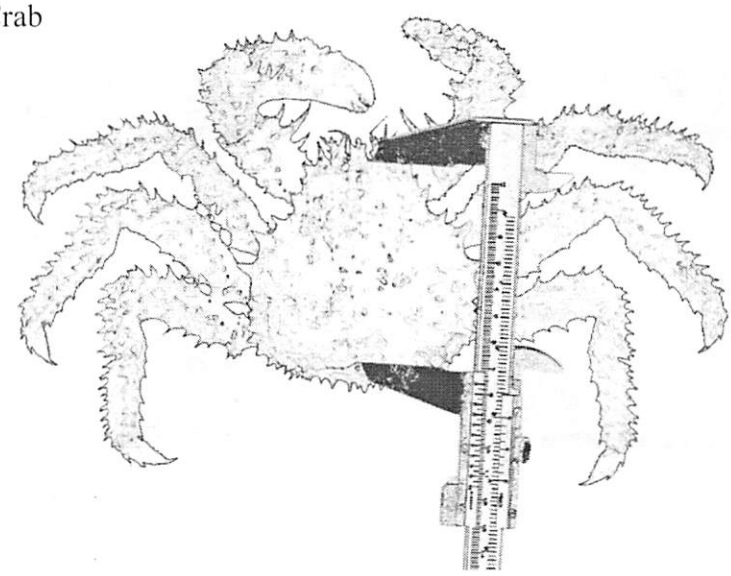
Sex
1-Male
2-Female

Shell Condition
0- Soft
1- New
2- Old
3-Very Old

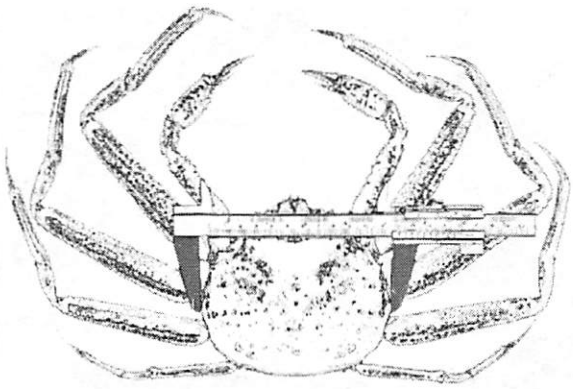
Mortility
1-Dead or moribund
2-Alive

Appendix A.10. Crab measurement.

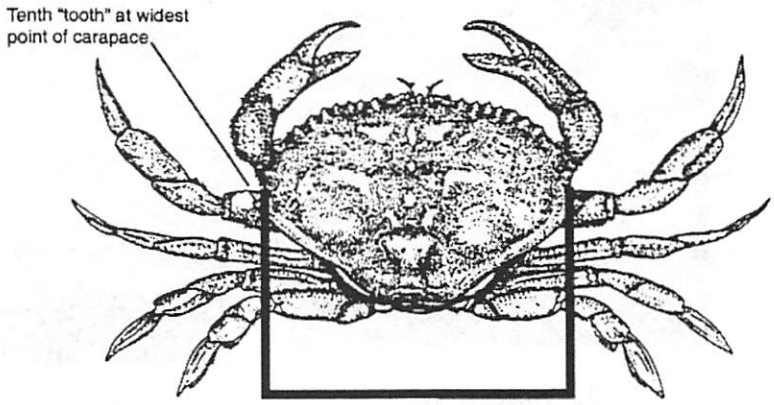
King Crab



King crabs are measured from the right eye socket to the mid point of the posterior of the upper carapace.



Tanner Crab

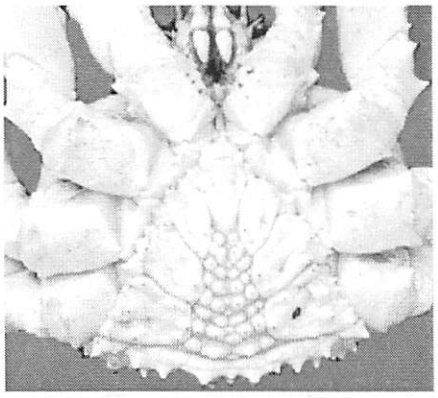


Dungeness Crab

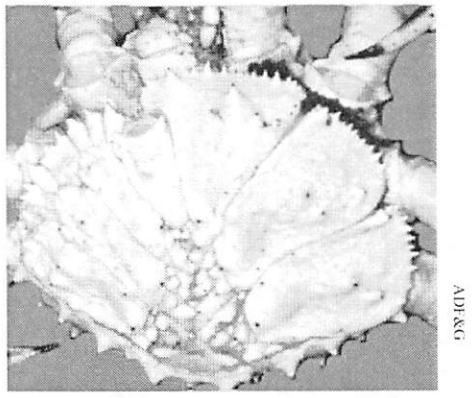
Tanner crabs are measured at maximum width, not counting spines. Dungeness crab widths are measured in the front of the "tenth tooth".

Appendix A.11. Crab sex determination.

