

**Special Publication No. 21-12**

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**Overview of the Sport Fisheries for Groundfish and Shellfish in Southeast Alaska through 2020: A Report to the Alaska Board of Fisheries**

by

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December 2021

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries





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**OVERVIEW OF THE SPORT FISHERIES FOR GROUND FISH AND  
SHELLFISH IN SOUTHEAST ALASKA THROUGH 2020: A REPORT TO  
THE ALASKA BOARD OF FISHERIES**

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December 2021

This investigation was partially financed by the Federal Aid in Sport Fish Restoration Act (16 U.S.C.777-777K) and State of Alaska Department of Fish and Game funds.

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*This document should be cited as follows:*

*Tydingco, T., K. Reppert, C. Schwanke, D. J. Teske, D. C. Love, and J. Nichols. 2021. Overview of the sport fisheries for groundfish and shellfish in Southeast Alaska through 2020: a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 21-12, Anchorage.*

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# TABLE OF CONTENTS

|  | Page |
|--|------|
| LIST OF TABLES.....  | ii   |
| LIST OF FIGURES.....   | iii  |
| LIST OF APPENDICES.....  | iii  |
| ABSTRACT.....  | 1    |
| INTRODUCTION.....  | 1    |
| FISHERY MONITORING TOOLS.....                                      | 1    |
| Alaska Sport Fishing Survey.....                                   | 1    |
| Charter Vessel Logbooks.....                                       | 3    |
| On-site Creel Surveys.....   | 3    |
| Sport Shrimp Permit and Reporting.....                             | 3    |
| SOUTHEAST ALASKA GROUND FISH AND SHELLFISH FISHERY ATTRIBUTES..... | 3    |
| Rockfish.....  | 3    |
| Stock Assessment.....  | 4    |
| Regulation History.....  | 4    |
| Barotrauma and Management Implications.....                        | 6    |
| Fishery Management.....  | 7    |
| Harvest Trends.....  | 16   |
| 2020/2021 Rockfish Proposals.....                                  | 20   |
| Lingcod.....   | 20   |
| Regulation History.....  | 20   |
| Fishery Management.....  | 21   |
| Harvest Trends.....  | 21   |
| 2020 Lingcod Proposals.....  | 22   |
| Sablefish.....   | 25   |
| Stock Assessment.....  | 25   |
| Regulation History.....  | 25   |
| Harvest Trends.....  | 25   |
| 2020 Sablefish Proposals.....                                      | 27   |
| Shellfish.....   | 28   |
| Harvest Monitoring.....  | 29   |
| Shrimp.....  | 29   |
| Life history.....  | 29   |
| Regulatory History.....  | 30   |
| Management.....  | 31   |
| Harvest.....   | 31   |
| 2020 Shrimp Proposals.....   | 35   |
| Dungeness Crab.....  | 36   |
| Life history.....  | 36   |
| Management.....  | 36   |
| Regulatory history.....  | 36   |
| Harvest.....   | 37   |
| 2020 Dungeness Crab Proposals.....                                 | 37   |

## TABLE OF CONTENTS (Continued)

|   | <b>Page</b> |
|---|-------------|
| Other Shellfish Species.....  | 39          |
| Introduction .....  | 39          |
| Regulatory History.....   | 39          |
| Management .....  | 40          |
| 2020 general shellfish Proposals .....  | 40          |
| REFERENCES CITED .....  | 41          |
| APPENDIX A: REGULATIONS AND BAROTRAUMA STUDIES FOR ROCKFISH .....                         | 43          |
| APPENDIX B: LINGCOD SPORT FISHERY REGULATIONS .....                                       | 49          |
| APPENDIX C: SABLEFISH SPORT FISHERY REGULATIONS.....                                      | 55          |
| APPENDIX D: REGULATORY HISTORY OF GUIDED SPORT ECOTOURISM DUNGENESS CRAB<br>FISHERY ..... | 57          |

## LIST OF TABLES

| <b>Table</b>   | <b>Page</b> |
|--|-------------|
| 1. Mortality of demersal shelf rockfish from research, directed commercial, incidental commercial, sport and subsistence fisheries in the Southeast Outside Subdistrict, 1992–2020, and total allowable catch for commercial and sport sectors combined..... | 9           |
| 2. Total sport mortality of slope rockfish by groundfish management area in Southeast Alaska, 2006–2020 estimated through Statewide Harvest Survey and marine creel.....   | 15          |
| 3. Statewide Harvest Survey estimates of the number of rockfish harvested in Southeast Alaska, 1977–2020.....  | 17          |
| 4. Statewide Harvest Survey estimates of the number of sablefish harvested in Southeast Alaska sport fishery, by management area, 2011–2020.....   | 27          |
| 5. Charter logbook sablefish harvest in Southeast Alaska sport fishery, by groundfish management area, 2011–2020.....  | 27          |
| 6. Statewide Harvest Survey estimates of the number of nonresident anglers participating in a shellfish fishery within Southeast Alaska. ....  | 28          |
| 7. Statewide Harvest Survey estimates of shrimp harvest by nonresident sport anglers and the minimum estimate of sport, personal use, and subsistence harvest by resident anglers, 1996–2020. ....   | 32          |
| 8. Number of permits issued, percent response, percent fished, pot days of effort, harvest in pounds, and HPUE of whole shrimp harvested by the SEAK sport shrimp fishery by residency status, 2019–2020.....  | 34          |
| 9. Estimated effort, harvest, and harvest per unit effort of whole shrimp harvested in the SEAK sport shrimp fishery by residency and ADF&G Commercial Fishing District, 2019.....   | 34          |
| 10. Estimated effort, harvest, and HPUE of whole shrimp harvested by the SEAK sport shrimp fishery by residency status and area, 2020. ....  | 35          |
| 11. Estimates of Dungeness crab harvest from the Statewide Harvest Survey in the mixed sport and personal use fisheries of Southeast Alaska, 1996–2020.....  | 38          |
| 12. Statewide Harvest Survey estimates of nonresident Dungeness crab harvest by survey area in Southeast Alaska, 2016–2020.....  | 39          |
| 13. Statewide Harvest Survey estimated harvest of hardshell clams and Tanner crab in the mixed personal use and sport fisheries in Southeast Alaska, 2016–2020.....  | 40          |

## LIST OF FIGURES

| <b>Figure</b>  | <b>Page</b> |
|--|-------------|
| 1. Map of Southeast Alaska showing boundaries of the Statewide Harvest Survey Areas. ....  | 2           |
| 2. Yelloweye rockfish biomass estimate and 90% lower and upper confidence intervals for the Southeast Outside Subdistrict, 1994–2020. ....   | 5           |
| 3. Map of Southeast Alaska groundfish management areas. ....   | 8           |
| 4. Total allowable catch and mortality by fishery and year of demersal shelf rockfish in the Southeast Outside Subdistrict of Southeast Alaska, 2006–2020. ....  | 11          |
| 5. Demersal shelf rockfish allocation and mortality in the sport fishery from the Southeast Outside Subdistrict of Southeast Alaska, 2006–2020 estimated through Statewide Harvest Survey and marine creel surveys. ....   | 13          |
| 6. Total sport mortality of nonpelagic rockfish estimated through Statewide Harvest Survey and marine creel surveys from the Southeast Outside, Southeast Inside, and all Southeast Alaska waters, 2006–2020. ....   | 14          |
| 7. Sport harvest estimates estimated through Statewide Harvest Survey and marine creel surveys of pelagic rockfish in Southeast Alaska, 2006–2020. ....  | 16          |
| 8. Statewide Harvest Survey estimates of total rockfish harvest in sport fisheries in the Southeast Outside Subdistrict of Southeast Alaska, 1977–2020. ....   | 18          |
| 9. Estimated harvest of rockfish in sport fisheries of Southeast Alaska as derived from the Statewide Harvest Survey by angler residency for years 1996–2020. ....   | 19          |
| 10. Number of harvested and released pelagic and nonpelagic rockfish by guided anglers as reported on charter vessel logbooks in Southeast Alaska during 1999–2020. ....   | 20          |
| 11. Lingcod harvests in the Central Southeast Outside, Northern Southeast Outside, and Icy Bay–East Yakutat subdistrict areas, relative to guideline harvest level during 1991–2020 as determined from Statewide Harvest Survey, charter logbook, and marine creel. .... | 23          |
| 12. Lingcod harvests from Statewide Harvest Survey, charter logbook, and marine creel surveys in the Southern Southeast Outside, Northern Southeast Inside, and Southern Southeast Inside areas, relative to guideline harvest level during 1991–2020. ....              | 24          |
| 13. Statewide Harvest Survey estimates of sablefish in the Southeast Alaska sport fishery 2010–2020. ....  | 26          |
| 14. Statewide Harvest Survey estimates of shrimp harvest in Southeast Alaska by residency, 1996–2020. ....   | 33          |

## LIST OF APPENDICES

| <b>Appendix</b>   | <b>Page</b> |
|---|-------------|
| A1. Summary of sport fish regulations for nonpelagic rockfish in Southeast Alaska, 1989–2020. ....  | 44          |
| A2. List of references for barotrauma studies on rockfish species survival when returned to depth. ....   | 47          |
| B1. Summary of sport fishery lingcod regulations in Southeast Alaska, 1994–2020. ....   | 50          |
| C1. Summary of sablefish sport fishery regulations in Southeast Alaska, 2009–2020. ....   | 56          |
| D1. Regulatory history of the George Inlet and Nakwasina Sound superexclusive guided sport ecotourism Dungeness crab fishery in Southeast Alaska, 2003–2020. .... | 58          |





## ABSTRACT

This report provides an overview of the sport fisheries for groundfish and shellfish, excluding halibut (*Hippoglossus stenolepis*), in Southeast Alaska. Catch and harvest information, descriptions of fisheries management, and a history of management actions involving these fisheries are provided. In addition, current proposals to the Alaska Board of Fisheries (board) affecting these fisheries are identified.

Keywords: rockfish, *Sebastes*, lingcod, *Ophiodon elongates*, Tanner Crab, *Chionoecetes bairdi*, Dungeness Crab, *Cancer magister*, sablefish, *Anoplopoma fimbria*, shrimp, shellfish, sport fishery, resident, nonresident, guided, unguided, groundfish, Alaska Board of Fisheries, board, Southeast Alaska

## INTRODUCTION

The Alaska Department of Fish and Game (ADF&G, department) has jurisdiction over all groundfish and shellfish fisheries management within the internal waters of the state, in coastal waters out to 3 miles offshore, and for certain groundfish species within the Exclusive Economic Zone (EEZ) which extends out to 300 miles offshore. In Southeast Alaska, yelloweye rockfish *Sebastes ruberrimus*, black rockfish *S. melanops*, lingcod *Ophiodon elongatus*, and sablefish *Anoplopoma fimbria* are the primary state-managed groundfish species harvested by sport fisheries. Shellfish harvested in the sport fisheries include shrimp (*Pandalidae* spp.), Dungeness crab *Cancer magister*, Tanner crab *Chionoecetes bairdi*, and clams (*Pharidae* spp.), as well as other miscellaneous shellfish species.

The objective of this report is to provide an overview of the sport fisheries for groundfish and shellfish in Southeast Alaska for the 2018–2020 seasons. Specifically, this report will detail the following:

- 1) fishery monitoring and briefings on the biology and functional groupings of groundfish and shellfish
- 2) the history of sport fisheries regulations and current fisheries management for groundfish and shellfish
- 3) groundfish and shellfish catch and harvest information
- 4) a description of management issues and current proposals before the Alaska Board of Fisheries (BOF, board)

## FISHERY MONITORING TOOLS

The department monitors the sport harvest of groundfish and shellfish via 3 primary sampling programs: the Alaska Sport Fishing Survey (commonly known as the Statewide Harvest Survey, SWHS), sport charter vessel logbooks, and on-site creel surveys. In 2018, a fourth method was implemented via a permit and reporting requirement for sport shrimp fishing. Each program's sampling methods has its utilities and limitations. A combination of the 3 primary fishery monitoring methods is used to generate different types of fisheries metrics such as harvest, biomass, and total mortality (harvest and release mortality).

## ALASKA SPORT FISHING SURVEY

The SWHS is an annual mail-out survey sent to a random sample of sport fishing license holders (Jennings et al. 2015; Romberg et al. 2020) and provides estimates of sport harvests of rockfish, lingcod, Dungeness crab, and shrimp (as well as for other species) by survey area (Figure 1). The SWHS estimates have been available for most groundfish species since 1977. The benefits of the

SWHS are that it provides a consistent annual estimate of all sport harvest that can be further divided into harvests by resident and nonresident anglers, as well as guided and unguided anglers. However, the SWHS is conducted after the fishing season has concluded and therefore estimates are not available until the following year. Furthermore, rockfish harvest estimates are for all species combined and cannot be apportioned to species or management assemblages (e.g., pelagic vs. nonpelagic rockfish) without using species information obtained from the onsite creel surveys. The SWHS does not collect biological characteristics of the harvest (e.g., age, sex, length, or weight).

The SWHS requires a minimum number of survey responses to produce statistically viable estimates. In some cases, the number of responses received is not sufficient to stratify estimates by residency and thereby distinguish nonresident sport harvest from the estimated minimum resident harvest. In these situations, harvest estimates are presented in this report as “mixed” sport and personal use harvest estimates, and residency type cannot be teased out while still maintaining statistically viable estimates.

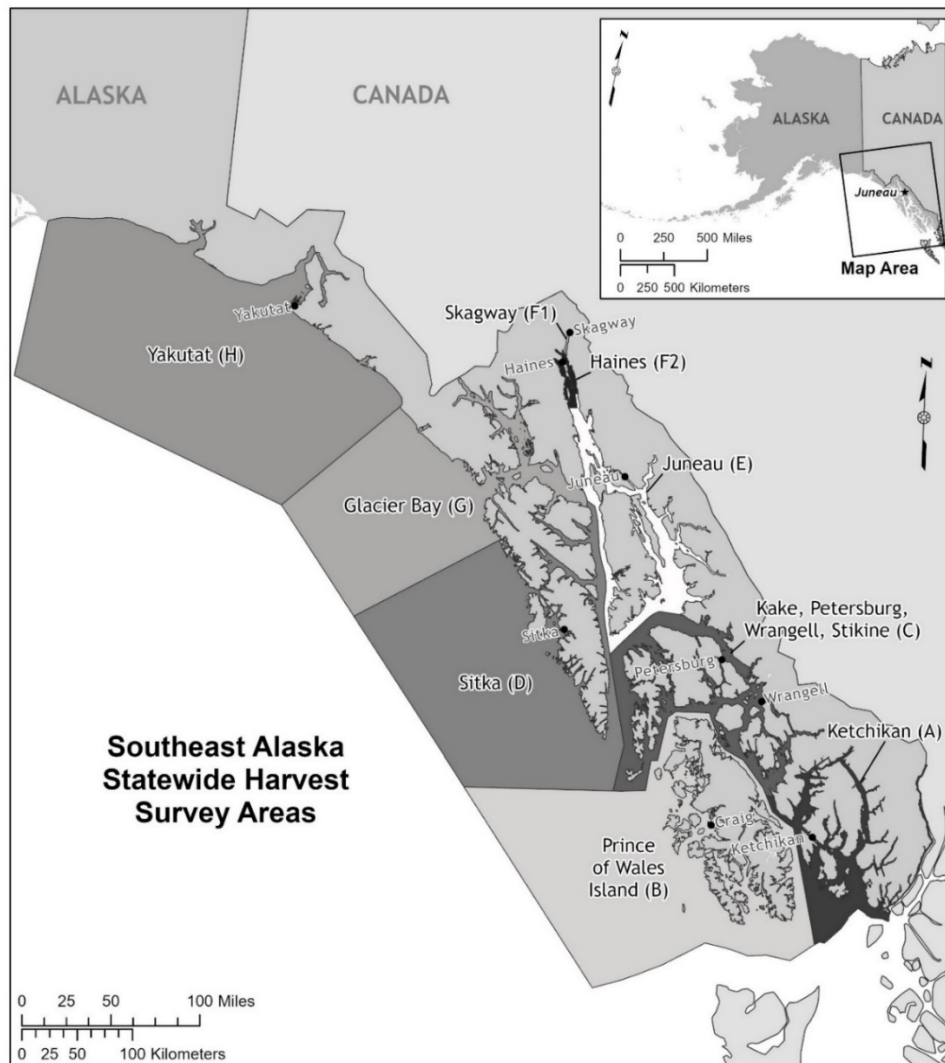


Figure 1.–Map of Southeast Alaska showing boundaries of the Statewide Harvest Survey (SWHS) Areas (saltwater).

## **CHARTER VESSEL LOGBOOKS**

Charter vessel logbooks have been required in Southeast Alaska since 1998 (Powers and Sigurdsson 2016). All charter operators who take clients fishing (guided anglers) in marine waters are required to report harvest and fishing effort in a logbook that must be filled out on a trip-by-trip basis. For the main part of each season, logbook pages for each week (ending on Sunday) are required to be returned (or postmarked) within 8 days. Operators are required to provide the number of anglers fishing along with their residency status, license number (permanent identification number, disabled veteran license number, or youth age), and the number of lingcod, sablefish, pelagic rockfish, yelloweye rockfish, and other nonpelagic rockfish harvested and released. Shellfish harvest is not required to be recorded.

