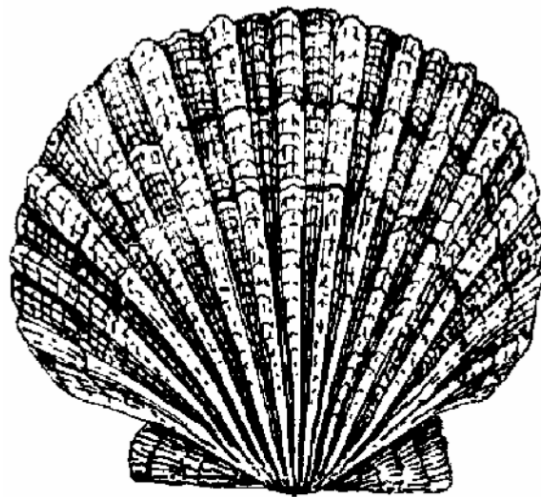


**STOCK ASSESSMENT AND FISHERY EVALUATION REPORT
FOR THE SCALLOP FISHERY OFF ALASKA**

March 5, 2024

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Definitions

The FMP contains the following stock status definitions:

Acceptable Biological Catch (ABC) is a level of annual catch of a stock that is set below the OFL and accounts for the scientific uncertainty in the estimate of OFL as well as any other scientific uncertainty. The maximum ABC is calculated from the ABC control rule. Annually, the Council's Scientific and Statistical Committee will set a statewide ABC for the weathervane scallop fishery prior to the beginning of the fishing season. The Scientific and Statistical Committee may set an ABC lower than the maximum ABC, but it must provide an explanation for setting the ABC below the maximum ABC.

ABC Control Rule is the specified approach for setting the maximum ABC for weathervane scallops. The ABC control rule calculates a maximum statewide ABC at 90 percent of the OFL, providing a 10 percent buffer to account for scientific uncertainty in estimation of the OFL.

Annual Catch Limit (ACL) is the level of annual catch that, if exceeded, invokes reactive accountability measures. For weathervane scallops, the ACL is set equal to ABC. B_{MSY} is the total weight of the stock, i.e., biomass (B) that results from fishing at F_{MSY} and is the minimum standard for a rebuilding target when a rebuilding plan is required.

Catch per unit Effort (CPUE) is related to abundance through catchability and for scallops is expressed as lb of meats per dredge hour. CPUE for fishing vessels is monitored through onboard observers.

F_{MSY} Control Rule is a harvest strategy based on fishing mortality (F) which would be expected to result in a long-term average catch approximating MSY. Guideline Harvest Level (GHL) is specified by the State and represents the pre-season estimated level of harvest that will not jeopardize the sustained yield of a stock. GHL may be expressed as a range of allowable harvests for each State registration area, district, sub-district, or section.

Maximum Sustainable Yield (MSY) is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions. The long-term average stock size obtained by fishing year after year at this rate under average recruitment may be a reasonable proxy for the MSY stock size, and the long-term average catch so obtained is considered a reasonable proxy for

Minimum Stock Size Threshold (MSST) is the biomass below which the stock is considered to be overfished and is usually equal to one half of B_{MSY} .

Optimum yield (OY) is the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems; that is prescribed on the basis of the MSY from the fishery, as reduced by any relevant economic, social, or ecological factor; and, in the case of an overfished fishery, that provides for rebuilding to a level consistent with producing the MSY in such fishery.

Overfishing Limit (OFL) is the catch above which overfishing is occurring and in the absence of an estimate of the statewide weathervane scallop spawning biomass, the default OFL is the MSY.

Executive Summary

1. **Stock:** Weathervane scallop (*Patinopecten cawrinus*) in waters off Alaska. Status of other Alaska scallop stocks are detailed in the Ecosystem Component section of time document.
2. **Catches:** Early landings of Alaska weathervane scallops occurred during the late-1960's near Kodiak Island. The fishery expanded rapidly to the eastern Gulf of Alaska (GOA)(i.e., Yakutat) and catches peaked in 1969 (1.85 mil lb; 839 t), then decreased through 1978. A smaller, more stable fishery occurred throughout the 1980's and the fishery expanded along the Aleutian Islands and to Prince William Sound. During the early-1990's fishery participation nearly doubled and scallop landings quickly rose to a second peak in 1992 (1,785,673 lb; 810 t shucked meats). Following a precipitous decline in the mid-1990's, scallop catches slowly decreased until the 2013/14 season whereafter landings in the Bering

Sea and Kodiak Shelikof beds sharply dropped, with the lowest statewide harvest level on record (aside from the 2020 COVID-19 pandemic) occurring during the 2016/17 season (229,009 lb; 104 t). There has been modest increase in catches following improved fishing performance in Kodiak Shelikof and Kodiak Northeast in 2021 (298,770 lb; 136 t) and 2022 (329,095 lb; 149 t). Statewide landings during the 2023/24 season totaled 318,647 lb (145 t) shucked meats.

3. **Stock Biomass:** Estimates of the full stock biomass are not available. ADF&G has performed dredge surveys in the Cook Inlet (Area H) and Prince William Sound (Area E) registration areas since 1996. Survey protocols were standardized and expanded to the Kodiak (Area K) and Yakutat (Area D) registration areas in 2016. The survey now alternates between major districts within registration areas in the western GOA (i.e., Kodiak Northeast, Kodiak Shelikof, Cook Inlet) and eastern GOA (i.e., Prince William Sound, Yakutat) on a biennial cycle. Bering Sea (Area Q), Dutch Harbor (Area O), and Alaska Peninsula (Area M) registration areas, as well as Area K districts west of Kodiak Shelikof has never been sampled by the dredge survey. ADF&G Dredge Survey results are listed in Table 3.
4. **Management performance:** No overfished determination has been made for this stock, thus stock status is "unknown". Two vessels participated in the 2023/24 fishery, resulting in 318,647 lb (145 t) retained shucked meats and an estimated 9,465 lb (4.3 t) discard mortality. Overfishing did not occur in the 2023/24 season, or any previous season in the time series (Figure 2).

Table 1: Management quantities for the statewide Alaska weathervane scallop fishery during the previous five seasons. All weights represent schucked meats. Total catch includes estimated discard removals assuming 20% handling mortality.

Season	Combined GHL	Retained Catch (lb)	Total Catch (lb)	OFL (mil lb)	ABC (mil lb)
2019/20	267,500	229,945	246,900	1.284	1.156
2020/21	277,500	222,560	234,662	1.284	1.156
2021/22	345,500	298,770	311,978	1.284	1.156
2022/23	375,500	329,095	345,689	1.284	1.156
2023/24	374,700	318,647	328,112	1.284	1.156

Season	Combined GHL	Retained Catch (t)	Total Catch (t)	OFL (t)	ABC (t)
2019/20	121	104	112	582	524
2020/21	126	101	106	582	524
2021/22	157	136	142	582	524
2022/23	170	149	157	582	524
2023/24	170	145	149	582	524

5. **Basis for the OFL:** OY is established as a range from 0 - 1.284 million lb (582 t) schucked meats. The upper limit of OY is based on the average retained catch from 1990 - 1997 (excluding 1995), plus an estimate of discard mortality during that time period. In lieu of an estimate of spawning biomass, OFL is set such that $\max \text{OFL} = \text{OY}$.
6. **Basis for the ABC recommendation:** The maximum ABC control rule is defined as $\max \text{ABC} = 90\% \text{ of OFL} = 1.156 \text{ million lb (524 t)}$.

A. Summary of Major Changes

1. Changes in Management of the Fishery

The Guideline Harvest Limit (GHL) for the West Kayak Island subsection of Area E (Prince William Sound) decreased from 8,000 lb (3.62 t) shucked meats to 7,200 lb (3.27 t), reducing the statewide total from 375,500 lb (170 t) to 374,700 lb (169.9 t).

2. Changes to the Input Data

There are no changes to data informing the current OFL and ABC. Retained catch and total fishing mortality have been updated through the 2023/24 season. New ancillary data include 2023/24 fishery observer data and 2023 ADF&G dredge survey estimates (see Section D for details).

3. Changes in Assessment Methodology

Harvest specifications continue to be determined using the average total catch approach described in the FMP and section E of this document. An alternative approach is described in Appendix B.