King Crab

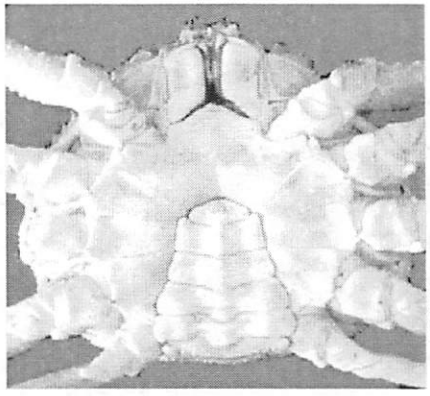


Adult Male

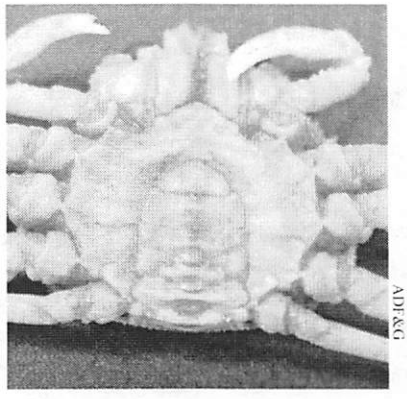


Adult Female

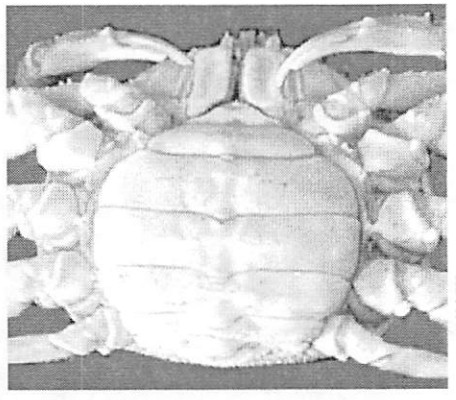
Tanner Crab



Juvenile Male,
similar characteristics in adults.



Juvenile Female



Adult Female

Appendix A.12. Halibut length and condition form.

ALASKA DEPARTMENT OF FISH AND GAME
HALIBUT LENGTH AND CONDITION FORM

Observer Steve Dredge
Vessel Lucky Duck
Year 2004

Trip #	ADF&G #	Fishery Code
	1 9 9 6 1 5	K S 0 4

Date Mo.	Date Day	Haul Number	Fish Length (cm)	Checked for injury Y=1, N=2	Condition Code	Comments
7	5	7 1	9 2	1	3	Small cut on Tail

Condition Codes

1. Excellent-- vigorous body movement before and after release; could close operculum tightly; minor external injuries if any.
2. Good--feeble body movements; could close operculum tightly; minor external injuries, if any.
3. Fair-- no body movement; could close operculum tightly; minor external injuries, if any.
4. Poor-- no body movement, could move operculum but not tightly; severe injuries i.e. bleeding
5. Dead-- no body or opercular movement, probably killed in sampled haul.
6. Previously dead--Obviously not killed in the current haul, incidentally picked up.

Appendix A.13. Scallop observer radio report form.

Reg. Area Kodiak - K
Vessel Lucky Duck
Observer Steve Dredge

SCALLOP OBSERVER RADIO REPORT FORM

		MONDAY	TUESDAY	MON-TUES TOTALS	WEDNESDAY	THURSDAY	WED-THURS TOTALS	FRIDAY	SATURDAY	SUNDAY	FRI-SAT-SUN TOTALS	WEEKLY TOTAL
DATE		7-5	7-6		7-7	7-8		7-9	7-10	7-11		
ITEM 1. Stat-Area	actual	515730	515730	515730	NO	NO		NO	NO	NO		515730
	code			LR	Fishing	Fishing		Fishing	Fishing	Fishing		
ITEM 2. Total minutes all hauls.	actual	840	445	1285	in	in		in	in	in		1285
	code			WBMG	STAT AREA	STAT AREA		STAT AREA	STAT AREA	STAT AREA		
ITEM 3. Total minutes all bycatch sampled hauls	actual	320	125	445	515730	515730		515730	515730	515730		445
	code			PAG								
ITEM 4. Number of king crab in all hauls	actual	0	0	0								0
	code			Y								
ITEM 5. Sampling Condition	actual	No Problem	No Problem	No Problem			No Problem				No Problem	No Problem
	code			XO			WB				GN	
ITEM 6. Number of *C. bairdi* Tanner in bycatch smpl'd hauls.	actual	23	5	28								28
	code			BU								
ITEM 7. # of *opilio* hybrids or Dungeness in bycatch smpl'd hauls.	actual	2	0	2								2
	code			C								
ITEM 8. Pounds of scallop meats retained.	actual	1650	860	2510								2510
	code			CNWS								
ITEM 9. Total # hauls / # bycatch sampled hauls	actual	13-5	7-2	20-7								20-7
	code			BY-5								

This is an example of a tri-weekly reporting schedule.

Appendix A.14. Radio codes.

ITEM 1:STAT-AREA CODES	MEANING
Y, K	O
F, A	1
L, N	2
R, T	3
C, V	4
X, D	5
Z, W	6
Q, U	7
M, E	8
H, O	9

ITEMS 2,3,4,6,7,8,9 CODES	MEANING
Y, S	O
F, V	OO
L, D	OOO
R, W	1
C, B	2
X, K	3
P, A	4
G, N	5
Z, T	6
Q, J	7
M, U	8
H, E	9
I, O	BLANK

SAMPLING CONDITION CODES (Item #5)	
CODES	MEANING
VR	NO PROBLEM
XO	NO PROBLEM
WB	NO PROBLEM
MD	NO PROBLEM
GN	NO PROBLEM
AF	NO PROBLEM
QP	POTENTIAL
DL	POTENTIAL
RM	HARASSMENT, UNABLE TO GET WORK DONE
FY	HARASSMENT, UNABLE TO GET WORK DONE
NC	HARASSMENT, BUT ABLE TO GET WORK DONE
EX	HARASSMENT, BUT ABLE TO GET WORK DONE
YS	SOS
PH	SICK
UU	SICK, UNABLE TO PERFORM WORK
SZ	CRAB DISCARDED BY CREW PRIOR TO ME GETTING SAMPLES
CG	CRAB DISCARDED BY CREW PRIOR TO ME GETTING SAMPLES
OE	SKIPPER AWARE OF HIGH BYCATCH, BUT DOESN'T CARE
IW	SPARE
JQ	SPARE