## **ON-SITE CREEL SURVEYS**

On-site creel surveys (marine creel) occur during late April through mid-September when more than 90% of the annual sport fishery effort in Southeast Alaska occurs, including over 95% of the guided effort (B. Powers, Sport Fish Program Coordinator, ADF&G, Anchorage, personal communication). Creel surveys are designed to collect data on the effort, catch, and harvest as well as biological characteristics of the harvest such as species, age, size, and sex composition (Jaenicke et al. 2019). On-site creel surveys occur in the major fishing ports of Yakutat, Haines, Gustavus, Elfin Cove, Juneau, Sitka, Petersburg, Wrangell, Craig, Klawock, and Ketchikan. Sport anglers are surveyed at the completion of their fishing trip by department personnel. Since inception, the primary focus of the on-site creel survey program has been to collect data on the sport salmon harvest of the region; however, catch and harvest information on groundfish have been consistently obtained since 2006. Biological data collected on rockfish, lingcod, and sablefish include species, length, weight, sex (lingcod only), and age (black rockfish only at Sitka).

## **SPORT SHRIMP PERMIT AND REPORTING**

The shrimp sport fishery in Southeast Alaska has a permit and reporting requirement that requires users to report the location, effort, and harvest of their sets allowing the department to estimate effort and harvest in the fishery. Through collecting this data over multiple years, trends in effort, harvest, and harvest per unit effort (HPUE) can be monitored. Harvest per unit effort is defined as pounds of whole shrimp per pot day. These results, along with commercial and personal use harvest estimates will be used by managers to estimate total removals of the shrimp resource and help ensure that harvest does not exceed the harvestable surplus.

## **SOUTHEAST ALASKA GROUND FISH AND SHELLFISH FISHERY ATTRIBUTES**

### **ROCKFISH**

Rockfish are found in marine waters throughout Southeast Alaska. Many are slow-growing (late maturation) and long-lived with estimated maximum ages up to 205 years for roughey rockfish *S. aleutianus* and 118 years for yelloweye rockfish (Love et al. 2002). They are susceptible to overharvest and slow population recovery once overharvest occurs. Rockfish have closed gas-filled swim bladders that expand when fish are brought to the surface from deep water. Expanded gases reabsorb very slowly, so fish are often unable to swim back to depth once released. Released

fish can die from injuries sustained due to the rapid pressure change or from predation when they cannot resubmerge on their own.

These life history characteristics combined with a lack of stock assessment information and increasing fishing effort and harvest led to the development of an interdivisional working group dedicated to sustainable management of rockfish throughout the Gulf of Alaska (GOA). In 2017, the *ADF&G Statewide Rockfish Initiative* was launched as an interdivisional effort focused on developing long-term collaborative management and assessment strategies for black and yelloweye rockfish fisheries (Howard et al. 2019). Initial phases of this initiative have included assessing the state of knowledge of black and yelloweye rockfishes in the GOA, developing statewide management priorities, sharing existing data between regions and divisions (Sport Fish and Commercial Fisheries), identifying key data gaps, and generating draft management objectives.

Rockfish of the genus *Sebastes* are grouped into multiple assemblages for sport fisheries management: pelagic rockfish include dark *S. ciliatus*, dusky *S. variabilis*, widow *S. entomelas*, yellowtail *S. flavidus*, black *S. melanops*, and deacon *S. mystinus* rockfish; and nonpelagic rockfish include all other species in the genus. Nonpelagic rockfish species assemblages are further divided into demersal shelf rockfish (DSR) and slope rockfish. The DSR component contains yelloweye rockfish and 6 other species: canary *S. pinniger*, China *S. nebulosus*, copper *S. caurinus*, quillback *S. maliger*, rosethorn *S. helvomaculatus*, and tiger *S. nigrocinctus* rockfish. The slope rockfish component contains all remaining nonpelagic rockfish species. Slope species common to the sport fishery include silvergray *S. brevispinis*, vermilion *S. miniatus*, shortraker *S. borealis*, and roughey rockfish.

### **Stock Assessment**

A multi-year stock assessment survey for yelloweye rockfish in Southeast Outside (SEO) waters is conducted by the Division of Commercial Fisheries using a remotely operated vehicle (Green and Stahl 2017). The stock assessment is habitat based and the biomass estimate is the product of estimated area of yelloweye rockfish suitable habitat, density of yelloweye rockfish, and average weight of yelloweye rockfish by management area. Despite a conservative management strategy, yelloweye rockfish biomass has been declining since the mid-1990s (Figure 2). There is also evidence of a slight but gradual decline in average length of yelloweye rockfish since at least 2006 in the Sitka Area sport harvest, suggesting a change in the population structure that may be a result of harvest patterns. Yelloweye rockfish are used as an indicator for other DSR species based on similar life history, habitat preference, and the lack of available data for other species. There are no stock assessments for any other rockfish species other than for yelloweye, and by extension, the DSR assemblage.

### **Regulation History**

Prior to 1989, there were no sport fishery bag or possession limits established for rockfish in Southeast Alaska. Sport fishing regulations for rockfish in Southeast Alaska south of Cape Fairweather were first established in 1989 and consisted of bag limits of 5 rockfish and 10 in possession, of which only 2 per day and 4 in possession could be yelloweye rockfish (Appendix A1). Special regulations for the Ketchikan and Sitka areas set bag and possession limits at 3 rockfish, of which only 1 could be a yelloweye rockfish.

In 1994, the Southeast Alaska regionwide regulations for rockfish were modified by the board to provide bag limits for pelagic and nonpelagic assemblages, as well as for yelloweye rockfish specifically. Bag limits for pelagic species were set at 5 fish, 10 in possession. The bag limits for other species were also 5 fish and 10 in possession, of which only 2 per day and 4 in possession could be yelloweye rockfish. These Southeast Alaska regionwide regulations were also extended to include the Yakutat area.

Since 2006, annual emergency orders (EOs) establishing nonpelagic rockfish regulations (Appendix A1) have been used to manage the sport fishery to stay within the allocation of demersal shelf rockfish. The specific exceptions for the Ketchikan and Sitka areas were repealed in 2015 because these regulations were superseded by annual EOs that implemented more restrictive regulations prior to commencement of the fishing season.

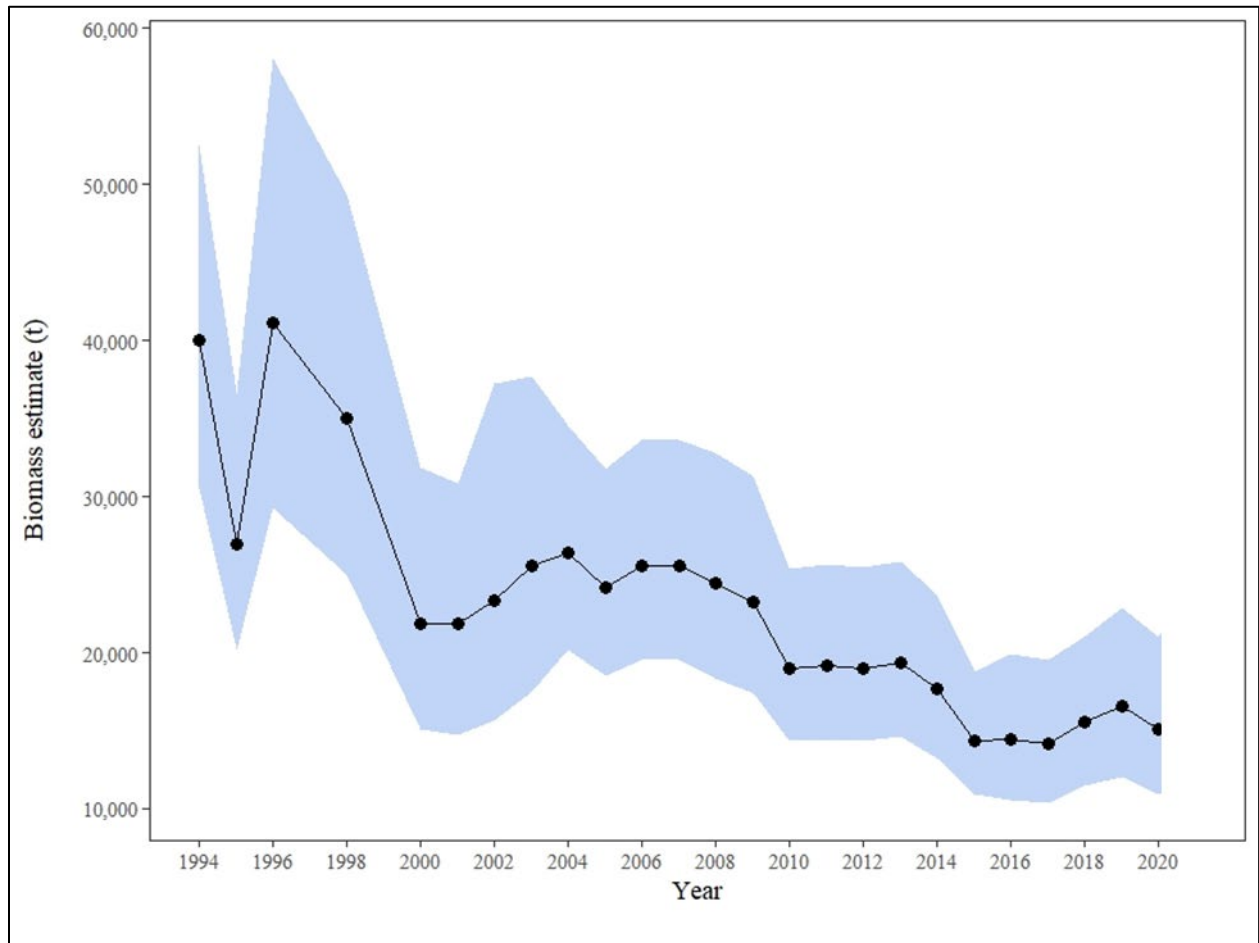


Figure 2.—Yelloweye rockfish biomass estimate (t) (solid line) and 90% lower and upper confidence intervals (blue) for the Southeast Outside (SEO) Subdistrict, 1994–2020.

In 2020, the sport harvest of nonpelagic rockfish was prohibited in all Southeast waters due to conservation concerns for DSR species. In a subsequent EO the nonpelagic species group (DSR and slope) was decoupled, and a limited harvest opportunity was provided for slope rockfish. The bag and possession limit was set at 1 slope rockfish per day.

## **Barotrauma and Management Implications**

Nonpelagic rockfish, including those in the DSR assemblage, are generally benthic, often found in rocky areas, and generally in deeper water than pelagic species. Nonpelagic rockfish are subject to high mortality rates when released at the surface due to tissue and organ injuries sustained by pressure differences from positive buoyancy, caused by expansion of swim bladder gases when the fish is brought to the surface, otherwise known as barotrauma. Barotrauma injuries include crushed, displaced, or ruptured internal organs, embolisms (air bubbles in blood), exophthalmia (bulging eye), and detached retina. Fish are often unable to return to depth on their own if released at the surface due to increased buoyancy caused by barotrauma injuries. Pelagic species also incur these injuries, but to a lesser extent due to physiological and behavioral differences for buoyancy regulation and preferences for shallower water.

The department reviewed scientific literature on survival of rockfish species released at depth (Appendix A2) and completed its own study in 2011 (Hochhalter and Reed 2011). Studies in California, Oregon, and Alaska indicate that some portion of rockfish released at the surface are able to submerge on their own, but it varies by species and depth of capture. The Alaska study (Hochhalter and Reed 2011) assessed the effectiveness of using deepwater release devices on common nonpelagic rockfish species in a field setting and deployed the devices mimicking techniques most likely to be used by the common angler. This study suggests survival of released yelloweye rockfish could be increased from about 20% to over 95% by using these simple devices. Survival of other rockfish species released in the Alaska study has not been estimated, but other studies in the scientific literature (Berry 2001; Jarvis and Lowe 2008; Parker et al. 2006; Pribyl et al. 2009) demonstrated substantial increased survival following deepwater release for numerous rockfish species. Collectively, this research has focused on ways to reduce the effects of barotrauma by sending released rockfish back to deep water quickly after capture.

In 2012, the department began an outreach program to encourage public awareness of rockfish biology and management with special focus on the susceptibility of rockfish to barotrauma injuries. The department developed communication plans, educational materials, and a video showing rockfish release mechanisms and their applied uses in the field to improve public understanding of nonpelagic rockfish concerns. In addition, Division of Sport Fish staff opportunistically promote strategies for deepwater release of rockfish at public meetings, informational events, advisory committee meetings, during dockside creel surveys, and in area offices. Area offices also display and demonstrate deepwater release mechanisms and provide a pamphlet describing the mechanisms and the benefits of their use. These efforts have contributed to public awareness and acceptance of the 2020 statewide regulation requiring mandatory use of deepwater release mechanisms.

In 2013, the board required all guided anglers in Southeast Alaska to release nonpelagic rockfish with a deepwater release mechanism, and in 2020, the board required all anglers statewide to release all rockfish at depth of capture or to a depth of at least 100 ft, whichever is shallower.

Based on the reviewed scientific literature of rockfish release survival, a mortality rate of 20% was applied to DSR released by guided anglers (since 2013) and a mortality rate of 100% was applied to DSR released by unguided anglers through 2019 for calculating total DSR biomass removal (Green et al. 2014; Jarvis and Lowe 2008; Hochhalter and Reed 2011; Hannah et al. 2014; GMT 2014). Because of the new regulation requiring all anglers to release fish at depth, a 20% mortality rate was applied to all rockfish released beginning in 2020.

## **Fishery Management**

### ***Nonpelagic Rockfish (DSR and Slope)***

The North Pacific Fishery Management Council delegated management of DSR species in the SEO Subdistrict to the State of Alaska under the federal Fishery Management Plan for Groundfish of the Gulf of Alaska. The SEO Subdistrict includes: the East Yakutat Section (EYKT), Northern Southeast Outside Section (NSEO), Central Southeast Outside Section (CSEO), and Southern Southeast Outside Section (SSEO; Figure 3). A total allowable catch (TAC) is set annually for the SEO Subdistrict as part of the North Pacific Fishery Management Council stock assessment process (Wood et al. 2020). The TAC varied between 217–960 metric tons (t) from 1988 to 2020 (Table 1). DSR fishery mortality occurs in the directed commercial fishery, sport fishery, subsistence fishery, and as bycatch and unreported mortality in the commercial groundfish and halibut fisheries (Figure 4). After the estimated subsistence harvest of DSR has been subtracted from the TAC, the remainder of the TAC is allocated between sport and commercial fisheries (5 AAC 28.160(c)).

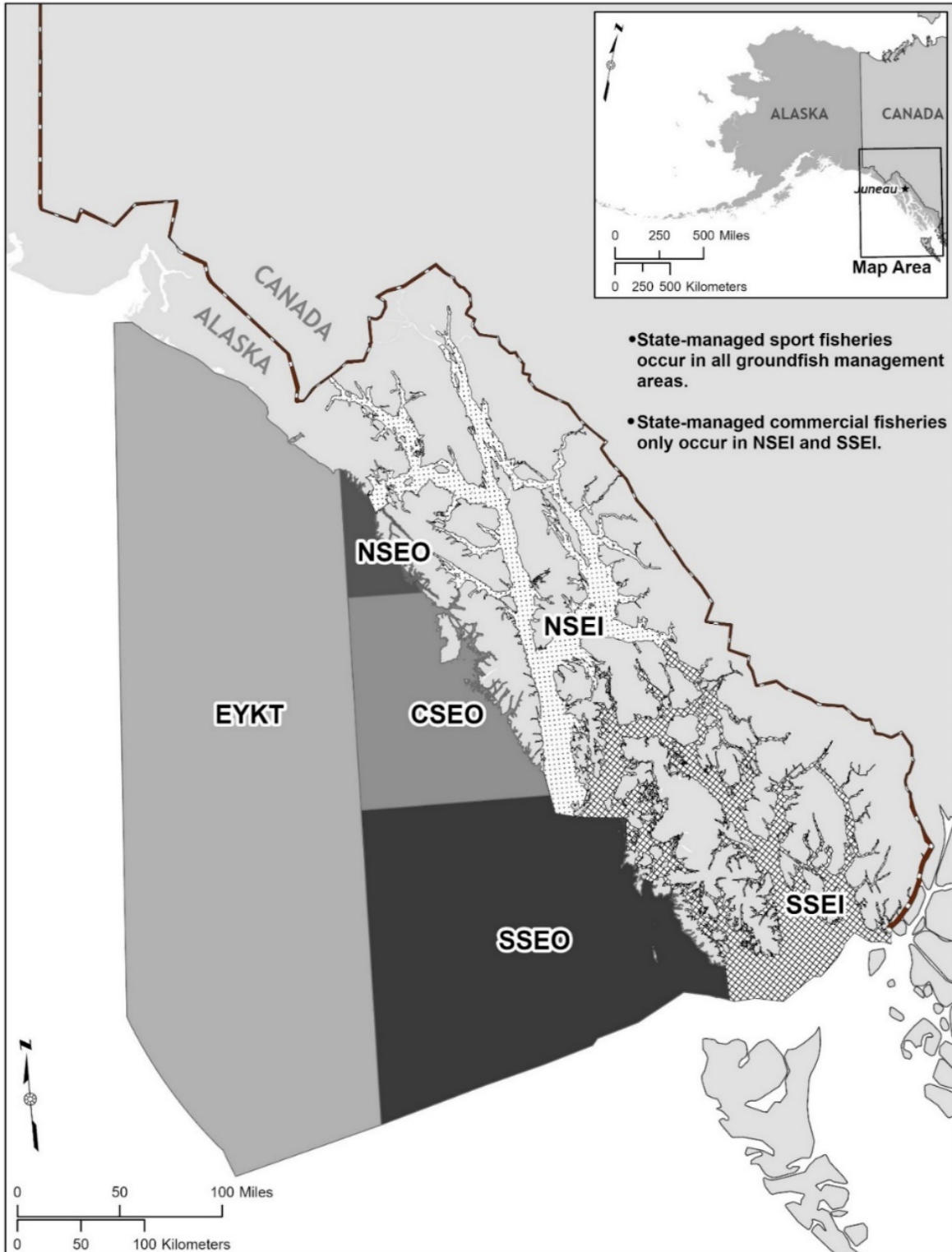


Figure 3.—Map of Southeast Alaska groundfish management areas.