4. Changes in Assessment Results

None.

B. Responses to Comments

SSC April 2023

Comment: *“The SSC concurred with the SPT that collecting retained-not-landed (RNL) meat data via the observer program would be valuable, if feasible, and recommended work on estimating RNL be a priority.”*

Response: There were no changes to observer protocols for the 2023/24 season, and the assessment author was unable to make progress on RNL meats estimation given the currently available data during this assessment cycle. The ADF&G Scallop Observer Program will consider if RNL meat data collection can be accommodated with current sampling duties.

Comment: *“The SSC appreciates ongoing efforts to recover 1992 - 2008 fishery data to better inform the CPUE index and size compositions supplied to the model.”*

Response: ADF&G staff have made some progress in partitioning fish ticket data from 1990 - 2008 by district, but no progress has been made regarding observer data pre-2008.

Comment: *“The SSC appreciates this work and concurs with the author and SPT recommendation to carry forward (stock synthesis) models 23.0a3 and 23.3 for review in the next full assessment. This is based on overall fit to the data and retrospective analysis.”*

Response: The author recommended shelving development of an age-structured model in favor of pursuing data limited approaches that could be used to assess a greater proportion of the stock.

Comment: *“Staff provided a summary of ongoing efforts to revise the Scallop FMP to remove language requiring that specifications be set annually and allow for a biennial or triennial schedule. The SSC reiterates its support for such an amendment.”*

Response: Amendment 18 is finalized, and the SPT recommends setting harvest specifications on a biennial cycle.

C. Introduction

1. Scientific Name

Weathervane scallop, (*Patinopectan carinus*), in waters of Alaska. Although the FMP covers all scallop stocks off the coast of Alaska, including reddish scallop (*Chlamys rubida*), spiny scallop (*Chlamys hastata*), and rock scallop (*Crassadoma gigantea*), the weathervane scallop is the only commercially targeted stock at this time. Status of other Alaska scallop stocks are detailed in the Ecosystem Component section of this document.

2. Distribution

Weathervane scallop inhabit waters 2 - 300 m depth in the northeastern Pacific Ocean as far west as the Aleutian Islands, Alaska and Bering Sea to as far south as Point Reyes, California. Scallop habitat generally consists of clayey silt to gravely mud substrates (Turk 2001).

3. Stock Structure

Alaska weathervane scallops are considered a single stock under the FMP (NPFMC 2014), though the State of Alaska manages the stock as nine registration areas, each containing various management districts or subdistricts (Figure 1). Scallops tend to form dense aggregations in discrete ‘beds’ that parallel the direction of the prevailing current. Gaffney et al., (2010) observed genetic homogeneity among several nuclear and mitochondrial genetic markers along much of the GOA and southeastern Bering Sea. There is little knowledge of larval connectivity, though it is assumed that connectivity throughout the GOA is facilitated from east to west by the Alaska Coastal Current.

4. Life History

Knowledge of weathervane scallop early life history is mostly borrowed from other, similar scallop species. Weathervane scallops are dioecious, and maintain an approximately 50:50 sex ratio within beds. Scallops in the western GOA grow faster and larger than those in the eastern GOA (Ignell and Haynes 2000). Sexual maturity takes place between ages 3 - 4 yr or 74 - 128 mm shell height in Kodiak and 73 - 92 mm in Yakutat (Hennick 1970). Gonads are observed full (i.e., ripe) between February - May, with spawning typically occurring in May - June. Gonad recovery to the next full state takes approximately six months. Spawn timing is thought to influence intra-annual fluctuation in abductor muscle weight (i.e., meat weight) at size (Hennen and Hart 2012). Fertilized eggs settle to the bottom where they develop into veliger larvae. Veligers swim in the water column and feed on microplankton for several weeks before settling to the bottom. Age is determined by the formation of concentric annual growth rings formed on the upper valve. The first annulus is formed during the second year of life (about 17 mm shell height) and subsequent annuli are laid on an annual basis. Weathervane scallops are long-lived, with ages commonly observed in the 20’s and as old as 28 years (Hennick 1973).

5. Fishery History

An Alaskan weathervane scallop fishery was first established near Kodiak Island in 1967 following decline in fishing opportunity for red king crab (*Paralithodes camtschaticus*). In 1968 the fishery expanded to Yakutat and 19 vessels landed 1.68 mil lb (761 t) shucked meats. The fleet included both specialized scallop vessels from New England and local vessels converted from other fisheries. The fishery peaked in 1969, with 1.85 mil lb (839 t). Interest in the fishery declined rapidly through 1973, with only 5-7 landing approximately 1.16 mil lb (527 t) annually. Early observer data suggested a lesser proportion of older (≥ 7 yr) scallops in catches compared to the fishery’s inaugural years. Landings further decline through the mid-1970’s, averaging only $\sim 306,000$ lb (139 t) yr^{-1} taken from Kodiak and Yakutat. The observer program was discontinued through this period and no data other than landings were collected (Kaiser 1986; Kruse et al., 2005).

Overcapitalization of the New England sea scallop (*Placopecten magellanicus*) renewed interest in Alaska weathervane scallops and more stable fishery occurred throughout the 1980’s. During this period, the fishery

began expanding outward from Yakutat and Kodiak areas, though Kodiak beds still accounted for nearly half of scallop landings. During the early-1990's exploration of previously unfished beds resulted in a rapid increase in fishery participation, landings, and ex-vessel revenue. Following a second peak in landings in 1992 (1,785,673 lb; 810 t shucked meats), ADF&G drafted an interim fishery management plan (FMP) that introduced new fishery management measures aimed at ensuring the long-term viability of the stock amid conservation concern surrounding increasing effort and harvest (Kruse et al., 2005). The early-1990's also saw greater specialization of scallop vessels and an increase in onboard freezing of shucked meats. New regulations curtailed landings between 1993-1994 and the fishery was closed for most of 1995 by NMFS after a loophole in state management jurisdiction was exploited by a single vessel operating in federal waters (> 3 mi from shore) after the GHl set by ADF&G was met. The fishery rebounded and reached its most recent peak in landings in 1999 (838,046 lb; 380 t). In 2000, the NPFMC implemented a license limitation program and most vessel owners formed a fishery cooperative. Throughout the 2000's fishery participation became more consolidated and scallop catches slowly decreased until the 2013/14 season, whereafter landings in the Bering Sea and Kodiak Shelikof beds sharply dropped. The lowest statewide harvest level on record (aside from the 2020 COVID-19 pandemic) occurred during the 2016/17 season (229,009 lb; 104 t). There has been modest increase in catches following improved fishing performance in Kodiak Shelikof and Kodiak Northeast in 2021 (298,770 lb; 136 t) and 2022 (329,095 lb; 149 t). Statewide landings during the 2023/24 season totaled 318,647 lb (145 t) shucked meats.

6. Management History

Management of the Alaska weathervane scallop fishery by the State of Alaska began in 1968 with the introduction of fishing seasons, gear restrictions, and closure areas. Initially a small survey and at-sea observer program were initiated for the collection of biological data, but were discontinued in the 1970's. After rapidly increased landings and ensuing conservation concern in the early 1990's, ADF&G declared the scallop fishery a "High-impact Emerging Fishery" and developed an interim FMP in 1993. A refined FMP was formally adopted in 1994 (Kruse 1994). The 1994 FMP established the current registration areas, crew limits, new gear restrictions, guideline harvest ranges (GHRs), and fishing seasons. During this time, a mandatory industry-funded onboard observer program began for collection of scallop biological data and monitoring of crab bycatch. In 1995, a single vessel exploited a loophole in federal-state management jurisdiction which results in over-harvest of area E. NMFS adopted an emergency measure closing the fishery and established the federal FMP (NPFMC 2014). The FMP established optimum yield (OY) as a range from 0 to 1.1 million lb (~500 t) of shucked scallop abductor muscles (meats) with the upper end being based on the historic high in landings since 1993.

6.1 Amendments to the FMP

Amendment 1 to the FMP established a joint federal and state management regime, in which federal regulations mirrored most state regulations as a temporary measure until changes to the Magnuson-Stevens Act allow the NPFMC to delegate management of the scallop fishery in federal waters to the State of Alaska. Amendment 1 also increased the upper limit of OY to 1.8 million lb (816 t) to account for historic landings in state waters. The fishery re-opened in federal waters on August 1, 1996. In 1997, Amendment 2 to the FMP established a temporary moratorium on new vessels entering the fishery through June, 2000. Eighteen vessels qualified for permits during this period. Amendment 3 to the FMP (1998) officially delegated management of the fishery in federal waters to the State of Alaska. The NPFMC adopted the current license limitation program (LLP) in June, 2000 (FMP Amendment 4). The LLP allowed nine licenses, two of which were limited to a single 6 ft dredge. Gear restrictions on these two licenses were removed by Amendment 10 in 2004. Amendment 6 to the FMP (1999) revised OY as 0 to 1.24 million lb (562 t), with the upper limit defined as the the average retained catch between 1990 - 1997, excluding 1995 (Free-Sloan 2007; Table 2). Amendment 7 and 9 to the FMP identified several habitat areas of particular concern that are closed to scallop dredging (i.e., bottom-contact fishing). Optimum yield was further refined by Amendment 13, which increased the OY upper limit by 44,000 lb (1.284 million lb) to account for all sources of fishing mortality during the reference period based on a proxy estimation (Balsiger et al., 2011). Amendment 13 also established that the overfishing limit (OFL) be set equal to the maximum sustainable yield (MSY; the upper limit of OY) and

specified an acceptable biological catch (ABC) control rule that allows a maximum ABC of 90% of the OFL. Annual catch limit (ACL) of weathervane scallops was set so that $ACL = ABC$, and state guideline harvest levels (GHLs) must be set so that retained catch and estimated discard mortality be no greater than the ACL/ABC .

6.2 ADF&G Management Measures

6.2.1 Registration Areas and Districts The Alaska Scallop Fishery Management Plan (5 AAC 38.076) established nine scallop registration areas in Alaska for vessels commercially fishing scallops (Figure 1). These include the Southeastern Alaska Registration Area (Area A); Yakutat Registration Area (Area D), which was previously divided into the YAK and D16 Districts; Prince William Sound Registration Area (Area E), which is subdivided into the East (EKI) and West Kayak Island (WKI) Subsections; Cook Inlet Registration Area (Area H), which is subdivided into the Northern, Central, Southern, Kamishak Bay (KAM), Barren Islands, Outer and Eastern Districts; Kodiak Registration Area (Area K), which is subdivided into the Northeast (KNE), Shelikof (KSH), Southeast (KSE), Southwest (KSW), and Semidi Islands Districts (KSEM); Alaska Peninsula Registration Area (Area M), which is subdivided into the West Chignik (WC), Central (C), and Unimak Bight (UB) Districts; Dutch Harbor Registration Area (Area O); Bering Sea Registration Area (Area Q); and Adak Registration Area (Area R). Scallop seasons have never been opened in Area A, and effort occurred in Area R during 1995 only. Since 2018/19, beds adjacent to the Karluk River have been managed as part of the KSW district, instead of the KSH district. Fishery statistics have been adjusted back to 2009/10 to account for this change.

6.2.2 Seasons The regulatory fishing season for weathervane scallops in Alaska outside of the Area H is July 1 through February 15 (5 AAC 38.167, 5 AAC 38.220 & 5 AAC 38.420). The regulatory fishing season for weathervane scallops in the KAM District of Area H is August 15 through October 31 (5 AAC 38.320). These seasons were developed to limit fishing during scallop spawning periods, to achieve the highest possible product quality, to limit gear conflicts with other fisheries, and to increase vessel safety. Scallop fishing in any registration area in the state may be closed by emergency order prior to the end of the regulatory season.

6.2.3 Guideline Harvest Ranges Guideline harvest ranges (GHRs) are hard caps established in State of Alaska regulations for each registration area and are not to be exceeded. GHLs are pre-season targets set for each fishing area (registration area, district, or statistical area) prior to the season by ADF&G regional managers. Total harvest for each fishing area in a given season is typically near or below the GHL, but may exceed it.

Regulatory GHRs for traditional scallop fishing areas were first established by ADF&G in 1993 under the interim FMP. Regulatory GHRs were set at 0 - 250,000 lb (113 t) for Area D; 0 - 50,000 lb (23 t) for Area E; 10,000 - 20,000 lb (4.5 - 9 t) for the KAM District of Area H; 0 - 400,000 lb (181 t) for Area K; and 0 - 170,000 lb (77 t) for Area O. These area GHR ceilings 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). Prior to the 1996 re-opening of the weathervane scallop fishery, the State of Alaska established GHRs for non-traditional registration areas including: 0 - 200,000 lb (91 t) for Area M; 0 - 600,000 (272 t) lb for Area Q; 0 - 35,000 lb (16 t) for District 16 (Area D); and 0 - 75,000 lb (34 t) for Area R. The combined total of the upper limits from traditional and non-traditional areas was 1.8 million lb (816 t), which was defined as MSY in Amendment 1 to the FMP.

To accommodate the new definition of OY in Amendment 6 of the FMP, regulatory GHR ceilings were reduced by the State of Alaska from 400,000 lb (181 t) to 300,000 lb (136 t) in Area K; from 200,000 lb (91 t) to 100,000 lb (45 t) in Area M; from 170,000 lb (77 t) to 110,000 (50 t) in Area O; and from 600,000 lb (272 t) to 300,000 lb (136 t) in Area Q. Hence, the regulatory GHR ceiling written into Alaska regulatory code is also 1.24 million lb.

6.2.4 Minimum Performance Standards Following concern over declining harvest within Area K during the 2002/03 season, an in-season minimum performance standard (MPS; formerly ‘benchmark’) was established prior to the 2003/04 season to gauge fishery performance and support in-season fishery closures, if

warranted. CPUE of shucked meats is tracked throughout the season by management area and compared to the MPS standard. If the in season cumulative CPUE is less than or equal to the MPS when approximately half of the GHL is taken, the fishery may close prior to achieving the upper end of the GHL. If CPUE is higher than the MPS the fishery may continue toward the upper end of the GHL with continued monitoring. This approach has been applied to management areas, major beds within management areas, and statistical reporting areas depending upon the level of concern. It is important to clarify that the MPS is not viewed as a management goal, but rather a low mark around which to base conversation on in-season management actions. ADF&G uses MPS for the KNE and KSH Districts of Area K and Area D (below).

Area	MPS (mt / dredge hr)	Basis Year	Reference Time Series
D (Yakutat)			
Yakutat	34	2011/12	1998/99 - 2013/14
K (Kodiak)			
KNE (Northeast)	46	2005/06	2000/01 - 2009/10
KSH (Shelikof)	47	2002/03	2000/01 - 2009/10
Q (Bering Sea)			
Q	43	2005/06	2000/01 - 2009/10

6.2.5 Crab Bycatch Limits Bycatch of crabs in the scallop fishery is controlled through the use of Crab Bycatch Limits (CBLs) that are based on condition of individual crab stocks. CBLs were first instituted by the State in July, 1993. Methods used to determine CBLs in 1993 and 1994 were approved by the State of Alaska Board of Fisheries and the NPFMC under Amendment 1 to the FMP. Since that time definitions of CBLs have undergone minor changes. In Areas K, M, O, and Q the CBLs for *Chionoecetes* crabs are determined as a rate of crab per pound of scallop GHL, whereas bycatch limits for red king crab (*Paralithodes camtschaticus*; RKC) are fixed. ADF&G uses different rates in Areas K and M depending on whether estimates of Tanner crab mature male biomass from recent trawl surveys are above (larger bycatch rate) or below (lower bycatch rate) a Tanner crab harvest strategy threshold (5 AAC 35.507). Rates applied to determine CBLs vary by scallop harvest area (below). In Areas H and E, the CBL for Tanner crab is set at 0.5% of area swept estimates of crab caught during the most recent scallop dredge survey, while the CBL is fixed at 30 crab for Area H only. Crab bycatch limits are not used in area D.