*Note:* NSEO = Northern Southeast Outside Section, NSEI = Northern Southeast Inside Subdistrict, EYKT = East Yakutat Section, CSEO = Central Southeast Outside Section, SSEO = Southern Southeast Outside Section, and SSEI = Southern Southeast Inside Subdistrict.



Table 1.–Mortality of demersal shelf rockfish (DSR) in metric tons (t) from research, directed commercial, incidental commercial, sport and subsistence fisheries in the Southeast Outside Subdistrict, 1992–2020, and total allowable catch (TAC) for commercial and sport sectors combined (modified from Wood et al. 2020).

| Year              | Research | Directed <sup>a</sup> | Incidental <sup>d,f</sup> | Sport <sup>b</sup> | Subsistence <sup>c</sup> | Total <sup>d</sup> | TAC | Sport allocation | Sport fishery realized % of sport allocation | Sport fishery realized % of TAC | All fisheries realized % of TAC |
|-------------------|----------|-----------------------|---------------------------|--------------------|--------------------------|--------------------|-----|------------------|--|---------------------------------|---------------------------------|
| 1992              | –        | 351                   | 119                       | –                  | –                        | 478                | 550 | –                | –  | –                               | –                               |
| 1993              | 13       | 341                   | 188                       | –                  | –                        | 534                | 800 | –                | –  | –                               | –                               |
| 1994              | 4        | 383                   | 219                       | –                  | –                        | 604                | 960 | –                | –  | –                               | –                               |
| 1995              | 13       | 168                   | 103                       | –                  | –                        | 271                | 580 | –                | –  | –                               | –                               |
| 1996              | 11       | 350                   | 85                        | –                  | –                        | 436                | 945 | –                | –  | –                               | –                               |
| 1997              | 16       | 280                   | 100                       | –                  | –                        | 380                | 945 | –                | –  | –                               | –                               |
| 1998              | 2        | 241                   | 120                       | –                  | –                        | 361                | 560 | –                | –  | –                               | –                               |
| 1999              | 2        | 242                   | 126                       | –                  | –                        | 367                | 560 | –                | –  | –                               | –                               |
| 2000              | 8        | 187                   | 107                       | –                  | –                        | 295                | 340 | –                | –  | –                               | –                               |
| 2001              | 7        | 178                   | 146                       | –                  | –                        | 324                | 330 | –                | –  | –                               | –                               |
| 2002              | 2        | 136                   | 149                       | –                  | –                        | 285                | 350 | –                | –  | –                               | –                               |
| 2003              | 6        | 105                   | 169                       | –                  | –                        | 275                | 390 | –                | –  | –                               | –                               |
| 2004              | 2        | 173                   | 155                       | –                  | –                        | 329                | 450 | –                | –  | –                               | –                               |
| 2005              | 4        | 42                    | 195                       | –                  | –                        | 237                | 410 | –                | –  | –                               | –                               |
| 2006              | 2        | 0                     | 203                       | 75                 | –                        | 280                | 410 | 66               | 114  | 18                              | 68                              |
| 2007              | 3        | 0                     | 196                       | 60                 | –                        | 259                | 410 | 66               | 91   | 15                              | 63                              |
| 2008              | 1        | 42                    | 152                       | 68                 | –                        | 263                | 382 | 61               | 111  | 18                              | 69                              |
| 2009              | 2        | 76                    | 139                       | 37                 | –                        | 254                | 362 | 58               | 64   | 10                              | 70                              |
| 2010              | 7        | 30                    | 131                       | 52                 | 8                        | 228                | 287 | 46               | 113  | 18                              | 79                              |
| 2011              | 5        | 22                    | 87                        | 36                 | 6                        | 156                | 294 | 47               | 77   | 12                              | 53                              |
| 2012              | 4        | 105                   | 76                        | 46                 | 7                        | 238                | 286 | 46               | 100  | 16                              | 83                              |
| 2013              | 4        | 130                   | 83                        | 34                 | 7                        | 258                | 296 | 47               | 72   | 11                              | 87                              |
| 2014              | 5        | 33                    | 63                        | 40                 | 7                        | 148                | 267 | 43               | 93   | 15                              | 55                              |
| 2015              | 4        | 33                    | 70                        | 48                 | 8                        | 163                | 217 | 35               | 137  | 22                              | 75                              |
| 2016              | 4        | 34                    | 79                        | 48                 | 7                        | 172                | 224 | 36               | 133  | 21                              | 77                              |
| 2017              | 5        | 32                    | 92                        | 45                 | 7                        | 181                | 220 | 35               | 129  | 20                              | 82                              |
| 2018              | 6        | 51                    | 79                        | 40                 | 7                        | 183                | 243 | 39               | 103  | 16                              | 75                              |
| 2019              | 10       | 45                    | 76                        | 47                 | 7                        | 185                | 254 | 41               | 115  | 19                              | 73                              |
| 2020 <sup>a</sup> | 6        | 0                     | 87                        | 7                  | 7                        | 107                | 231 | 37               | 19   | 3                               | 46                              |

-continued-

*Note:* En dashes denote no data.

- <sup>a</sup> Landings from ADF&G Southeast Region fish ticket database and National Marine Fisheries Service (NMFS) weekly catch reports through October 5, 2020. The directed commercial DSR fishery was closed in all management areas in 2020.
- <sup>b</sup> Sport harvest (retained harvest plus estimated release mortality) from 2006 to 2008 include East Yakutat Section (EYKT) and Icy Bay Subdistrict (IBS). These data are not available prior to 2006. Harvest of DSR was prohibited in the sport fishery in 2020 for Southeast Alaska; however, this number reflects release mortality estimates.
- <sup>c</sup> Projected subsistence catch for the fishery year, (i.e., 2010 is for the 2010 fishery). These data were not available or deducted from the allowable biological catch (ABC) prior to 2009. The subsistence data has not been updated since 2015 due to lack of funding.
- <sup>d</sup> Data are from reported landings. Full retention of DSR went into effect in 2005; unreported DSR discards not reported in this table.
- <sup>e</sup> No ABC prior to 1988, 1988–1993 ABC for Central Southeast Outside Section (CSEO), Northern Southeast Outside Section (NSEO), and Southern Southeast Outside Section (SSEO) only (not EYKT).
- <sup>f</sup> Assignment of ADF&G groundfish management areas for DSR bycatch landed in the commercial salmon troll fishery began in 2015.

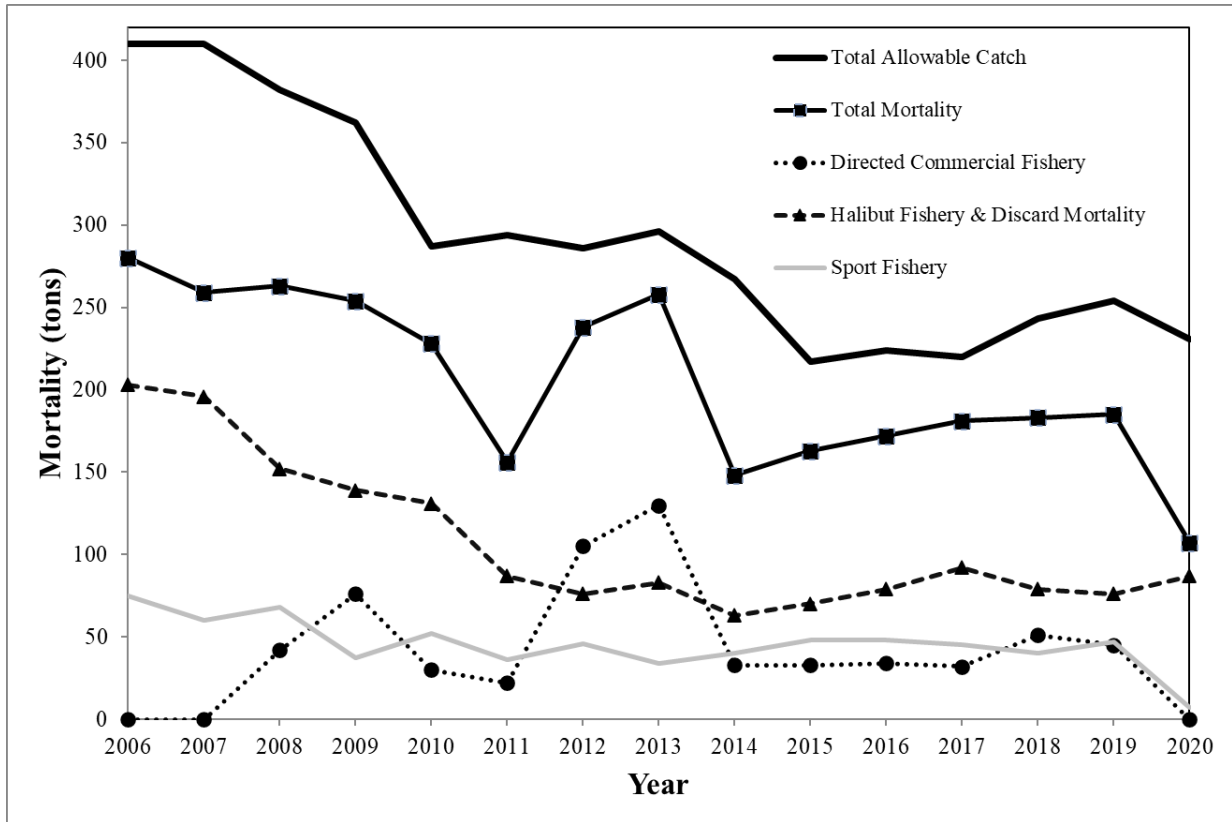


Figure 4.—Total allowable catch (TAC) and mortality by fishery and year of demersal shelf rockfish in the Southeast Outside Subdistrict of Southeast Alaska, 2006–2020.

*Note:* Sport fishery mortality equals harvest plus release mortality and is estimated through SWHS and marine creel surveys.

In 2006, the board allocated 16% of the TAC remainder of DSR in the SEO to the sport fishery. At this time the board also outlined a series of management measures that ADF&G's Commissioner may implement by EO to keep the sport fishery within its allocation (5 AAC 47.065). These measures include the following:

- 1) reduced bag and possession limits for nonresident anglers
- 2) retention of all DSR caught by a nonresident angler is required until the nonresident bag limit is reached
- 3) charter operators and crewmembers may not retain DSR while clients are on board the vessel
- 4) annual limits for DSR for nonresident anglers
- 5) reduced bag and possession limits for resident anglers
- 6) retention of all DSR caught by a resident angler is required until the resident angler's bag limit is reached
- 7) annual limits for DSR for resident anglers
- 8) time and area closures

To date, the department has implemented all the management measures, except resident annual limits, to keep the sport fishery harvest within its allocation (Appendix A1). Although DSR sport mortality in outside waters remained relatively stable from 2009 through 2019, the TAC, and subsequently the allocation to the sport fishery, has steadily decreased from 66 t in 2006 to a low of 35 t in 2017, followed by small increases in the TAC in 2018 and 2019 (Figure 5).

In response to the decreases in allocation, the department has used increasingly restrictive management measures to maintain the sport harvest within its allocation. After exceeding the allocation in 2015 and 2016, time and area closures were implemented and extended each year since 2017 (Appendix A1). Despite the more restrictive measures implemented in 2017 through 2019, mortality estimates indicate the sport fishery exceeded its allocation in all 3 years (Figure 5). The seventh provision (annual limits for resident anglers) has also been considered but would not have had an appreciable effect on overall harvest because of the small relative contribution in SEO by resident anglers.

DSR species represent an average of 89% by weight of the nonpelagic mortality in SEO of which yelloweye rockfish represent an average of 44% of the annual sport mortality of DSR in SEO during the period 2010–2019.

Unlike the SEO waters, there is no stock assessment or allocation set for nonpelagic rockfish in Southeast Inside (SEI) waters. Nonpelagic rockfish harvest in SEI increased from approximately 16,000 fish in 2002 to over 30,000 fish in 2005. The increased harvest, coupled with a lack of stock information and susceptibility to overharvest, led to the establishment of conservative nonpelagic rockfish regulations for SEI waters in 2006. Despite a conservative management strategy, the total mortality of nonpelagic rockfish in inside waters continued to rise from 2011 to 2016 and has exceeded removals from the SEO through 2019 (Figure 6). This was attributed to more restrictive regulations in SEO and a shift in sport effort towards rockfish given restrictions in other SEI fisheries.

In response, emergency orders issued from 2017 through 2019 reduced nonpelagic rockfish bag limits in all Southeast waters (Appendix A1). Due to the continued decline in biomass in outside

waters and increasing harvest in inside waters an emergency order was issued in January 2020 prohibiting the retention of nonpelagic rockfish in all Southeast waters to ensure the sustainability of these stocks. In April 2020, the nonpelagic species group (DSR and slope) was decoupled, and limited harvest opportunity was provided for slope species. The bag limit for slope species was set at 1 fish for all anglers, with no size and annual limit, and the retention of DSR was prohibited.

The recent 10-year average (2010–2019) total sport mortality of slope rockfish in Southeast Alaska is 9,381 fish, which represents approximately 14% of the nonpelagic total sport mortality in Southeast Alaska (Table 2). In 2020, when harvest of DSR was prohibited, the total sport mortality of slope rockfish was approximately 6,588 fish; however, marine sport effort in Southeast Alaska was down 48% due to impacts of the COVID-19 pandemic (Table 2).

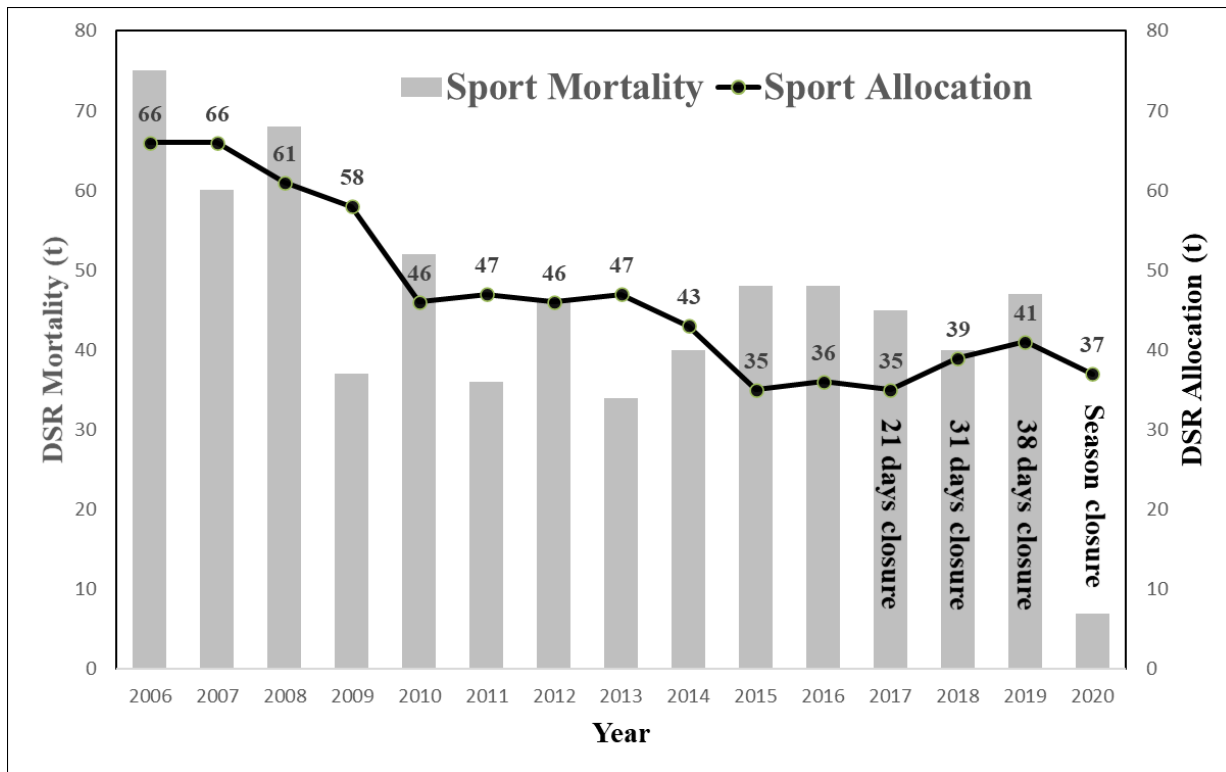


Figure 5.—Demersal shelf rockfish (DSR) allocation and mortality in the sport fishery from the Southeast Outside (SEO) Subdistrict of Southeast Alaska, 2006–2020 estimated through Statewide Harvest Survey (SWHS) and marine creel surveys.