Registration Area	RKC ^a (number of crab)	Tanner crab (<i>C. bairdi</i>) (crab / lb)	Snow crab (<i>C. opilio</i>) (crab / lb)
K (Kodiak)	25	0.5 or 0.6	
M (Alaska Peninsula)	25	0.5 or 0.6	
O (Dutch Harbor)	10	0.75	
Q (Bering Sea)	100	2.5	1.5

6.2.6 State Water Vessel Limitation Participating in the Scallop fishery in State of Alaska waters (0-3 nmi) had been limited by a vessel-based limited entry program until State limited entry expired in 2013 and was not renewed by the Alaska State Legislature. To date, no additional state-only vessels have participated in the open access state water fishery.

D. Data

1. Historic Catch Data

Fish ticket data have been previously used to document retained catch in the early years of the fishery (Kruse et al. 2005; Free-Sloan 2007). From 1985 until 2008, retained scallop meat weight harvested during scallop fisheries was stored within the State of Alaska shellfish fish ticket database and not directly connected with other data collected by the scallop observer program. Errors and omissions are common within this data because the data were reviewed independently by staff among ADF&G regions and lacked a standardized comprehensive review by a statewide coordinator familiar with the fishery and participants. After researching the fish ticket database, scallop observer databases, historic annual management reports, emergency orders,

news releases, trip logs, vessel registrations and speaking with vessel operators, errors in the fish ticket data from 1990 to 2008 were identified. Scallop observer program staff worked with staff at ADF&G Headquarters as well as within the Southeastern, Central, and Westward Regions to correct the errors. A summary of retained scallop meat weight harvest data by registration area and district has been compiled from 1990-2008.

2. ADF&G Scallop Observer Program

ADF&G established the current at-sea observer program for the scallop fishery in 1993 under 5 AAC 38.076 (g). Earlier, at-sea observers were utilized intermittently for targeted collection of biological data. ADF&G has always required 100% observer coverage, except in Area H, where the fishery has historically been prosecuted by smaller vessels. Scallop observers principally collect information on the retained catch, as well as discard and bycatch rates to satisfy requirements of the Magnuson-Stevens Act and support regulatory enforcement. In addition, observers have collected a suite of biological data including shell height compositions of the retained and discarded catch, individual meat weights and gonad condition, shells for aging, and condition of discarded scallops. Data gathered through the observer program comprise the primary information source for ADF&G in setting harvest limits.

In 2009, ADF&G made changes to how observers recorded data at sea and subsequently, the program's data management practices. These changes no longer required observers to summarize data at sea and shoreside ADF&G staff began curating raw data in a local database. The current scallop observer database only contains data from 2009 - present. Data collected from 1993 - 2008 requires considerable reformatting, rescue of data from original paper data forms and current quality assurance/quality control procedures applied before it is used in conjunction with data from 2009 - present. As a result, only prior estimates of retained round and meat biomass, discards, and nominal CPUE are available for 1993 - 2008.

Vessel fishing logbooks track haul specific data from both observer sampled and non-sampled hauls including location, duration, retained catch (i.e., in units of bushels of whole scallops), and crab bycatch. These data are paired with daily observer collected catch sampling data to estimate haul specific retained catch in units of round biomass and associated CPUE. Haul specific retained meat biomass is obtained by apportioning totals from the vessel's daily meat weight production log to fishing logbook data. Daily meat weight production logs are used by ADF&G as the primary data source for tracking retained catch towards area GHLs. Time series of area specific GHL, estimated retained catch, discard mortality, and CPUE are in Tables 4 - 15.

3. ADF&G Dredge Survey

ADF&G dredge surveys began in Area H and Area E. The program's inaugural surveys were conducted in Kamishak Bay in 1984 (Hammarstrom and Merritt 1985) and around Kayak Island in 1996 (Bechtol et al., 2003). Since 1996 biennial surveys have continued in these areas (Gustafson and Goldman 2012), enabling ADF&G to (1) delineate the primary scallop beds; (2) estimate scallop abundance and biomass within them; (3) characterize bed composition using age and shell height data; and (4) estimate catch rates of non-target species, particularly Tanner crab. In 2016, ADF&G expanded the dredge survey to other commercially important harvest areas (Smith et al., 2016). Surveys from 2016 - 2018 sampled beds within Kodiak Shelikof (KSH) and Northeast (KNE) Districts, Area E, and Area D somewhat irregularly. Since 2019, ADF&G has standardized existing survey efforts and focused on sampling all actively fished beds in the eastern GOA (Areas E and D) or western GOA (KSH, KNE, and Area H) on a biennial basis. In 2016, ADF&G standardized existing survey efforts and expanded the dredge survey to other commercially important harvest areas (Smith et al., 2016). Surveys from 2016 - 2018 sampled beds within Kodiak Shelikof (KSH) and Northeast (KNE) Districts, Area E, and Area D somewhat irregularly. Since 2019, the ADF&G has focused on sampling all actively fished beds in the eastern GOA (Areas E and D) or western GOA (KSH, KNE, and Area H) on a biennial basis. Complete details of the survey area, survey design, sampling protocols, and data analysis are found in Burt et al., (2021).

The 2023 ADF&G dredge survey sampled seven beds between the YAK District (Area D) and the EKI and WKI subsections of Area E. The portion of the EK1 bed that lies within the YAK District was not sampled due to logistic restraints. Abundance and biomass of exploitable-sized scallops (≥ 100 mm shell height) increased overall in the YAK District, and slightly decreased in WKI and EKI. Abundance and biomass

of pre-recruit-sized scallops (< 100 mm) decreased among all beds except WKI (Hopkins et al., *in prep*). Estimates from the 2023 survey are in Table 3, and full details of survey results are in Hopkins et al., (*in prep*). ADF&G dredge survey data are not currently used for computation of OFL/ABC.

E. Analytical Approach

1. History of Modelling Explorations

Bechtol (2000) used fishery and ADF&G dredge survey data to develop an age-structured assessment model of the Kamishak Bay portion of the stock from 1983 – 1997. This model was updated using newer survey age compositions and catch data through 2012 (Zhang 2014). Exploration of a Kamishak catch-at-age model was again furthered by Zheng (2018), and Jackson and Zheng (2022) using Stock Synthesis (Methot and Wetzel 2013). Scallop modelling using Stock Synthesis was continued for Kodiak Shelikof District by Jackson (2023). While results of model explorations in Kamishak and Shelikof Districts were promising, extension of these models to the broader stock is unlikely due to the disparity in data availability among districts and the resources necessary for model development. Appendix B explores using ADF&G dredge survey and fishery CPUE data in a state-space random walk model (REMA; Sullivan et al. 2023) as a data-limited approach for assessing this stock.

2. Current Approach

MSY stock size and allowable catch limits for the full stock have been based on historic catches since 1996 (NPFMC 2014). A reference period from 1990 - 1997, excluding 1995 reflects the prevailing ecological conditions and a time when the fishery was fully capitalized. Since 1996, MSY has been revised to 1) use average total catch as opposed to maximum (Amendment 6; NPFMC 1998) and 2) incorporate bycatch fisheries (Amendment 13; Balsiger et al., 2013).

F. Harvest Specifications

1. Calculation of the OFL

The original FMP established optimum yield (OY) as a range from 0 to 1.1 million lb (499 t) of shucked meats with the upper end being based on the historic high in landings since 1993. Under Amendment 1, in 1996, the upper end for OY was increased to 1.8 million lb (816 t) to account for historic State water landings. A more conservative approach was taken in 1999, when OY was re-defined as 0 to 1.24 million lb (562 t) with the upper end reflecting average rather than maximum catch. The reference period for defining the upper range for OY is 1990-1997 excluding 1995 (Free-Sloan 2007; Table 2). Most recently, in 2012, under Amendment 13, OY was re-defined as 0 to 1.284 million lb (582 t) of shucked meats to include estimated discard mortality (39,680 lb; 18 t) in the directed fishery, groundfish fisheries, and agency surveys over the reference time frame, assuming 20% handling mortality. Balsiger et al., (2013) details accounting of total scallop mortality in the directed fishery and bycatch fisheries as computed at the time.

2. Calculation of the ABC

The ABC control rule calculates a statewide maximum ABC at 90% of the OFL, which provides a 10% buffer to account for scientific uncertainty in the estimation of the OFL. The recommendation is to set ABC at the maximum allowable, or 1.156 million lb (524 t) shucked meats.

G. Data Gaps and Research Priorities

H. Ecosystem Components

1. Ecosystem Component Stocks

In Amendment 13 to the FMP established an ‘Ecosystem Component’ for non-target scallop stocks. Stocks contained under this category of the FMP are stocks which are not the subject of a directed fishery, including: rock scallops *Crassadoma gigantea*, pink scallops *Chlamys rubida*, and spiny scallops: *Chlamys hastata*, *Chlamys behringiana*, and *Chlamys albida*. For these stocks annual catch limits are not required to be annually specified.

No commercial harvests have been documented for scallop species other than weathervane scallops in waters off Alaska since at least 1992, but there are currently low-level personal use/subsistence fisheries for some of these species. Should a target fishery become desirable for any of these species, either as a whole complex or by individual stock grouping, an FMP amendment would need to be initiated by the Council to move the stock ‘into the fishery’ under the FMP and ACLs annually specified. Major fishery development is not anticipated for non-weathervane scallops, but market potential does exist for both pink and rock scallops. The spatial distribution of non-weathervane scallop species is not well defined, although these species currently compose a relatively minor component of catches in both NMFS and ADF&G surveys (von Szalay and Raring 2017; Markowitz et al., 2023).

2. Fishery Effects on Ecosystem

2.1 Effects on Benthos

The Alaska weathervane scallop fishery occurs in continental shelf waters at depths 40–150 m in throughout the Gulf of Alaska and into the Eastern Bering Sea (Figure 1). There is strong evidence that scallop dredging reduces diversity, at least in the near term, however, the level of impact and the recovery rate tend to vary among habitat types (Collie et al. 2000; Kaiser et al. 2006). Past studies on the effects of scallop dredging in the Gulf of Alaska have found differences in community abundance and diversity for areas either open or closed to dredging (Stone et al. 2005). More recently, Glass and Kruse (2017) found evidence of recovery from disturbance by fishing gear in the Bering Sea scallop bed through increases in sessile benthic organisms during a period of decreased fishing activity. Although Glass and Kruse (2017) also found contrasting impacts in the Kodiak Shelikof district, the authors suggest that reductions in bycatch through self-regulatory fishing practices, extensive closure areas, and the small size of the fishery combine to constrain impacts overall. It is proposed, however, that controlled fishing experiments that apply a before–after, control–impact (BACI) approach could be used to better characterize the effects of scallop dredging on benthic communities off Alaska.

2.1 Effects on Bycatch Species

Scallop fishery bycatch is closely monitored by the ADF&G Shellfish Observer Program. Bycatch in the scallop fishery includes prohibited species such as red king crab, Tanner crab, snow crab, and Pacific halibut *Hippoglossus stenolepis*, other commercially important species of fish and invertebrates, miscellaneous non-commercial species, and natural and man-made debris. Weathervane scallops predominate the catch composition by a large margin (~90-95%) (Figure 3). Crab bycatch in the scallop fishery is highest in the Bering Sea, although this accounts for a small proportion of total BSAI crab bycatch. Non-crustacean benthic invertebrates make up the largest proportion of bycatch in the Gulf of Alaska (Figure 3).

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Tables

Table 2: Statewide landings from 1990 to 1995 as summarized by Free-Sloan (2007).

Season	Retained catch (lb)	Retained catch (t)
1990	1,488,737	675
1991	1,136,649	516
1992	1,753,873	796
1993	1,511,539	686
1994	1,256,736	570
1995	351,023	159
1996	728,424	330
1997	802,383	364

Table 3: Estimated abundance (N), round biomass (t), meat biomass (t), and associated CVs of exploitable-sized (≥ 100 mm shell height) and pre-recruit scallops (< 100 mm shell height) by bed, from the 2023 ADF&G Dredge Survey.

Shell Height ≥ 100 mm		Abundance		Round Biomass		Meat Biomass	
District	Bed	N	CV	t	CV	t	CV
West Kayak Is. (WKI)	WK1	5,325,185	0.31	992	0.30	53.5	0.30
East Kayak Is. (EKI)	EK1	2,138,574	0.17	585	0.20	41.6	0.19
Yakutat (YAK)	YAK1	6,938,249	0.20	1,283	0.18	66.2	0.21
	YAK2	12,576,025	0.16	2,373	0.16	93.2	0.21
	YAK3	4,411,808	0.15	869	0.15	67.9	0.13
	YAK4	13,363,442	0.19	1,928	0.19	104.2	0.21
	YAK5	3,227,592	0.39	554	0.38	36.5	0.38

Shell Height < 100 mm		Abundance		Round Biomass	
District	Bed	N	CV	t	CV
West Kayak Is. (WKI)	WK1	2,933,414	0.45	86.8	0.45
East Kayak Is. (EKI)	EK1	372,686	0.16	11.4	0.17
Yakutat (YAK)	YAK1	799,331	0.19	37.2	0.20
	YAK2	2,025,499	0.34	58.4	0.28
	YAK3	54,205	0.40	2.3	0.37
	YAK4	3,649,828	0.24	165.1	0.25
	YAK5	159,633	0.49	6.9	0.40

Table 4: Area D (Yakutat) fishery statistics from 1990 - present. Statistics pre-2009 are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	GHL	Retained Catch		Discard	Dredge Hrs	CPUE (Meat)	CPUE (Round)
		Meat (lb)	Round (lb)	Mortality (lb)			
1990		590,934	5,909,340				
1991		442,388	4,423,880				
1992		1,068,303	10,683,030				
1993	160,000	289,101	2,891,010		1,999	145	1,446
1994/95	285,000	280,673	2,806,730		4,262	66	659
1995/96	285,000	275,793	2,757,930		5,807	47	475
1996/97	285,000	272,796	2,727,960	7,893	4,899	56	557
1997/98	285,000	265,830	2,658,300	5,842	4,517	59	589
1998/99	285,000	275,831	2,758,310	5,217	4,894	56	564
1999/00	285,000	284,305	2,843,050	10,379	4,514	63	630
2000/01	235,000	226,603	2,266,030	11,255	4,717	48	480
2001/02	235,000	124,198	1,241,980	5,624	2,823	44	440
2002/03	235,000	126,403	1,264,030	6,537	2,539	50	498
2003/04	235,000	161,990	1,619,900	6,958	3,376	48	480
2004/05	235,000	111,380	1,113,800	4,201	2,553	44	436
2005/06	235,000	213,001	2,130,010	7,585	5,496	39	388
2006/07	171,000	163,486	1,634,860	7,130	3,126	52	523
2007/08	171,000	126,140	1,261,400	9,218	2,615	48	482
2008/09	171,000	171,275	1,712,750	8,620	3,709	46	462
2009/10	185,000	170,016	2,514,992	13,966	4,385	39	574
2010/11	185,000	159,268	2,160,484	11,901	3,578	45	604
2011/12	185,000	158,210	2,378,995	11,344	4,653	34	511
2012/13	145,000	143,395	1,987,648	11,503	4,038	36	492
2013/14	145,000	147,400	1,852,695	5,042	3,025	49	612
2014/15	145,000	129,493	1,583,493	2,774	3,159	41	501
2015/16	145,000	120,690	1,704,274	3,656	2,571	47	663
2016/17	125,000	120,380	1,634,704	5,024	2,109	57	775
2017/18	145,000	145,080	1,819,772	8,150	2,899	50	628
2018/19	145,000	145,083	1,768,845	3,972	2,267	64	780
2019/20	155,000	144,245	1,986,687	11,282	3,293	44	603
2020/21	145,000	141,455	1,882,573	9,757	3,001	47	627
2021/22	145,000	145,010	1,976,880	6,765	2,455	59	805
2022/23	145,000	128,210	1,786,638	8,797	1,902	67	939
2023/24	145,000	145,270	1,815,838	4,512	2,077	70	874

Table 5: Area E (Prince William Sound) fishery statistics from 1990 - 1999. After 2000, Area E was managed as East and West Kayak Island Subsections. Statistics are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	District	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
			Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
1993	50,000	63,068	630,680					
1994/95								
1995/96	50,000	48,280	482,800					
1996/97								
1997/98	17,200	18,000	180,000					
1998/99	20,000	19,650	196,500		179	110	1,096	
1999/00	20,000	20,410	204,100		149	137	1,367	

*Landed Catch for 1995/96 doesn't include illegal fishing by one vessel.