*Note:* Sport fishery mortality equals harvest plus release mortality.

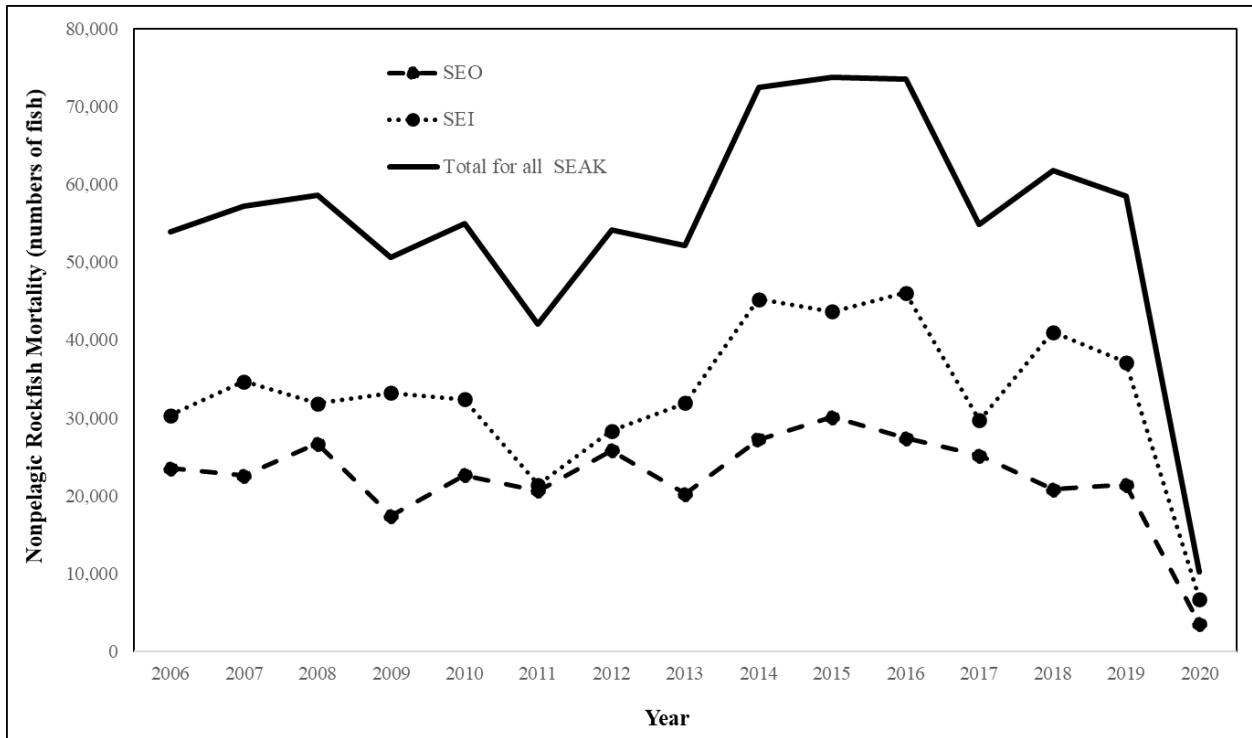


Figure 6.—Total sport mortality of nonpelagic rockfish (numbers of fish) estimated through Statewide Harvest Survey (SWHS) and marine creel surveys from the Southeast Outside (SEO), Southeast Inside (SEI), and all Southeast Alaska waters, 2006–2020.

Table 2.—Total sport mortality (harvest plus release mortality) of slope rockfish by groundfish management area in Southeast Alaska, 2006–2020 estimated through Statewide Harvest Survey (SWHS) and marine creel surveys.

| Year              | Slope Rockfish Mortality (numbers of fish) |     |      |       |      |       |       | All Southeast |
|-------------------|--|-----|------|-------|------|-------|-------|---------------|
|                   | EYKT                                       | IBS | NSEO | CSEO  | SSEO | NSEI  | SSEI  |               |
| 2006              | 0  | 0   | 181  | 656   | 291  | 1,000 | 4,042 | 6,170         |
| 2007              | 0  | 0   | 36   | 596   | 213  | 1,531 | 5,147 | 7,523         |
| 2008              | 0  | 0   | 182  | 1,177 | 483  | 958   | 2,821 | 5,621         |
| 2009              | 0  | 0   | 81   | 419   | 300  | 1,723 | 2,415 | 4,938         |
| 2010              | 0  | 0   | 57   | 1,201 | 352  | 1,427 | 2,421 | 5,458         |
| 2011              | 0  | 6   | 188  | 1,353 | 427  | 1,171 | 2,377 | 5,522         |
| 2012              | 0  | 0   | 224  | 1,681 | 393  | 1,639 | 3,242 | 7,179         |
| 2013              | 0  | 0   | 222  | 1,905 | 214  | 2,465 | 3,926 | 8,732         |
| 2014              | 2  | 95  | 330  | 2,221 | 406  | 4,005 | 6,408 | 13,467        |
| 2015              | 0  | 0   | 308  | 2,026 | 471  | 2,874 | 5,209 | 10,888        |
| 2016              | 0  | 0   | 187  | 2,472 | 211  | 6,628 | 5,329 | 14,827        |
| 2017              | 0  | 0   | 201  | 2,659 | 833  | 1,546 | 3,751 | 8,990         |
| 2018              | 0  | 2   | 350  | 2,322 | 572  | 1,938 | 4,775 | 9,959         |
| 2019              | 1  | 13  | 403  | 870   | 885  | 2,623 | 4,110 | 8,905         |
| 2020 <sup>a</sup> | 0  | 0   | 139  | 1,959 | 523  | 2,454 | 2,150 | 7,225         |
| Avg 2011–2020     | 0  | 11  | 237  | 1,879 | 481  | 2,615 | 3,973 | 9,196         |

Note: EYKT = East Yakutat Section; IBS = Icy Bay Subdistrict; NSEO = Northern Southeast Outside Section; CSEO = Central Southeast Outside Section; SSEO = Southern Southeast Outside Section; NSEI = Northern Southeast Inside Subdistrict; SSEI = Southern Southeast Inside Subdistrict.

<sup>a</sup> Retention of DSR was prohibited and slope rockfish daily bag limit was 1 fish.

### ***Pelagic Rockfish***

Pelagic rockfish have been managed as a separate rockfish species assemblage since 1994. Stock assessment data has been limited for this species group and regional regulations have remained unchanged since 1994. The regional harvest of pelagic rockfish, predominantly black rockfish, has been on an increasing trend since the early 2000s (Figure 7). Between 2009–2014 the regional harvest more than doubled, increasing from 45,000 fish in 2009 to 113,000 fish in 2014. Although harvest has increased throughout the region, the Sitka Area (CSEO) has seen the greatest increase in pelagic harvest. Black rockfish account for 91% (range 86–94%) of the pelagic rockfish harvested in the sport fishery across the region, although the contribution varies by management area.

Estimated harvest of pelagic rockfish in CSEO grew from 20,000 fish in 2009 to over 60,000 fish in 2014 and 2015 (SWHS estimates). Given the increase in harvest and lack of stock status information, the department reduced the pelagic bag and possession limit in the Sitka Area from the regionwide bag limit of 5 fish, 10 in possession to 3 fish, 6 in possession by EO in 2016 and 2017. This action resulted in a 27% decrease in pelagic rockfish harvest in CSEO during 2017 compared to 2015 (Figure 7). In 2018, the board implemented a 3 fish bag limit in CSEO for nonresidents only and the resident limit reverted back to the 5 fish regional bag limit. These management measures successfully stabilized the harvest of pelagic rockfish in CSEO from 2017 through 2019. Reduced effort during 2020, due to the COVID-19 pandemic, further reduced harvest in NSEO, CSEO, SSEO, and NSEI (Figure 7).

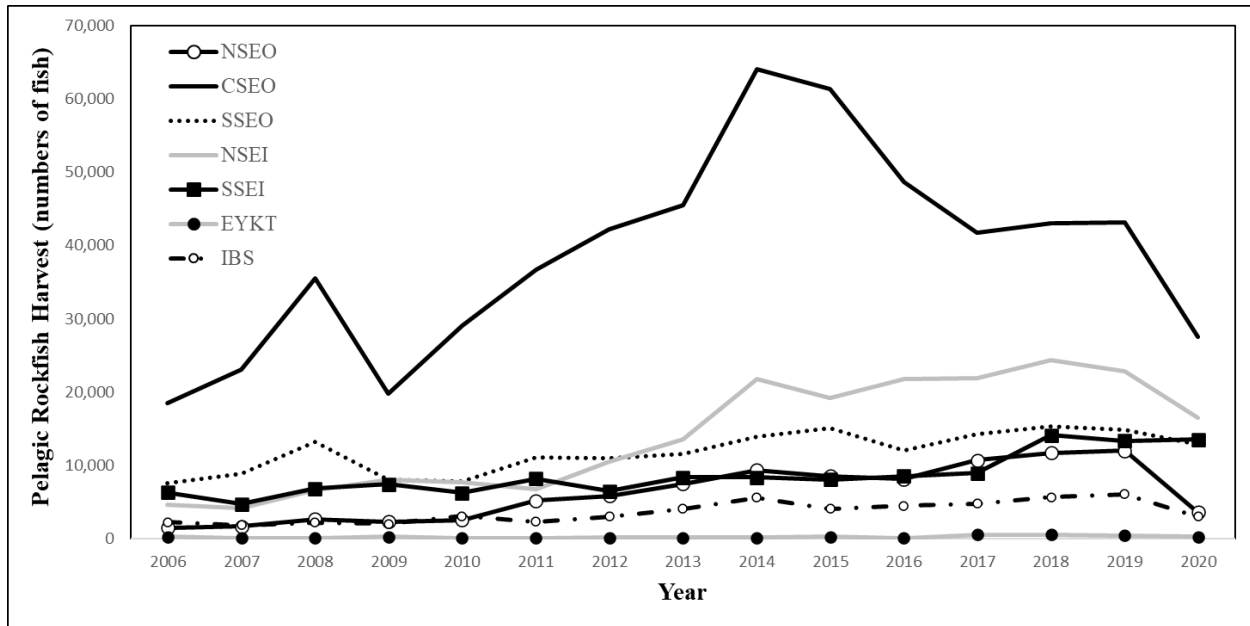


Figure 7.—Sport harvest estimates (numbers of fish) estimated through Statewide Harvest Survey (SWHS) and marine creel surveys of pelagic rockfish in Southeast Alaska, 2006–2020.

## Harvest Trends

Estimates of rockfish harvest have been obtained via the SWHS since 1977 (Table 3). Total harvest of all rockfish (pelagic and nonpelagic combined) increased steadily from 1977 through 1988, peaking at 57,000 fish (Figure 8). With the implementation of bag limits for rockfish in 1989, harvest declined and remained relatively constant at about 30,000–40,000 fish until 1999. Harvest increased substantially from 2003 to 2013. The decline in total rockfish harvest since 2014 is likely due to bag limit reductions of pelagic rockfish in CSEO since 2016 and nonpelagic rockfish bag limit reductions and outside water closures by EO since 2017. The recent 5-year average harvest (2016–2020) is approximately 145,450 fish.

The majority of rockfish harvest in Southeast Alaska, as well as the majority of the recent increase in rockfish harvest, has primarily come from 3 sport fish harvest areas on the outer coast: Prince of Wales Island (Area B), Sitka (Area D), and Glacier Bay (Area G). These 3 areas generally correspond to the 3 groundfish management areas (SSEO, CSEO, and NSEO), and accounted for about 65% of the average regional rockfish harvest over the last 5 years (Figure 8).

Since 1996, the SWHS has provided estimates of harvest that further separates the harvest by resident and nonresident anglers. The proportion of the sport fishery rockfish harvest taken by nonresidents has varied between 63%–90%, with a large increase in the proportion harvested by nonresidents starting in 2004 (Figure 9). In the last 5 years (2016–2020), nonresidents have taken an average of 89% of the total rockfish sport harvest in Southeast Alaska.



Table 3.—Statewide Harvest Survey (SWHS) estimates of the number of rockfish harvested in Southeast Alaska, 1977–2020.

| Year | Ketchikan | PWI <sup>a</sup> | PSG-WRG <sup>b</sup> | Sitka  | Juneau | H-S <sup>c</sup> | Glacier Bay | Yakutat | Total   |
|------|-----------|------------------|----------------------|--------|--------|------------------|-------------|---------|---------|
| 1977 | 834       | 571              | 762                  | 3,635  | 2,996  | 130              | 34          | 0       | 8,962   |
| 1978 | 6,898     | 2,504            | 2,106                | 2,784  | 2,169  | 362              | 63          | 0       | 16,886  |
| 1979 | 8,491     | 1,882            | 1,881                | 8,372  | 9,627  | 364              | 182         | 182     | 30,981  |
| 1980 | 18,415    | 4,968            | 2,841                | 8,481  | 6,724  | 319              | 43          | 0       | 41,791  |
| 1981 | 20,581    | 4,544            | 1,937                | 11,837 | 5,649  | 820              | 259         | 44      | 45,671  |
| 1982 | 21,023    | 8,027            | 1,581                | 13,027 | 6,141  | 1,583            | 168         | 52      | 51,602  |
| 1983 | 18,824    | 12,040           | 1,008                | 9,855  | 7,859  | 168              | 409         | 105     | 50,268  |
| 1984 | 16,295    | 5,197            | 2,265                | 6,375  | 5,978  | 558              | 85          | 146     | 36,899  |
| 1985 | 16,632    | 4,168            | 2,663                | 5,085  | 4,704  | 315              | 472         | 0       | 34,039  |
| 1986 | 17,861    | 9,841            | 2,106                | 5,997  | 4,847  | 794              | 78          | 44      | 41,568  |
| 1987 | 18,231    | 9,984            | 2,525                | 5,944  | 4,709  | 289              | 307         | 272     | 42,261  |
| 1988 | 26,378    | 8,692            | 480                  | 9,319  | 10,224 | 854              | 801         | 91      | 56,839  |
| 1989 | 17,159    | 8,955            | 1,726                | 6,196  | 4,638  | 465              | 357         | 8       | 39,504  |
| 1990 | 9,043     | 9,062            | 1,150                | 3,948  | 1,881  | 488              | 306         | 81      | 25,959  |
| 1991 | 8,504     | 7,200            | 1,222                | 4,879  | 3,408  | 415              | 936         | 264     | 26,828  |
| 1992 | 9,927     | 7,968            | 1,838                | 6,852  | 3,532  | 181              | 501         | 414     | 31,213  |
| 1993 | 6,764     | 9,589            | 2,070                | 6,622  | 5,717  | 569              | 448         | 251     | 32,030  |
| 1994 | 11,741    | 12,122           | 2,298                | 13,446 | 3,271  | 157              | 881         | 490     | 44,406  |
| 1995 | 7,984     | 11,915           | 1,870                | 7,968  | 3,438  | 233              | 355         | 584     | 34,347  |
| 1996 | 7,092     | 9,446            | 1,085                | 9,026  | 3,008  | 329              | 2,294       | 599     | 32,886  |
| 1997 | 8,156     | 10,804           | 1,760                | 10,471 | 4,735  | 323              | 2,441       | 1,396   | 40,088  |
| 1998 | 5,133     | 11,759           | 2,678                | 13,936 | 5,570  | 214              | 3,629       | 1,224   | 44,142  |
| 1999 | 10,538    | 23,667           | 3,778                | 20,281 | 8,379  | 233              | 3,840       | 772     | 71,489  |
| 2000 | 12,318    | 17,152           | 4,103                | 18,439 | 9,685  | 117              | 6,477       | 858     | 69,149  |
| 2001 | 8,540     | 17,161           | 2,461                | 16,444 | 8,857  | 138              | 3,309       | 668     | 57,578  |
| 2002 | 7,077     | 15,189           | 2,531                | 15,856 | 5,768  | 19               | 2,572       | 737     | 49,749  |
| 2003 | 7,321     | 15,518           | 1,940                | 16,212 | 8,649  | 44               | 4,095       | 1,615   | 55,394  |
| 2004 | 13,805    | 27,027           | 3,712                | 30,239 | 6,753  | 566              | 4,148       | 1,413   | 87,663  |
| 2005 | 13,136    | 23,617           | 3,598                | 31,984 | 8,412  | 277              | 6,595       | 2,371   | 89,990  |
| 2006 | 13,473    | 23,425           | 2,437                | 34,160 | 3,913  | 291              | 4,986       | 2,800   | 85,485  |
| 2007 | 15,522    | 25,371           | 4,190                | 38,264 | 5,323  | 90               | 3,765       | 2,013   | 94,538  |
| 2008 | 14,763    | 30,891           | 5,329                | 53,414 | 6,344  | 28               | 5,592       | 2,636   | 118,997 |
| 2009 | 16,742    | 23,767           | 4,623                | 30,601 | 9,683  | 140              | 5,823       | 2,372   | 93,751  |

-continued-

Table 3.–Page 2 of 2.

| Year | Ketchikan | PWI <sup>a</sup> | PSG-WRG <sup>b</sup> | Sitka  | Juneau | H-S <sup>c</sup> | Glacier Bay | Yakutat | Total   |
|------|-----------|------------------|----------------------|--------|--------|------------------|-------------|---------|---------|
| 2010 | 12,552    | 25,254           | 3,111                | 44,381 | 10,005 | 14               | 6,525       | 3,723   | 105,565 |
| 2011 | 9,233     | 28,637           | 3,786                | 51,514 | 5,309  | 29               | 7,939       | 2,710   | 109,157 |
| 2012 | 11,673    | 26,902           | 6,196                | 62,239 | 9,225  | 68               | 8,485       | 3,634   | 128,422 |
| 2013 | 17,232    | 27,334           | 4,471                | 60,322 | 12,502 | 277              | 13,253      | 4,518   | 139,909 |
| 2014 | 23,573    | 32,010           | 7,893                | 83,780 | 21,978 | 341              | 16,727      | 6,796   | 193,098 |
| 2015 | 20,786    | 37,181           | 6,170                | 86,099 | 16,443 | 203              | 15,348      | 4,586   | 186,816 |
| 2016 | 18,264    | 31,373           | 10,361               | 71,214 | 20,065 | 496              | 16,933      | 5,141   | 173,847 |
| 2017 | 13,070    | 31,401           | 5,892                | 60,601 | 16,772 | 263              | 16,058      | 5,870   | 149,927 |
| 2018 | 21,486    | 33,014           | 5,988                | 58,825 | 19,807 | 621              | 17,203      | 6,878   | 163,822 |
| 2019 | 16,439    | 35,895           | 5,450                | 55,490 | 17,289 | 1,253            | 17,437      | 7,115   | 156,368 |
| 2020 | 5,381     | 21,485           | 5,296                | 31,424 | 8,722  | 0                | 7,769       | 3,192   | 83,269  |

<sup>a</sup> PWI = Prince of Wales Island.