Table 6: EKI (East Kayak Island) Subsection fishery statistics from 2000 - present. Statistics are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%. EKI has been closed since the 2012/13 season.

Season	District	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
			Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
2000/01	9,000	8,998	89,980		92	98	983	
2001/02	9,000	9,060	90,600		140	65	649	
2002/03	6,000	1,680	16,800		43	39	394	
2003/04	6,000	5,910	59,100		123	48	480	
2004/05	26,000	25,350	253,500		430	59	590	
2005/06	26,000	24,435	244,350		219	112	1,116	
2006/07	20,000	20,010	200,100		188	106	1,064	
2007/08	20,000	20,015	200,150		203	99	988	
2008/09	15,000	15,030	150,300		197	76	763	
2009/10	15,000	15,005	237,062		563	339	44	700
2010/11	8,400	8,445	133,502		191	161	52	828
2011/12	8,400	8,460	134,129		224	162	52	830

Table 7: WKI (West Kayak Island) Subsection fishery statistics from 2000 - present. Statistics are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	District	GHL	Retained Catch		Discard	Dredge	CPUE	CPUE
			Meat (lb)	Round (lb)	Mortality (lb)	Hrs	(Meat)	(Round)
2000/01	21,000	21,268	212,680		129	164	1,643	
2001/02	21,000	21,030	210,300		124	170	1,699	
2002/03	14,000	13,961	139,610		79	177	1,766	
2003/04	14,000	14,070	140,700		92	152	1,521	
2004/05	24,000	23,970	239,700		185	130	1,298	
2005/06	24,000	24,781	247,810		272	91	911	
2006/07	17,000	17,005	170,050		147	116	1,157	
2007/08	17,000	17,090	170,900		225	76	759	
2008/09	5,000	5,010	50,100		134	37	374	
2009/10	5,000	4,980	77,571	568	87	57	892	
2010/11	Closed							
2011/12	Closed							
2012/13	Closed							
2013/14	Closed							
2014/15	Closed							
2015/16	Closed							
2016/17	6,300	6,360	102,506	175	112	57	913	
2017/18	6,300	6,330	88,328	258	102	62	864	
2018/19	6,300	6,420	85,467	530	133	48	643	
2019/20	Closed							
2020/21	Closed							
2021/22	8,000	8,170	113,329	96	66	124	1,714	
2022/23	8,000	8,130	108,687	157	86	94	1,259	
2023/24	7,200	7,380	93,815	62	75	99	1,257	

Table 8: Area H (Cook Inlet) fishery statistics from 2000 - 2017. Statistics are based on preliminary analysis of historic fish ticket data. Round weight is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%. Area H has been closed since 2017.

Season	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
1990					0		
1991					0		
1992					0		
1993	20,000	20,115	201,150		528	38	381
1994/95	20,000	20,431	204,310		458	45	446
1995/96					0		
1996/97	28,000	28,228	282,280		534	53	529
1997/98	20,000	20,336	203,360		395	51	515
1998/99	20,000	17,247	172,470		390	44	442
1999/00	20,000	20,315	203,150		325	63	625
2000/01	20,000	20,516	205,160		275	75	746
2001/02	20,000	20,097	200,970		325	62	618
2002/03	20,000	8,591	85,910		311	28	276
2003/04	20,000	15,843	158,430		896	18	177
2004/05	20,000	6,117	61,170		364	17	168
2005/06	7,000	7,384	73,840		372	20	198
2006/07	7,000	50	500		10	5	50
2007/08	12,000				0		
2008/09	12,000				0		
2009/10	14,000				0		
2010/11	14,000	9,460	94,600		365	26	260
2011/12	12,500	9,975	99,750		324	31	310
2012/13	12,500	11,739	117,390		392	30	300
2013/14	Closed						
2014/15	Closed						
2015/16	10,000	9,485	94,850		459	21	210
2016/17	10,000	3,982	39,820		271	15	150
2017/18	10,000				0		

Table 9: KSH (Kodiak Shelikof) District fishery statistics from 1990 - present. Statistics pre-2009 are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	GHL	Retained Catch		Discard	Dredge	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)	Hrs	(Meat)	(Round)
1990		449,841	4,498,410				
1991		464,405	4,644,050				
1992		256,142	2,561,420				
1993		156,118	1,561,180		2,491	63	627
1994/95		314,051	3,140,510		8,662	36	363
1995/96							
1996/97		219,305	2,193,050	4,018	3,491	63	628
1997/98		258,346	2,583,460	1,900	5,492	47	470
1998/99		179,870	1,798,700	4,409	4,081	44	441
1999/00	180,000	187,963	1,879,630	5,907	4,304	44	437
2000/01	180,000	180,087	1,800,870	2,621	2,907	62	619
2001/02	180,000	177,112	1,771,120	4,880	3,398	52	521
2002/03	180,000	180,580	1,805,800	10,120	3,799	48	475
2003/04	180,000	180,011	1,800,110	8,209	3,258	55	553
2004/05	180,000	174,622	1,746,220	8,883	3,467	50	504
2005/06	160,000	159,941	1,599,410	4,767	2,280	70	701
2006/07	160,000	162,537	1,625,370	4,789	2,183	74	745
2007/08	170,000	169,968	1,699,680	7,685	2,937	58	579
2008/09	170,000	13,761	137,610	658	263	52	523
2009/10	170,000	170,021	1,710,147	6,358	3,496	49	489
2010/11	170,000	167,293	1,843,528	6,923	3,407	49	541
2011/12	135,000	136,491	1,433,618	2,314	2,438	56	588
2012/13	105,000	106,040	994,397	2,296	2,001	53	497
2013/14	105,000	104,725	903,518	1,443	2,449	43	369
2014/15	105,000	62,556	612,125	734	1,548	40	395
2015/16	75,000	35,626	430,207	1,011	1,188	30	362
2016/17	25,000	20,606	264,873	873	719	29	368
2017/18	25,000	20,870	211,277	740	481	43	439
2018/19	25,000	21,701	239,700	2,973	416	52	577
2019/20	20,000	20,125	248,914	2,296	380	53	656
2020/21	40,000	40,060	409,155	999	433	93	945
2021/22	80,000	80,215	863,788	3,630	754	106	1,145
2022/23	100,000	99,970	975,847	3,995	923	108	1,058
2023/24	100,000	100,285	966,526	3,316	969	103	997

Table 10: KNE (Kodiak Northeast) District fishery statistics from 1990 - present. Statistics pre-2009 are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	GHL	Retained Catch		Discard	Dredge	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)	Hrs	(Meat)	(Round)
1990		239,656	2,396,560				
1991		39,943	399,430				
1992		133,712	1,337,120				
1993		186,840	1,868,400		6,940	27	269
1994/95		35,207	352,070		1,773	20	199
1995/96							
1996/97		11,430	114,300	175	581	20	197
1997/98		95,858	958,580	874	2,604	37	368
1998/99		120,010	1,200,100	4,000	2,747	44	437
1999/00	75,000	77,119	771,190	2,380	1,384	56	557
2000/01	80,000	79,965	799,650	2,382	1,101	73	726
2001/02	80,000	80,470	804,700	3,497	1,142	70	705
2002/03	80,000	80,000	800,000	2,384	1,350	59	593
2003/04	80,000	79,965	799,650	5,522	1,248	64	641
2004/05	80,000	80,105	801,050	4,408	1,227	65	653
2005/06	80,000	79,990	799,900	2,842	1,759	45	455
2006/07	90,000	75,160	751,600	4,264	1,168	64	644
2007/08	90,000	75,105	751,050	2,328	1,170	64	642
2008/09	90,000	74,863	748,630	2,541	1,363	55	549
2009/10	75,000	69,410	834,953	2,396	1,222	57	683
2010/11	65,000	64,475	671,348	1,444	1,015	64	661
2011/12	70,000	61,209	671,789	1,734	986	62	681
2012/13	60,000	62,496	744,678	1,895	1,322	47	563
2013/14	55,000	54,926	526,629	1,257	934	59	564
2014/15	55,000	55,659	679,578	1,060	752	74	904
2015/16	55,000	55,577	636,996	1,668	1,228	45	519
2016/17	55,000	24,401	292,815	538	1,096	22	267
2017/18	55,000	14,190	136,297	418	349	41	391
2018/19	15,000	15,150	154,337	1,147	260	58	593
2019/20	15,000	15,070	165,696	932	206	73	806
2020/21	15,000	15,095	180,966	671	194	78	934
2021/22	30,000	30,295	279,451	2,123	294	103	949
2022/23	40,000	40,040	386,144	1,735	310	129	1,244
2023/24	40,000	40,385	411,129	1,318	544	74	755

Table 11: KSW (Kodiak Southwest) District fishery statistics from 2009 - present. Discard handling mortality was assumed 20%. All estimates include beds adjacent to the Karluk River that were managed as KSW since 2018/19. GHLS prior to 2018/19 do not reflect these beds.