<sup>b</sup> PSG-WRG = Petersburg and Wrangell

<sup>c</sup> H-S = Haines and Skagway

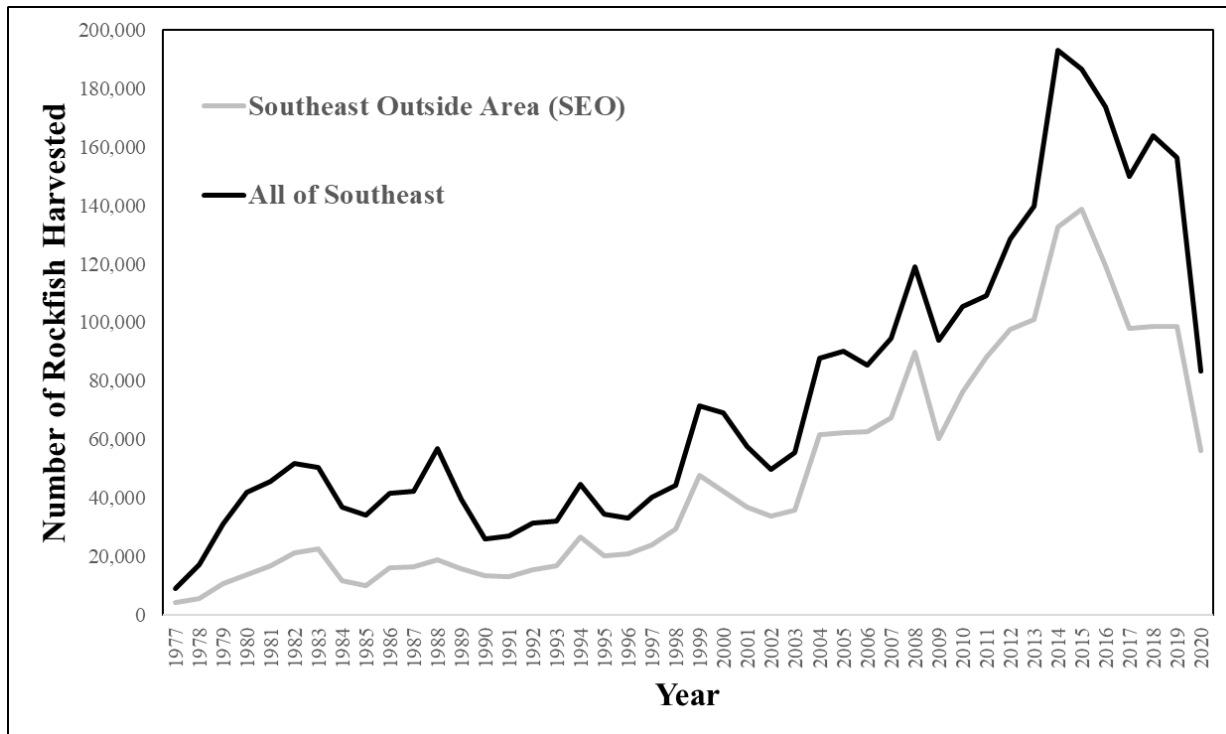


Figure 8.—Statewide Harvest Survey (SWHS) estimates of total rockfish harvest (pelagic and nonpelagic) in sport fisheries in the Southeast Outside (SEO) Subdistrict of Southeast Alaska, 1977–2020.

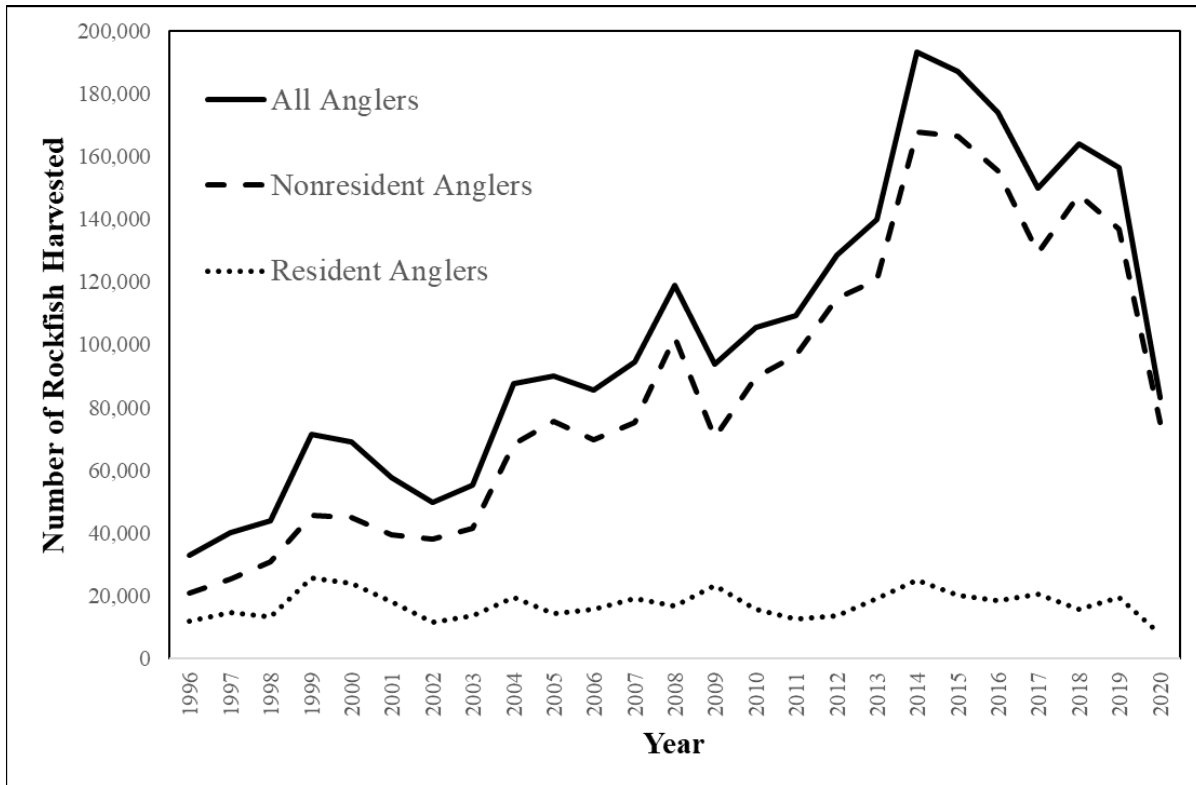


Figure 9.—Estimated harvest of rockfish in sport fisheries of Southeast Alaska as derived from the Statewide Harvest Survey (SWHS) by angler residency for years 1996–2020.

The charter logbook program provides more detailed information on harvest as well as release estimates for pelagic and nonpelagic rockfish in the guided (charter) fishery. Rockfish harvest reported in logbooks increased from 31,000 fish in 1999 to 108,000 fish in 2008, followed by a decrease to 71,000 fish in 2009 and then a steady increase to a peak of 178,800 fish in 2018 (Figure 10).

Increased regulatory restrictions on nonpelagic rockfish in 2017–2020 resulted in a corresponding decrease in the harvest from about 50,000 to about 38,000 nonpelagic rockfish (Figure 10). Prior to 2006, the nonpelagic component of the guided harvest was slightly larger than the harvest of pelagic rockfish (Figure 10). Since then, the harvest of pelagic rockfish has continued to increase and is now more than double the harvest of nonpelagic rockfish in the guided fishery.

## 2020/2021 ROCKFISH PROPOSALS

Four proposals addressing rockfish management have been submitted to the board for consideration in the 2022 Southeast Alaska and Yakutat Finfish and Shellfish regulatory meeting.

- **Proposal 226** would create a bag limit for slope rockfish while DSR would be closed.
- **Proposal 227** would reduce the bag limit of nonpelagic rockfish while prohibiting retention of yelloweye rockfish.
- **Proposal 228** would reduce the bag limit of nonpelagic rockfish in Southern Southeast Inside Subdistrict (SSEI) while prohibiting retention of yelloweye rockfish for nonresidents.
- **Proposal 230** would exempt resident anglers from DSR rockfish closures.

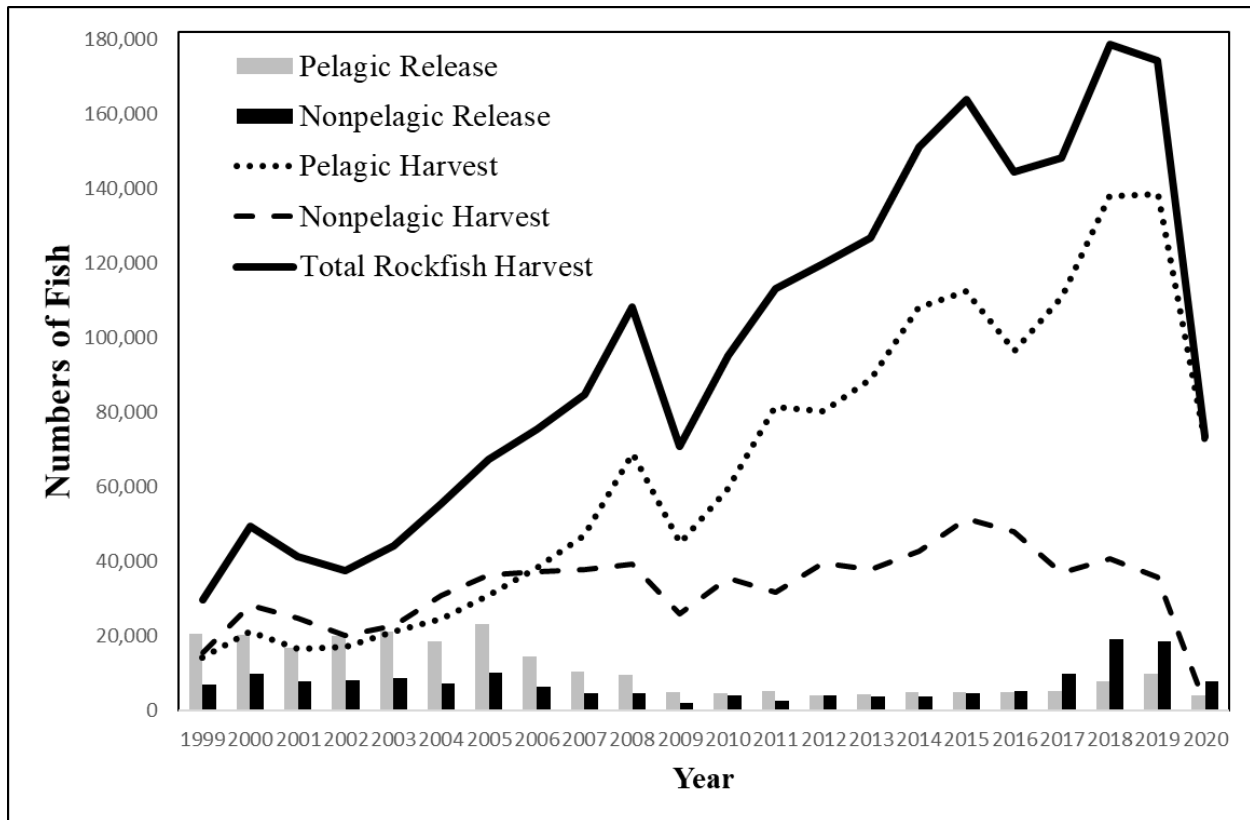


Figure 10.—Number of harvested and released pelagic and nonpelagic rockfish by guided anglers as reported on charter vessel logbooks in Southeast Alaska during 1999–2020.

## LINGCOD

Lingcod are the largest member of the greenling family, unique to the west coast of North America, and found throughout the marine waters of Southeast Alaska. Lingcod are predatory, can grow to over 50 lb in weight, and are targeted by sport anglers. As with rockfish, lingcod are relatively sedentary and easy to locate and catch, and therefore are vulnerable to overharvest. But unlike rockfish, lingcod have no air bladder and therefore are not susceptible to barotrauma. They are also not as long-lived as most rockfish species.

The department does not have a stock assessment for lingcod and is not currently able to reliably estimate lingcod biomass or abundance in Southeast Alaska. Lacking abundance estimates and given the complex life history and behavior of lingcod, impacts to their population numbers due to fishing are difficult to assess.

### Regulation History

Prior to 1994 there were no bag or possession limits, size limits, or closed seasons for lingcod in the Southeast Alaska sport fishery. In 1994, lingcod regulations were adopted with a bag limit of 2 and a possession limit of 4, no size limits, and an open season from May 1–November 30. Season dates were established to protect lingcod during spawning and nest guarding. Since the adoption of the *Lingcod Allocation Guidelines* (5 AAC 28.165) in 2000, an EO has been issued annually to manage the sport lingcod fishery within its allocation (Appendix B1).

## **Fishery Management**

The board adopted the Allocation Guidelines for lingcod in response to declining CPUE in the directed commercial fishery. In this plan, the board established a guideline harvest level (GHL) management approach for sport and commercial fisheries in Southeast Alaska (5 AAC 28.160(e)). A GHL was established for each of the 7 management areas and the GHLs for each area were allocated between sport and commercial fisheries (5 AAC 28.165). The 7 areas are as follows: Icy Bay Subdistrict (IBS), East Yakutat Section (EYKT), Northern Southeast Outside Section (NSEO), Northern Southeast Inside Subdistrict (NSEI), Central Southeast Outside Section (CSEO), Southern Southeast Outer Coast Sector (SSEOC), and Southern Southeast Internal Sector (SSEIW). The SSEIW and SSEOC lingcod areas have slightly different boundaries than the SSEI and SSEO areas used in nonpelagic rockfish management delineated in Figure 3.

Under this approach, the sport fishery is managed to maintain lingcod harvest within its allocation. In addition to existing EO authority, the board granted authority for the department to implement size limits and annual limits for guided and nonresident anglers to achieve lingcod GHLs (5 AAC 47.060). In 2009, the board changed the authority to manage anglers based on whether or not they were guided to management based on residency.

The department has used this authority to achieve the desired GHL for each area by establishing sport fishing regulations through an annual EO. Before each fishing season the department examines current and historic harvest data, trends, and other fisheries information collected through the on-site creel surveys, SWHS, and charter logbooks to determine management actions which provide sport fishing opportunity while remaining within the allocation.

The department manages the sport lingcod harvest for each area but often uses CSEO and NSEO for a combined allocation due to the interconnected nature of the sport fisheries in this area. Whenever possible, lingcod sport fishing regulations are kept uniform across areas or groupings of areas to provide consistency for anglers and simplify regulatory complexity. In recent years, distinct sport fishing regulations have been established for 3 areas within Southeast Alaska: Yakutat (IBS and EYKT), Northern Southeast (NSEO, CSEO, and NSEI), and Southern Southeast (SSEOC and SSEIW; Appendix B1).