Season	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
2009/10	25,000	3,480	62,241	75	159	22	392
2010/11	25,000	3,783	50,987	546	100	38	508
2011/12	25,000	25,110	348,142	335	455	55	766
2012/13	25,000	25,025	261,291	312	672	37	389
2013/14	25,000	21,715	244,884	374	549	40	446
2014/15	25,000	28,555	354,597	305	636	45	558
2015/16	25,000	15,614	208,334	204	417	37	500
2016/17	25,000	29,624	501,480	566	558	53	898
2017/18	25,000	29,200	384,499	1,737	441	66	871
2018/19	30,000	33,319	398,928	1,991	510	65	782
2019/20	35,000	35,010	449,584	1,740	636	55	707
2020/21	35,000	25,950	361,366	675	589	44	613
2021/22	35,000	35,080	536,435	593	630	56	851
2022/23	35,000	35,030	484,498	931	517	68	938
2023/24	35,000	25,327	337,358	258	400	63	844

Table 12: KSE (Kodiak Southeast) District fishery statistics from 2018 - present. Discard handling mortality was assumed 20%.

Season	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
2018/19	15,000	469	3,551	2	60	8	60
2019/20	15,000				0		
2020/21	15,000				0		
2021/22	15,000				0		
2022/23	15,000				0		
2023/24	15,000				0		

Table 13: Area M (Alaska Peninsula) fishery statistics from 1993 - present. Statistics pre-2009 are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
1993					1,847	71	710
1994/95					1,664	39	392
1995/96					0		
1996/97	200,000	12,560	125,600	136	327	38	384
1997/98	200,000	51,616	516,160	703	1,752	29	295
1998/99	200,000	63,290	632,900	794	1,612	39	393
1999/00	200,000	75,610	756,100	1,087	2,025	37	373
2000/01	33,000	7,660	76,600	83	320	24	239
2001/02	Closed				0		
2002/03	Closed				0		
2003/04	Closed				0		
2004/05	Closed				0		
2005/06	20,000				0		
2006/07	25,000	155	1,550	15	64	2	24
2007/08	10,000				0		
2008/09	10,000	2,460	24,600	75	151	16	163
2009/10	Closed				0		
2010/11	Closed				0		
2011/12	Closed				0		
2012/13	15,000	15,040	217,607	531	255	59	853
2013/14	15,000	15,155	193,106	339	247	61	781
2014/15	22,500	15,000	227,381	367	294	51	775
2015/16	22,500	15,000	207,991	180	308	49	676
2016/17	22,500	15,013	202,806	207	345	43	587
2017/18	22,500	15,250	181,646	469	328	47	555
2018/19	22,500	8,905	119,458	732	264	34	452
2019/20	15,000	5,740	63,937	518	118	49	542
2020/21	15,000				0		
2021/22	15,000				0		
2022/23	15,000	7,560	84,492	684	214	35	395
2023/24	15,000				0		

Table 14: Area O (Dutch Harbor) fishery statistics from 1993 - present. Statistics pre-2009 are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
1993	170,000	39,346	393,460		838	47	470
1994/95	170,000	1,931	19,310		81	24	238
1995/96	170,000	26,950	269,500		1,047	26	257
1996/97	170,000				0		
1997/98	170,000	5,790	57,900	402	160	36	362
1998/99	110,000	46,432	464,320	636	941	49	493
1999/00	110,000	6,465	64,650	93	278	23	233
2000/01	Closed				0		
2001/02	Closed				0		
2002/03	10,000	6,000	60,000	94	184	33	326
2003/04	Closed				0		
2004/05	Closed				0		
2005/06	Closed				0		
2006/07	Closed				0		
2007/08	Closed				0		
2008/09	10,000	10,040	100,400	706	225	45	446
2009/10	10,000	6,080	54,882	42	104	59	528
2010/11	10,000	5,640	42,177	65	83	68	506
2011/12	10,000	5,570	45,513	51	77	73	593
2012/13	5,000	5,100	37,730	54	64	79	588
2013/14	5,000	5,225	44,572	89	56	94	798
2014/15	5,000	5,160	41,323	78	73	70	563
2015/16	10,000	5,040	45,215	69	157	32	288
2016/17	10,000	5,050	39,181	26	104	48	376
2017/18	10,000	285	2,250	1	24	12	93
2018/19	5,000	325	3,571	1	24	14	152
2019/20	5,000	2,625	24,739	64	131	20	189
2020/21	5,000				0		
2021/22	10,000				0		
2022/23	10,000	2,620	32,482	97	132	20	247
2023/24	10,000				0		

Table 15: Area Q (Dutch Harbor) fishery statistics from 1993 - present. Statistics pre-2009 are based on preliminary analysis of historic fish ticket data. Round weight catch pre-2009 is estimated assuming meat weight catch is 10% of round weight catch. Discard handling mortality was assumed 20%.

Season	GHL	Retained Catch		Discard	Dredge Hrs	CPUE	CPUE
		Meat (lb)	Round (lb)	Mortality (lb)		(Meat)	(Round)
1993					5,764	105	1,051
1994/95					11,113	45	455
1995/96					0		
1996/97	600,000	150,295	1,502,950	296	2,313	65	650
1997/98	600,000	97,002	970,020	699	2,246	43	432
1998/99	400,000	96,795	967,950	2,330	2,319	42	417
1999/00	400,000	164,929	1,649,290	1,249	3,294	50	501
2000/01	200,000	205,520	2,055,200	1,789	3,355	61	613
2001/02	200,000	140,871	1,408,710	1,393	3,072	46	459
2002/03	105,000	92,240	922,400	1,008	2,038	45	453
2003/04	105,000	42,590	425,900	627	1,020	42	418
2004/05	50,000	10,050	100,500	103	275	37	366
2005/06	50,000	23,220	232,200	318	602	39	386
2006/07	50,000	48,246	482,460	995	1,138	42	424
2007/08	50,000	49,995	499,950	901	1,084	46	461
2008/09	50,000	49,995	499,950	1,067	962	52	520
2009/10	50,000	48,921	603,386	1,078	1,275	38	473
2010/11	50,000	50,100	548,274	1,434	972	52	564
2011/12	50,000	50,275	530,103	619	984	51	539
2012/13	50,000	50,045	564,787	758	943	53	599
2013/14	50,000	49,989	561,255	422	1,086	46	517
2014/15	50,000	12,445	226,888	159	525	24	432
2015/16	7,500	7,500	107,337	93	307	24	350
2016/17	7,500	7,575	108,191	133	275	28	393
2017/18	7,500	7,535	105,668	78	316	24	334
2018/19	7,500	7,540	125,978	75	357	21	353
2019/20	7,500	7,130	106,177	123	365	20	291
2020/21	7,500				0		
2021/22	7,500				0		
2022/23	7,500	7,535	110,073	197	331	23	333
2023/24	7,500				0		

Figures

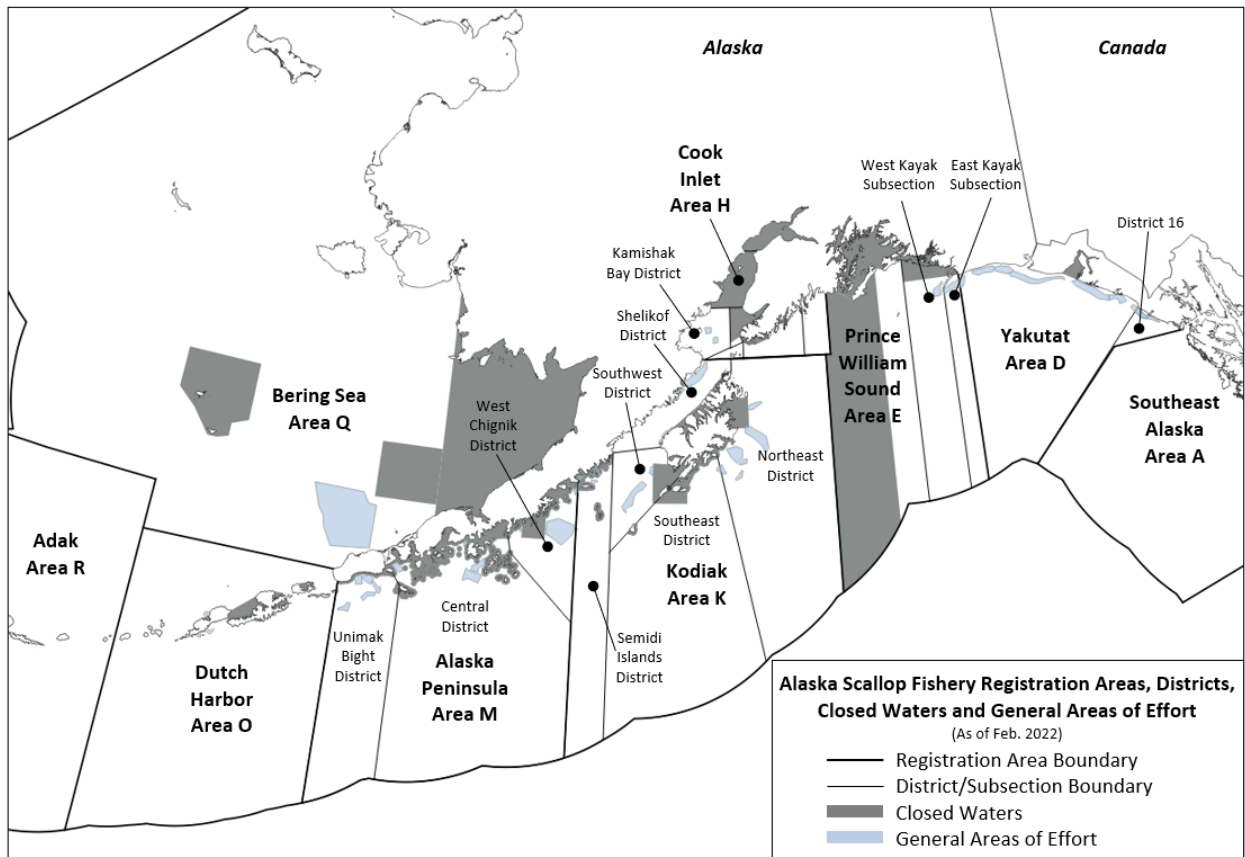


Figure 1: Alaska scallop fishery registration areas. General areas of effort are overlaid by blue polygons. Exploratory fisheries in waters normally closed to scallop fishing (gray shading) have been opened by ADF&G Commissioner’s Permit in the Alaska Peninsula Unimak Bight District during past seasons.

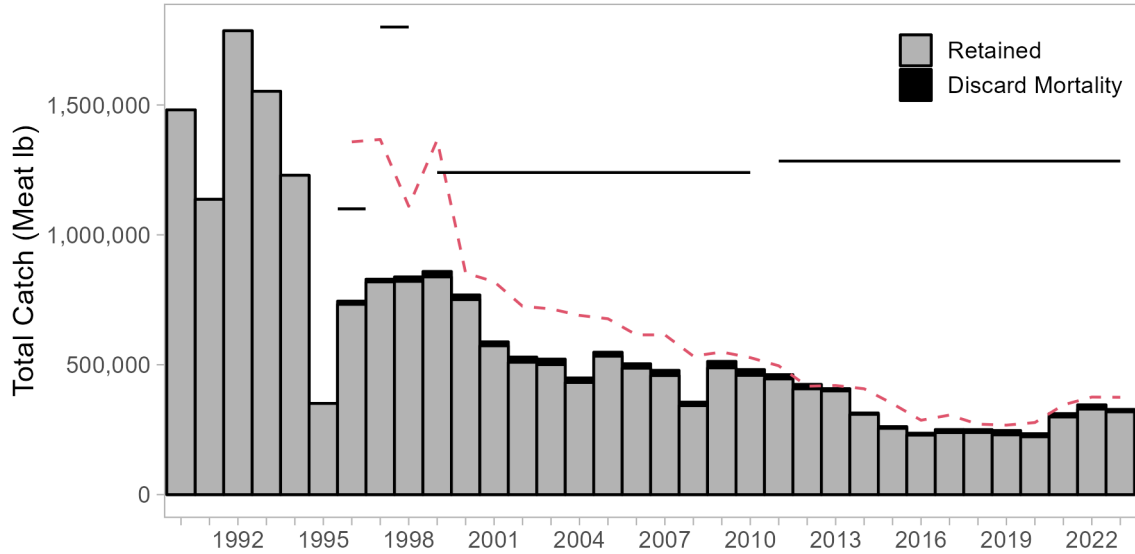


Figure 2: Statwide total catch estimates from 1990 - 2023. OFL is indicated by solid horizontal lines. The red dashed line indicates the statewide cumulative GHL.

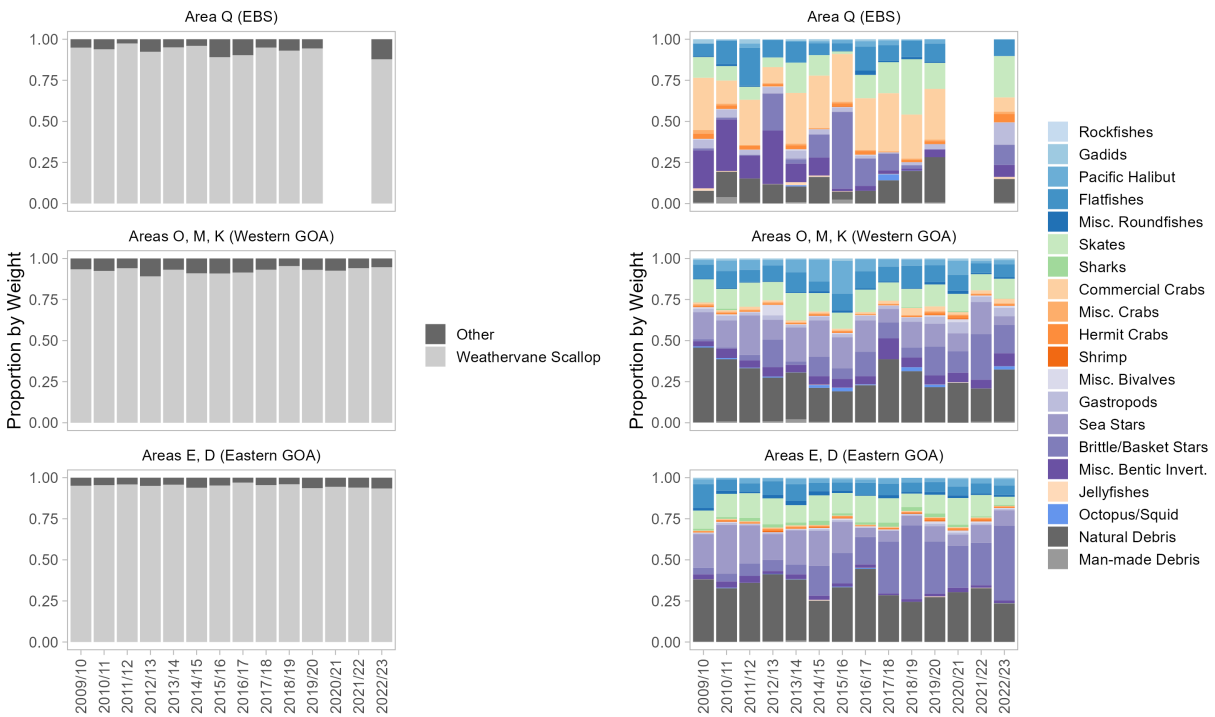


Figure 3: Proportion of directed scallop fishery catch as the target species or all other bycatch species (left) and the proportion of bycatch by taxonomic group (right) by ecoregion.