## **Harvest Trends**

The SWHS provides lingcod harvest estimates, in number of fish by SWHS area (areas roughly comparable to, but not identical to, groundfish management areas) dating back to 1991. On-site creel surveys are conducted at major ports in Southeast Alaska and provide estimates of harvest and average length for lingcod taken by anglers returning to those ports. Charter vessel logbooks have provided harvest estimates for guided anglers since 1998. Creel survey results become available before the next season, but SWHS data are not available until the fall of the following year. The SWHS is the only source of complete harvest estimates because creel surveys are not conducted in every location where sport harvests are landed. Additionally, charter vessel logbook data are available only for the guided sector.

The GHL approach requires harvest estimates, in round pound (lb), for each management area. At the 9 ports in Southeast Alaska with on-site sport fish creel survey programs, the length of harvested lingcod is measured to the nearest centimeter (cm), and the angler type (guided or unguided) is recorded. The length data are then converted into round weights based upon the length-weight relationship employed by the department. The average round weight is then

calculated by angler type (resident or nonresident) for each port where on-site sampling occurs. The estimated average round weights of harvested lingcod are multiplied by the SWHS harvest estimates for each angler type (resident or nonresident) to obtain estimated harvest in pounds. The estimated harvest (lb) from each angler type (resident or nonresident) is then added together to come up with the overall harvest estimates for each lingcod management area.

Harvest guidelines for Southeast Alaska were established for each management area in 2000 as a range from zero (0) to an upper limit. The allocation of the GHGs were 39% less than the 1997–1998 sport harvest estimates in CSEO/NSEO and NSEI, but similar (–1% to +14%) in other areas. A series of bag limit reductions and minimum length limit regulations were implemented by EO in 2000 to reduce harvest by 39% (Appendix B1). These regulations were generally effective in constraining the sport fishery harvest within the GHGs during 2001–2003. However, in 2004 and 2005, the GHG was exceeded in the CSEO/NSEO, SSEOC, SSEIW, and NSEI areas (Figures 11 and 12). The increase may have been due to increased effort and efficiency as well as a tendency for residents to retain larger lingcod.

From 2006 to 2008, the department implemented additional regulations by EO including annual limits for nonresidents and guided anglers, and prohibitions on charter operators and crew from retaining lingcod while clients were on board (Appendix B1). In addition, some slot limits were added or made more restrictive. These regulations were generally effective in restricting the sport fishery harvest to be near the GHGs in most management areas in 2007 and 2008 (Figures 11 and 12). Beginning in 2009 and continuing through 2012, small measures have been taken to liberalize the sport fisheries (size limit liberalizations and season extensions) in some areas. Lingcod regulations have been mostly consistent for the past 9 years (2012–2020).

## **2020 LINGCOD PROPOSALS**

Two proposals addressing lingcod management have been submitted to the board for consideration in 2020.

- **Proposal 229** would increase the nonresident slot limit for lingcod in CSEO and decouple management of CSEO and NSEO.
- **Proposal 231** would require nonresident anglers to record length of harvested lingcod.

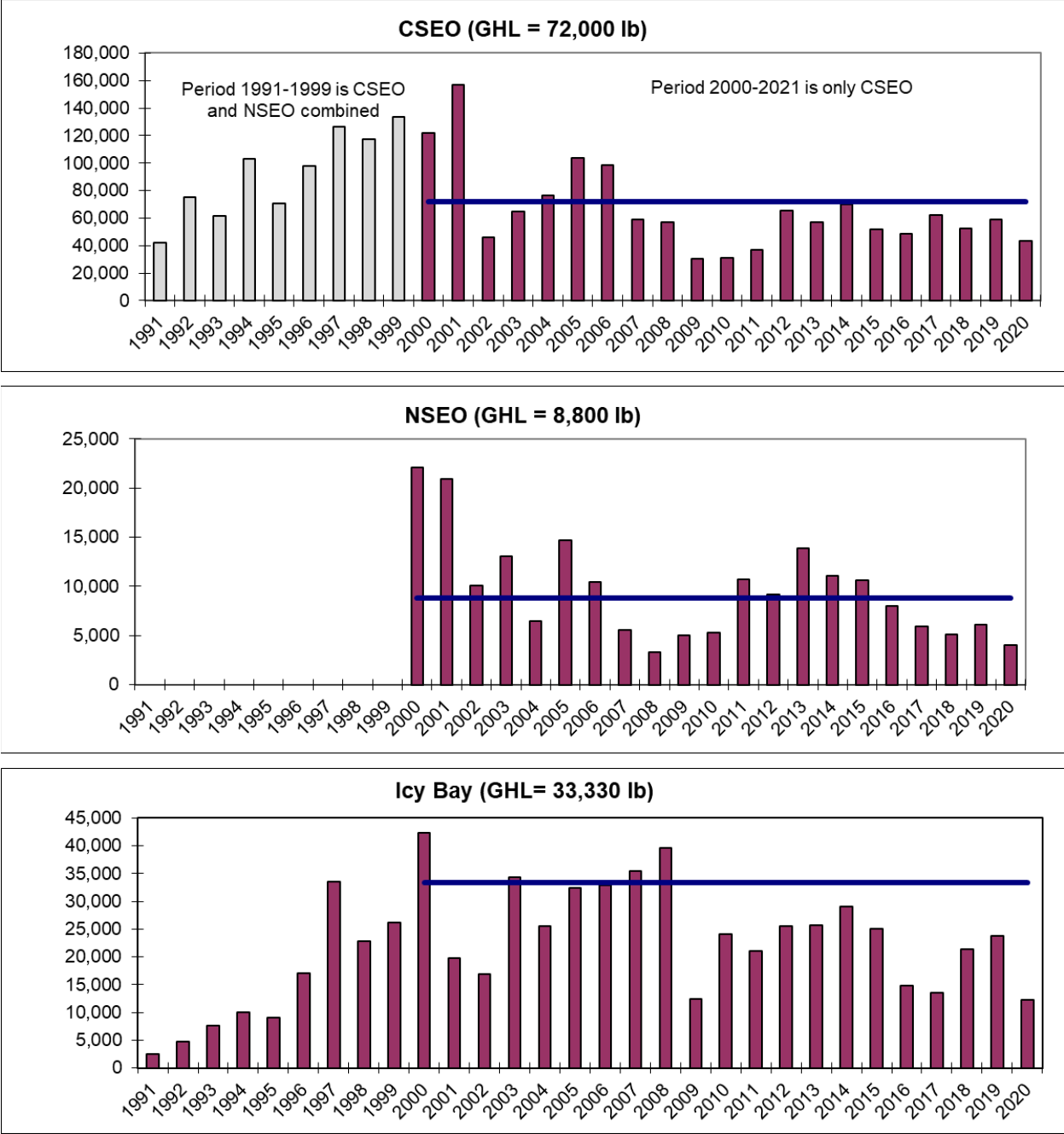


Figure 11.—Lingcod harvests in the Central Southeast Outside (CSEO; top), Northern Southeast Outside (NSEO; middle), and Icy Bay–East Yakutat subdistrict (bottom) areas, relative to guideline harvest level (GHL; blue horizontal line) during 1991–2020 as determined from Statewide Harvest Survey (SWHS), charter logbook, and marine creel surveys.

Note: Estimates for 2020 are preliminary.

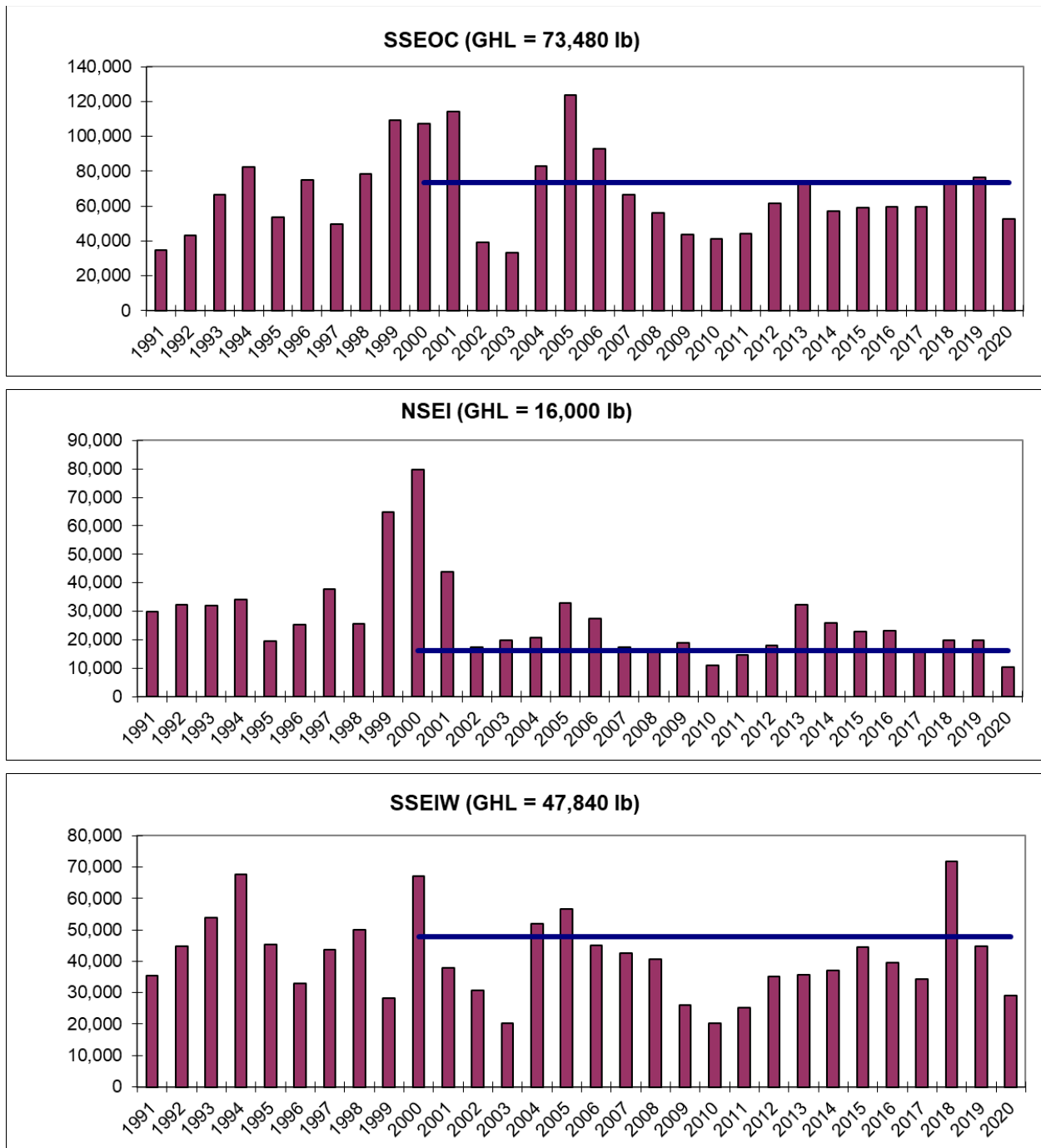


Figure 12.—Lingcod harvests from Statewide Harvest Survey (SWHS), charter logbook, and marine creel surveys in the Southern Southeast Outside (SSEO; top), Northern Southeast Inside (NSEI; middle), and Southern Southeast Inside (SSEIW; bottom) areas, relative to guideline harvest level (GHL; blue horizontal line) during 1991–2020.

Note: Estimates for 2020 are preliminary.



## **SABLEFISH**

Sablefish are a long-lived, deepwater species that can be found from Baja California to the Aleutian Islands and Bering Sea. State managed sablefish fisheries occur in offshore federal waters (SEO) for the sport fishery and in SEI for the sport, commercial, personal use, and subsistence fisheries. The federal government sets a TAC for SEO federal waters, and in 2020, the sport fishery harvested approximately 0.26% of the federal TAC.

### **Stock Assessment**

In Southeast Alaska, sablefish populations are assessed by the Division of Commercial Fisheries in 2 management areas: NSEI and SSEI (Sullivan et al. 2019; Sullivan et al. 2020). Annual longline surveys have been conducted in NSEI and SSEI since 1988. Biological data collected during these surveys (length, weight, sex, stage of maturity, and otoliths) are used to describe the age/size structure of the populations and recruitment events. In addition to the annual longline surveys, the department has conducted an annual or biannual mark–recapture survey in NSEI since 1997 (Beder and Stahl 2017). Marking surveys are used to estimate absolute abundance of sablefish and provide release and recapture locations for tagged fish, which are important in estimating migration rates and understanding movement patterns between internal waters and the Gulf of Alaska, Bering Sea, Aleutian Islands, and British Columbia. Beginning in 2020, a new statistical catch-at-age model replaced past methodology using a mark–recapture abundance estimate in NSEI.

Unlike NSEI, the department does not currently estimate the absolute abundance of the SSEI sablefish stock. There appears to be substantial movement of sablefish in and out of the SSEI area (Hanselman et al. 2015), therefore mark–recapture estimates of abundance or exploitation rates are not possible for this stock. Instead, relative abundance trends are assessed in SSEI by annual longline surveys that provide CPUE and biological data (Ehresmann et al. 2020; Olson and Carroll 2017). Data collected from these surveys are used to set the commercial annual harvest objective (AHO) for the following year in each management area. NSEI is the only management area that establishes a recommended allowable biological catch (ABC) and decrements other sources of known sablefish mortality including sport harvest from the ABC prior to setting the commercial AHO.

### **Regulation History**

There were no bag or possession limits for sablefish in the Southeast Alaska sport fishery prior to 2009. In 2009, the board established a sablefish sport fish limit of 2 per day, 4 in possession and an annual limit of 8 fish for all anglers. During the same year, the board acted on a board-generated proposal and increased the bag limit from 2 fish to 4 fish and rescinded the resident annual limit. In 2012, the board rescinded the Southeast Alaska Area nonresident annual limit of 8 fish except in the waters of Lower Lynn Canal and Chatham Strait (District 12). In 2018, the board established a sablefish nonresident annual limit of 8 fish throughout the Southeast Alaska Area.

### **Harvest Trends**

Statewide Harvest Survey estimates of sablefish harvest in the Southeast Alaska sport fishery ranged from 4,793–20,431 fish from 2010 to 2020 of which nonresidents harvest accounted for 93% of the total annually (Figure 13). Most of the sablefish harvest in Southeast Alaska occurs in Juneau, Sitka, Ketchikan, and Prince of Wales Island; however, most of the recent increase in sablefish harvest has primarily come from 3 sport fish harvest areas: Sitka (Area D), Prince of

Wales Island (Area B), and Ketchikan (Area A; Table 4). These 3 areas accounted for 73% of the average regional sablefish harvest in 2018 and 2019. These areas correspond roughly to the 3 groundfish management areas: CSEO, SSEO, and SSEI (Figure 3). Within the guided fishery, the majority of the sablefish harvest occurs in NSEI and CSEO, followed by SSEI, with very little guided harvest occurring in the remaining groundfish management areas of Southeast Alaska (Table 5).

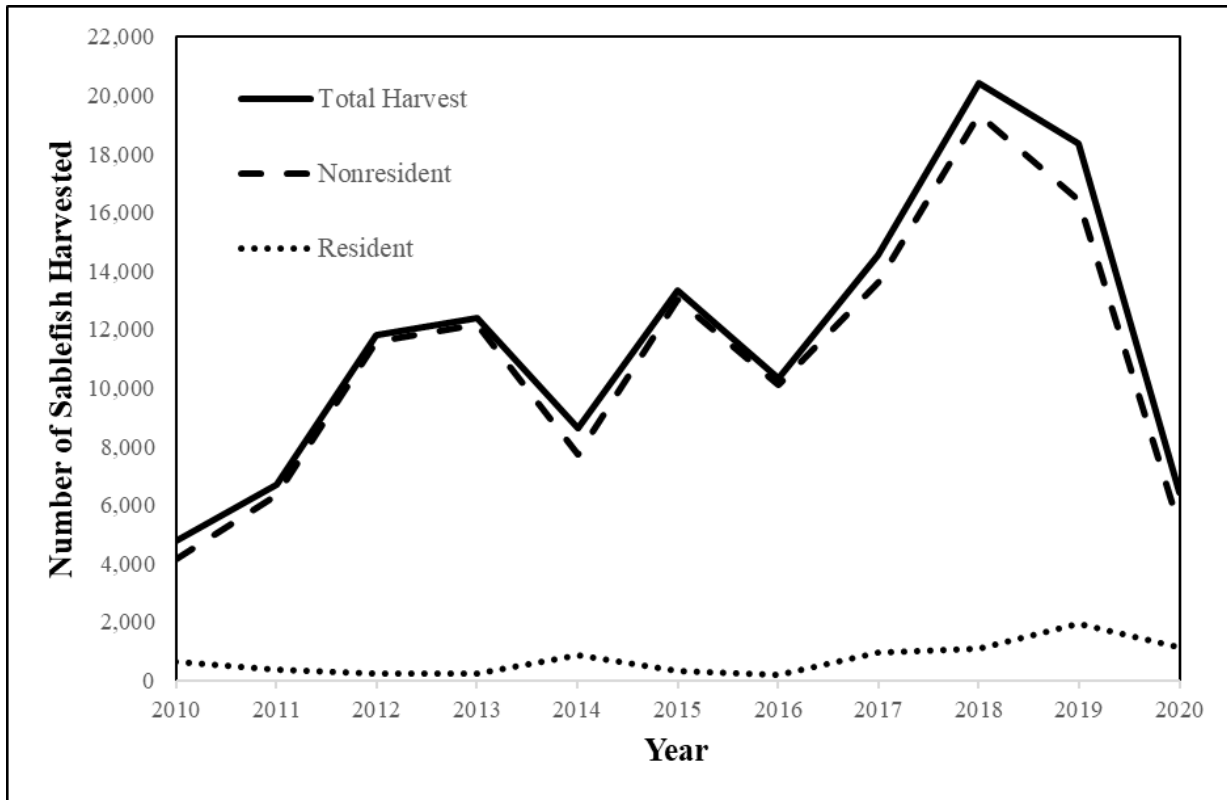


Figure 13.—Statewide Harvest Survey (SWHS) estimates (numbers of fish) of sablefish in the Southeast Alaska sport fishery 2010–2020.

Table 4.–Statewide Harvest Survey (SWHS) estimates of the number of sablefish harvested in Southeast Alaska sport fishery, by management area, 2011–2020.

| Year                           | Ketchikan | PWI <sup>a</sup> | PSG-WRG <sup>b</sup> | Sitka | Juneau | H-S <sup>c</sup> | Glacier Bay | Yakutat | Total Harvest |
|--------------------------------|-----------|------------------|----------------------|-------|--------|------------------|-------------|---------|---------------|
| 2011                           | 68        | 1,171            | 88                   | 2,282 | 2,542  | 0                | 298         | 256     | 6,705         |
| 2012                           | 315       | 2,503            | 194                  | 4,441 | 2,850  | 48               | 1,063       | 384     | 11,798        |
| 2013                           | 155       | 1,675            | 112                  | 3,645 | 5,013  | 0                | 1,342       | 453     | 12,395        |
| 2014                           | 406       | 2,057            | 120                  | 2,393 | 3,049  | 9                | 533         | 55      | 8,622         |
| 2015                           | 864       | 2,280            | 118                  | 4,605 | 4,602  | 0                | 601         | 268     | 13,338        |
| 2016                           | 213       | 1,815            | 172                  | 3,232 | 4,210  | 0                | 404         | 270     | 10,316        |
| 2017                           | 977       | 4,593            | 185                  | 3,531 | 3,819  | 82               | 920         | 457     | 14,564        |
| 2018                           | 2,429     | 4,633            | 483                  | 7,285 | 4,919  | 20               | 625         | 37      | 20,431        |
| 2019                           | 1,311     | 3,964            | 119                  | 8,804 | 3,143  | 0                | 562         | 473     | 18,376        |
| 2020                           | 697       | 1,320            | 325                  | 2,459 | 924    | 0                | 502         | 187     | 6,414         |
| 2011–2019 Average <sup>d</sup> | 749       | 2,743            | 177                  | 4,469 | 3,794  | 18               | 705         | 295     | 12,949        |
| 2018–2019 Average <sup>d</sup> | 1,870     | 4,299            | 301                  | 8,045 | 4,031  | 10               | 594         | 255     | 19,404        |

<sup>a</sup> PWI = Prince of Wales Island

<sup>b</sup> PSG-WRG = Petersburg and Wrangell

<sup>c</sup> H-S = Haines and Skagway

<sup>d</sup> 2020 was excluded from the average because it was not representative of normal harvest patterns due to reduction in effort caused by the COVID-19 pandemic.

Table 5.–Charter logbook sablefish harvest in Southeast Alaska sport fishery, by groundfish management area, 2011–2020.

| Year | CSEO  | NSEI  | NSEO           | SSEI  | SSEO           | Other harvest <sup>a</sup> | Total harvest |
|------|-------|-------|----------------|-------|----------------|----------------------------|---------------|
| 2011 | 665   | 4,325 | 70             | 61    | – <sup>b</sup> | 6                          | 5,127         |
| 2012 | 840   | 4,273 | 29             | 22    | – <sup>b</sup> | 20                         | 5,184         |
| 2013 | 2,081 | 5,193 | – <sup>b</sup> | 47    | – <sup>b</sup> | 102                        | 7,423         |
| 2014 | 1,421 | 5,404 | – <sup>b</sup> | 78    | 14             | 66                         | 6,983         |
| 2015 | 1,131 | 4,867 | – <sup>b</sup> | 85    | – <sup>b</sup> | 70                         | 6,153         |
| 2016 | 1,338 | 4,754 | 98             | 232   | – <sup>b</sup> | 8                          | 6,430         |
| 2017 | 1,644 | 5,005 | 173            | 1,580 | 45             | 7                          | 8,454         |
| 2018 | 3,391 | 4,996 | 125            | 3,246 | – <sup>b</sup> | 20                         | 11,778        |
| 2019 | 7,858 | 5,564 | 159            | 2,003 | – <sup>b</sup> | 28                         | 15,612        |
| 2020 | 2,911 | 122   | 181            | 838   | 24             | 8                          | 4,084         |

Note: CSEO = Central Southeast Outside Section; NSEI = Northern Southeast Inside Subdistrict; NSEO = Northern Southeast Outside Section; SSEI = Southern Southeast Inside Subdistrict; SSEO = Southern Southeast Outside Section; EYKT = East Yakutat Section; IBS = Icy Bay Subdistrict.

<sup>a</sup> “Other harvest” includes responses with less than 4 businesses, undesignated areas, and EYKT and IBS. Responses with less than 4 businesses are not reported separately, to protect confidentiality of respondents; this harvest is accumulated into “Other harvest”.

## 2020 SABLEFISH PROPOSALS

There is 1 proposal in 2020 that would directly affect sablefish management.

- **Proposal 225** would incrementally increase the sport fish daily bag limit to 5 or 6 fish with an annual limit of 10 or 12 fish based on increases in the recommended sablefish allowable biological catch (ABC).

## SHELLFISH

The Southeast Alaska sport shellfish fishery includes all waters of Alaska east of the longitude of Cape Suckling and north of the International Boundary at Dixon Entrance. The sport shellfish fishery includes provisions for all species of shellfish and marine invertebrates except abalone, geoducks, and king crab, which are closed to sport fishing. The primary species harvested in the sport fishery are Dungeness crab, shrimp, and clams.

In Southeast Alaska, noncommercial harvest of shellfish may occur under sport, personal use, and for most locations and species, subsistence fisheries. For all commonly harvested shellfish species, personal use and subsistence shellfish regulations either duplicate sport fishing regulations or provide additional opportunity through increased bag and possession limits and/or more liberal methods and means. This overlap between sport, personal use, and subsistence fisheries has resulted in a regulatory environment where Alaska residents harvest shellfish under personal use or subsistence regulations while nonresidents participate in the sport shellfish fishery. To reduce confusion for the average angler, Southeast Alaska shellfish regulations are presented in department literature, including the “Southeast Alaska Sport Fish Regulation Summary”, as resident regulations (personal use) and nonresident regulations (sport fish). Sport shellfish fisheries are managed by the Division of Sport Fish while personal use and subsistence shellfish fisheries are managed by the Division of Commercial Fisheries.

In general, the majority of noncommercial shellfish harvest in Southeast Alaska occurs from Alaska residents fishing under personal use or subsistence regulations, rather than under sport regulations. Only a small proportion of nonresident anglers fishing in Southeast Alaska participate in a shellfish fishery (Table 6).

Table 6.—Statewide Harvest Survey (SWHS) estimates of the number of nonresident anglers participating in a shellfish fishery within Southeast Alaska.

| Year              | Nonresident shellfish anglers | Nonresident anglers | Percentage (%) of nonresident anglers participating in a shellfish fishery |
|-------------------|-------------------------------|---------------------|--|
| 2010              | 3,220                         | 78,733              | 4.1  |
| 2011 <sup>a</sup> | 5,532                         | 78,614              | 7.0  |
| 2012              | 6,033                         | 80,396              | 7.5  |
| 2013              | 6,694                         | 84,467              | 7.9  |
| 2014              | 6,378                         | 90,236              | 7.1  |
| 2015              | 6,658                         | 97,662              | 6.8  |
| 2016              | 5,824                         | 90,599              | 6.4  |
| 2017              | 6,014                         | 92,076              | 6.5  |
| 2018              | 6,351                         | 101,169             | 6.3  |
| 2019              | 7,259                         | 95,966              | 7.6  |
| 2020              | 3,611                         | 34,735              | 10.4   |
| Average           | 5,779                         | 84,059              | 6.9  |

<sup>a</sup> In 2011, a layout change was made in the SWHS mail-out survey which added a specific page to report shellfish harvest; the number of anglers reporting shellfish harvest increased after this time.

## Harvest Monitoring

The primary tool to estimate sport shellfish harvest and effort data is the Statewide Harvest Survey (SWHS), which collects catch and harvest information specific to the following: number of Dungeness crab, Tanner crab, razor clams *Siliqua patula*, shrimp, hardshell clams, and “other shellfish” (Romberg et al. 2020). Recipients of the SWHS are selected from all anglers who have purchased sport fishing licenses, which are required to participate in both sport and personal use fisheries. The SWHS has been designed as a tool to estimate activity in the sport fishery only; however, in the case of Southeast Alaska shellfish fisheries, the SWHS may also collect information from resident anglers who could also be participating in personal use, subsistence, and/or sport shellfish fisheries. Although SWHS instructions ask anglers to only report activity occurring under sport fishing regulations, and specifically instruct anglers not to report personal use and subsistence harvest, many resident anglers in Southeast Alaska may not understand this regulatory distinction for shellfish fisheries.

It is worth noting that some recipients of the SWHS do understand this requirement and may not report their personal use shellfish harvest. Although the SWHS was not designed to produce estimates of personal use harvest in Southeast Alaska shellfish fisheries, the regulatory structure has created an environment wherein residents have more liberal bag and possession limits under personal use and subsistence regulations, thus resident harvest reported in the SWHS should be viewed as a combination of sport and non-sport resident harvest. This combination of harvest reporting results in SWHS estimates for residents should be considered a minimum estimate of resident harvest.

Nonresident shellfish harvest estimates produced by the SWHS for Southeast Alaska are more straightforward and can be used to directly represent nonresident sport harvest, given only residents are allowed to participate in personal use or subsistence fisheries.

On-site creel surveys do not currently collect shellfish harvest information but have been used to collect shellfish effort and harvest data for selected species in the Juneau and Ketchikan management areas from 1988 to 2007. A permit and reporting system had been established for area 11-A, near Juneau, but this area has remained closed to sport fishing since this system was established in 2013. Permits for noncommercial shrimp harvest in Southeast Alaska have been required since 2018, with the first full year of reporting in 2019. Shellfish harvest data are not collected in sport fish charter logbooks.

## SHRIMP

### Life history

The 5 species of pandalid shrimp commonly harvested in Southeast Alaska are northern (*Pandalus borealis*), humpy (*Pandalus goniurus*), sidestripe (*Pandalopsis dispar*), coonstripe (*Pandalus hypsinotis*), and spot shrimp (*Pandalus platyceros*). Spot shrimp are the largest species, followed by coonstripe shrimp. Spot and coonstripe shrimp are generally found in rock piles, coral gardens, and debris covered bottoms; northern, sidestripe, and humpy shrimp are typically associated with muddy bottoms.

All of these species are protandric hermaphrodites, with most individuals beginning life as males then transitioning to females for the remainder of their lives. After hatching and progressing through multiple planktonic stages, juvenile shrimp settle to the bottom before migrating to preferred adult benthic habitat. Mating occurs in the fall after female molting and eggs hatch in

the spring. Pandalid shrimp are opportunistic bottom feeders which eat a wide variety of items such as worms, diatoms, detritus, algae, and other invertebrates.

Spot shrimp in British Columbia have been found to reach sexual maturity at 1.5 years of age and measure 28 mm in carapace length (Butler 1970); however, growth and maturity rates are likely different in Southeast Alaska. The age and size at which the sex transition to female occurs is variable and related to growth rate, but is thought to occur between 2.5 and 3.5 years of age and has been observed to occur at a size of 37–42 mm carapace length in Southeast Alaska (Love and Bishop 2005).

## **Regulatory History**

Sport fishing regulations for shrimp in Southeast Alaska were first established in 1989 with a bag and possession limit of 10 lb or 10 quarts. Prior to 1989, there were no sport bag or possession limits established for shrimp in Southeast Alaska. Allowable gear for shrimp was limited to pots or ring nets, and no more than 4 pots per person or 10 per vessel could be used to take shellfish, including shrimp, at any time. A biodegradable escape mechanism has been required on all sport shellfish pots since 1989.

In 1994, the number of shrimp pots which could be used in the sport fishery increased when a separate pot limit was established for shrimp pots in addition to other shellfish gear. The new pot limits allowed up to 10 shrimp pots per person and 20 per vessel in addition to other shellfish pots.

In 2000, in order to limit oversized commercial shrimp gear from entering the sport fishery, pot size restrictions were adopted in Southeast Alaska, which limited sport shrimp pots to a bottom perimeter of no more than 153 inches and a volume of 25 cubic ft. In addition, the number of shrimp pot tunnel eye openings was restricted to no more than 4, each of which may not exceed 15 inches in perimeter.

In 2006, in response to hearing testimony that a growing sport fishery could displace opportunity for personal use harvesters in waters where the commercial pot shrimp fishery was closed, the board closed the following areas to sport shrimp harvest: Sitka Sound Special Use Area, Twelve Mile Arm near Hollis, and a small portion of west Behm Canal near Ketchikan.

The bag and possession limit for the sport shrimp fishery was reduced in 2009 from 10 lb or quarts to 3 lb or quarts. This was followed in 2012 by a reduction in the quantity of pots allowed in the sport fishery from 10 pots per person and 20 per vessel to 5 pots per person and 10 per vessel.

In 2018, in an effort to have better accounting of shrimp harvest, permit and reporting regulations were adopted by the board for all noncommercial harvest (subsistence, personal use, and sport). Due to differing regulations of bag limits and methods and means, 2 separate permits were developed: 1 for the sport fishery and 1 for the personal use and subsistence fisheries. The sport, personal use, and subsistence shrimp fisheries are open year-round, and the permits are good for the calendar year with reporting of effort and harvest due after the new year even if the permit was not fished.

Resident anglers commonly target shrimp by setting a string of pots on a single line (longlining) with only 1 labeled buoy attached. This practice is explicitly allowed in the personal use regulations but is not clearly defined for nonresidents participating in the sport fishery other than each pot is required to have a labeled buoy attached to it.

## **Management**

Spot shrimp are the primary species harvested by sport anglers while relatively fewer coonstripe, sidestripe, and northern shrimp are also harvested. Shrimp may only be taken with the use of pots in the sport fishery, and gear must meet size requirements and biodegradable escape mechanism requirements, and buoy markings must include the angler's first initial, last name, address, and vessel name or AK boat registration numbers used to operate the pot.

The Southeast Alaska sport shrimp fishery is managed as a species assemblage with regional bag and possession limits, gear limits, and specific area closures when necessary. The current bag and possession limit is 3 lb or quarts of shrimp and gear used in the sport fishery is limited to 5 shrimp pots per person and 10 per vessel.

Currently, the best indicator of shrimp stock health in Southeast Alaska comes from fishery-independent shrimp surveys conducted by the department along with fishery-dependent harvest data and biological samples collected from commercial fisheries (Smith 2020). Although the sport harvest of shrimp is a small component of the regional total harvested by sport, personal use, and subsistence users, much of the sport harvest is likely focused in areas near population centers, where local area depletions can occur. In areas where the department has noted concern for shrimp stocks and sport harvest is expected to be considerable, the sport fishery has been closed by EO; notably, Tenakee Inlet (2012–2018) and area 11-A (2013–present).

During the 2018 Southeast Alaska and Yakutat board meeting in Sitka, the board passed a board generated proposal (RC 45), based on a petition from the Sitka Fish and Game Advisory Committee, that set the District 13 spot shrimp bag and possession household limit at 10 gallons for resident permit holders fishing in subsistence or personal use fisheries. A free noncommercial annual permit is also required to fish for shrimp in the remainder of Southeast Alaska either under sport, personal use, or subsistence regulations, and the household personal use bag and possession limit in Section 11-A is limited to 1 gallon of spot shrimp, whether whole or de-headed. Permitted sport anglers in Southeast Alaska have a bag and possession limit of 3 pounds or 3 quarts of shrimp with a harvest recording form. Bag and possession limits cannot be accumulated no matter which fishery was fished (e.g., sport could not be combined with personal use and/or subsistence).

## **Harvest**

The SWHS collects shrimp harvest data by requesting anglers to report their shrimp harvest (all species combined) in gallons of shrimp. While anglers are asked to report in gallons of shrimp, anglers may be reporting gallons of shrimp with head-on or head-off. This variable can dramatically impact a conversion from gallons of shrimp to pounds. ADF&G research in Prince William Sound calculated a conversion factor of 3.89 lb to the gallon of head-on shrimp harvested using pots with a 7/8-inch minimum mesh size (Wessel et al. 2015). At a minimum, the Southeast Alaska average nonresident sport harvest estimate for 2015–2019 of 3,153 gallons could be converted to 12,150 lb, but this should be viewed as a conservative estimate because this conversion will underestimate the poundage if anglers reported gallons of head-off shrimp. Nonresident and resident harvest in gallons for 1996–2020 appears to be relatively consistent, on average, compared to the most recent 5 years (Table 7). The average estimated nonresident sport shrimp harvest between 2016–2020 made up about 29% of the total harvest reported based on SWHS as compared to the minimum estimate of harvest by residents (Figure 14).

Table 7.—Statewide Harvest Survey (SWHS) estimates of shrimp harvest by nonresident sport anglers and the minimum estimate of sport, personal use, and subsistence harvest by resident anglers, 1996–2020.

| Year <sup>a</sup>   | Nonresident harvest <sup>b</sup> in gallons | Resident harvest <sup>b</sup> in gallons |
|---------------------|---|--|
| 1996                | 1,123                                       | 4,134                                    |
| 1997                | 1,678                                       | 9,355                                    |
| 1998                | 1,658                                       | 12,244                                   |
| 1999                | 1,763                                       | 20,790                                   |
| 2000                | 3,629                                       | 10,771                                   |
| 2001                | 4,674                                       | 9,929                                    |
| 2002                | 2,846                                       | 5,210                                    |
| 2003                | 6,686                                       | 19,107                                   |
| 2004                | 5,508                                       | 12,175                                   |
| 2005                | 10,947                                      | 30,228                                   |
| 2006                | 3,625                                       | 10,747                                   |
| 2007                | 1,809                                       | 7,597                                    |
| 2008                | 7,217                                       | 8,695                                    |
| 2009                | 2,436                                       | 9,272                                    |
| 2010                | 5,260                                       | 12,898                                   |
| 2011                | 3,774                                       | 11,317                                   |
| 2012                | 3,577                                       | 8,661                                    |
| 2013                | 3,603                                       | 7,985                                    |
| 2014                | 3,439                                       | 6,014                                    |
| 2015                | 3,132                                       | 10,619                                   |
| 2016                | 1,866                                       | 18,328                                   |
| 2017                | 3,718                                       | 6,264                                    |
| 2018                | 2,551                                       | 4,636                                    |
| 2019                | 4,497                                       | 6,509                                    |
| 2020                | 1,272                                       | 9,233                                    |
| Average (1996–2020) | 3,692                                       | 10,909                                   |
| Average (2016–2020) | 2,781                                       | 8,994                                    |

<sup>a</sup> Sport and personal use estimates are based on the calendar year.

<sup>b</sup> Estimates are derived from the SWHS for Southeast Alaska; estimated harvest is recorded in gallons.



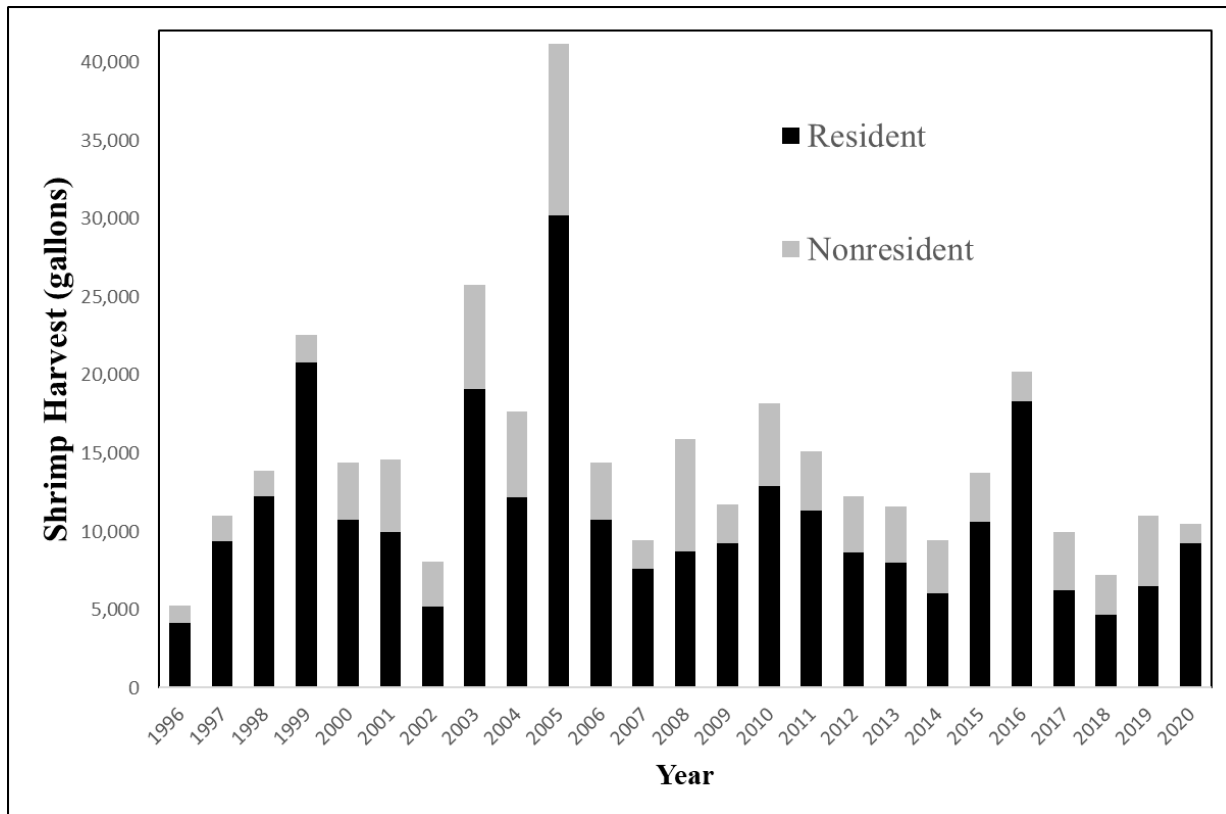


Figure 14.—Statewide Harvest Survey (SWHS) estimates of shrimp harvest in Southeast Alaska by residency, 1996–2020.

The permit and reporting requirement for sport shrimp harvest in Southeast Alaska was implemented in mid-2018; therefore, the 2018 partial data are not reported here. For 2019, a total of 3,602 shrimp sport permits were issued with a total expanded harvest of 15,371 pounds for the Southeast region. In 2020, a total of 1,897 sport shrimp permits were issued with a total expanded harvest of 9,491 pounds for the Southeast region (Table 8). Total effort and harvest is also expanded out by district (Tables 9 and 10).

Response rates have increased since inception of the permit and reporting requirements (Table 8). An increased effort to contact anglers who failed to report has been implemented and response rates should continue to increase in future years.

## 2020 SHRIMP PROPOSALS

There are 3 proposals in 2020 that would directly affect sport shrimp management:

- **Proposal 183** seeks to increase the maximum size perimeter opening for rigid mesh shrimp pots from a maximum perimeter of 15 inches to a maximum perimeter of 20 inches.
- **Proposal 184** seeks clarification from the board and would explicitly state whether the practice of longlining pots is allowed in the shrimp pot sport fishery.

Table 8.—Number of permits issued, percent response, percent fished, pot days of effort, harvest in pounds, and HPUE (pounds per pot day) of whole shrimp harvested by the SEAK sport shrimp fishery by residency status, 2019–2020.

| Year | Residency   | Permits issued | Percent (%) response | Percent (%) fished | Effort <sup>a</sup> (pots) | Harvest <sup>a,b</sup> (lb) | Harvest per unit effort |
|------|-------------|----------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------|
| 2019 | Resident    | 458            | 40                   | 47                 | 3,359                      | 8,983                       | 2.67                    |
|      | Nonresident | 3,144          | 33                   | 71                 | 9,326                      | 24,035                      | 2.58                    |
| 2020 | Resident    | 73             | 82                   | 37                 | 341                        | 1,331                       | 3.91                    |
|      | Nonresident | 1,824          | 73                   | 38                 | 3,883                      | 8,160                       | 2.10                    |

Source: Kirk Brogdon, Analyst Programmer V, ADF&G Division of Sport Fish, Anchorage, unpublished data.

<sup>a</sup> Harvest and effort are expanded to account for nonrespondents.

<sup>b</sup> Conversion factors of 1.80 lb/quart and 2.02 tail/whole of shrimp were used to estimate harvest in pounds. These conversion factors are based on an ADF&G study (Dave Harris, ADF&G Division of Commercial Fisheries, unpublished data).

Table 9.—Estimated effort (pots), harvest (lb), and harvest per unit effort (HPUE) of whole shrimp harvested in the SEAK sport shrimp fishery by residency and ADF&G Commercial Fishing District, 2019.

| District <sup>a</sup> | Resident            |                             |      | Nonresident         |                             |      |
|-----------------------|---------------------|-----------------------------|------|---------------------|-----------------------------|------|
|                       | Effort <sup>b</sup> | Harvest (lb) <sup>b,c</sup> | HPUE | Effort <sup>b</sup> | Harvest (lb) <sup>b,c</sup> | HPUE |
| 1                     | 1,304               | 4,440                       | 3.41 | 1,477               | 3,405                       | 2.31 |
| 2                     | 420                 | 888                         | 2.11 | 1,462               | 4,244                       | 2.90 |
| 3                     | 108                 | 170                         | 1.58 | 242                 | 825                         | 3.41 |
| 5                     | 23                  | 0                           | 0.00 | 248                 | 693                         | 2.79 |
| 6                     | 105                 | 160                         | 1.53 | 166                 | 364                         | 2.18 |
| 7                     | 218                 | 945                         | 4.34 | 690                 | 2,103                       | 3.05 |
| 8                     | 173                 | 335                         | 1.94 | 551                 | 1,590                       | 2.89 |
| 9                     | 233                 | 325                         | 1.40 | 336                 | 725                         | 2.16 |
| 10                    | 265                 | 503                         | 1.90 | 669                 | 1,671                       | 2.50 |
| 11                    | 58                  | 175                         | 3.04 | 121                 | 221                         | 1.82 |
| 12                    | 288                 | 584                         | 2.03 | 1,219               | 3,328                       | 2.73 |
| 13                    | 33                  | 62                          | 1.89 | 799                 | 2,340                       | 2.93 |
| 14                    | 43                  | 227                         | 5.35 | 336                 | 712                         | 2.12 |
| 15                    | 90                  | 169                         | 1.88 | 735                 | 1,131                       | 1.54 |
| 152                   | 0                   | 0                           | 0.00 | 61                  | 343                         | 5.67 |
| 154                   | 0                   | 0                           | 0.00 | 179                 | 247                         | 1.38 |
| 183                   | 0                   | 0                           | 0.00 | 33                  | 88                          | 2.64 |
| 189                   | 0                   | 0                           | 0.00 | 3                   | 5                           | 1.80 |
| Total                 | 3,359               | 8,983                       | 2.67 | 9,326               | 24,035                      | 2.58 |

Source: Kirk Brogdon, Analyst Programmer V, ADF&G Division of Sport Fish, Anchorage, unpublished data.

Note: Minor rounding errors for estimates of effort and harvest are present in all 3 panels (resident, nonresident, and total).

<sup>a</sup> Districts not included with a year have an estimated harvest of zero.

<sup>b</sup> Harvest and effort are expanded to account for nonrespondents.

<sup>c</sup> A conversion factor of 1.80 lb/quart and 2.02 tail/whole of shrimp was used to estimate harvest in pounds. These conversion factors are based on an ADF&G study (Dave Harris, ADF&G Division of Commercial Fisheries, unpublished data).

Table 10.—Estimated effort (pot days), harvest (pounds), and HPUE (pounds per pot day) of whole shrimp harvested by the SEAK sport shrimp fishery by residency status and area, 2020.

| District <sup>a</sup> | Resident            |                             |      | Nonresident         |                             |      |
|-----------------------|---------------------|-----------------------------|------|---------------------|-----------------------------|------|
|                       | Effort <sup>b</sup> | Harvest (lb) <sup>b,c</sup> | HPUE | Effort <sup>b</sup> | Harvest (lb) <sup>b,c</sup> | HPUE |
| 1                     | 51                  | 265                         | 5.19 | 616                 | 1,397                       | 2.27 |
| 2                     | 83                  | 371                         | 4.48 | 345                 | 939                         | 2.72 |
| 3                     | 5                   | 10                          | 2.13 | 84                  | 97                          | 1.16 |
| 5                     | 0                   | 0                           | 0.00 | 100                 | 158                         | 1.58 |
| 6                     | 7                   | 16                          | 2.17 | 61                  | 110                         | 1.81 |
| 7                     | 7                   | 49                          | 6.67 | 231                 | 417                         | 1.81 |
| 8                     | 0                   | 0                           | 0.00 | 178                 | 478                         | 2.69 |
| 9                     | 13                  | 59                          | 4.40 | 182                 | 314                         | 1.72 |
| 10                    | 24                  | 84                          | 3.44 | 229                 | 484                         | 2.11 |
| 11                    | 0                   | 0                           | 0.00 | 43                  | 39                          | 0.91 |
| 12                    | 6                   | 6                           | 0.95 | 469                 | 1,015                       | 2.17 |
| 13                    | 30                  | 69                          | 2.26 | 300                 | 608                         | 2.03 |
| 14                    | 33                  | 119                         | 3.64 | 60                  | 227                         | 3.81 |
| 15                    | 2                   | 0                           | 0.00 | 185                 | 328                         | 1.78 |
| 152                   | 0                   | 0                           | 0.00 | 4                   | 6                           | 1.52 |
| 154                   | 0                   | 0                           | 0.00 | 46                  | 51                          | 1.10 |
| 183                   | 0                   | 0                           | 0.00 | 13                  | 31                          | 2.40 |
| 189                   | 0                   | 0                           | 0.00 | 2                   | 4                           | 1.80 |
| Total                 | 341                 | 1,331                       | 3.91 | 3,883               | 8,160                       | 2.10 |

Source: Kirk Brogdon, Analyst Programmer V, ADF&G Division of Sport Fish, Anchorage, unpublished data.

Note: Minor rounding errors for estimates of effort and harvest are present in all 3 panels (resident, nonresident, and total).

<sup>a</sup> Districts not included with a year have an estimated harvest of zero.

<sup>b</sup> Harvest and effort are expanded to account for nonrespondents.

<sup>c</sup> A conversion factor of 1.80 lb/quart and 2.02 tail/whole of shrimp was used to estimate harvest in pounds. These conversion factors are based on an ADF&G study (Dave Harris, ADF&G Division of Commercial Fisheries, unpublished data).

## **DUNGENESS CRAB**

### **Life history**

Dungeness crab (*Metacarcinus magister*) are found throughout Southeast Alaska in areas with mud and sand substrate typically at depths less than 50 fathoms. Peak mating in Southeast Alaska occurs in late summer through early fall between hard shelled males and soft shell females (Shirley and Sturdevant 1987; Stone and O Clair 2001; Swiney et al. 2003). Egg fertilization occurs when oviparous females extrude eggs shortly after their shells harden, approximately 1 month after molting. There is evidence that female Dungeness crab in Southeast Alaska may not reproduce every year (Swiney et al. 2003); female crab are not required to mate every year since they can store and utilize sperm for at least 2.5 years (Hankin et al. 1989). Eggs are held by the female until hatching in the spring or early summer.

Upon hatching, crab larvae transition through 6 stages before reaching the first juvenile stage. A male Dungeness crab may reach 6½ inches in shell width after 4 to 5 years (Bishop et al. 2007).

### **Management**

The Southeast Alaska Dungeness crab fishery is managed with regional bag and possession limits, size and sex requirements, and gear restrictions. Emergency orders have been issued to close areas when a conservation concern is identified. The current bag and possession limit is 3 male Dungeness/Tanner crab in combination. Dungeness crab must be a minimum of 6½ in across the carapace, not including spines. Up to 4 pots or 10 ring nets may be used to take Dungeness crab with a maximum of 10 crab pots or 20 ring nets per vessel. There is no closed season for Dungeness crab in the Southeast Alaska sport fishery.

Pots used to take Dungeness crab must meet requirements for a biodegradable escape mechanism defined in 5 AAC 39.145. Two escape rings with an inside diameter of 4¾ in or larger must be installed on opposing sides and within the upper half of the vertical plane of the pot. Buoy markings must include the angler's first initial, last name, address, and vessel name or AK boat registration numbers used to operate the pot. Dungeness crab may be taken by pots, ring nets, diving gear, dip nets, hooked or hookless hand lines, and by hand. The use of pots is the primary harvest method of Dungeness crab in the sport fishery.

In 2008, the board established an ecotourism fishery by establishing statewide guided sport ecotourism regulations and the George Inlet superexclusive guided sport ecotourism Dungeness crab fishery near Ketchikan. A similar fishery was established in Sitka Sound in 2018 (Appendix D). In this superexclusive fishery, registered operators and vessels may not participate in any other Dungeness crab fishery or any other guided sport fishery during the calendar year of operation.

### **Regulatory history**

Sport fishing regulations for Dungeness crab in Southeast Alaska were first established in 1989 with a bag and possession limit of 5 male Dungeness/Tanner crab in combination and a minimum size limit of 6½ inches for Dungeness. In 2009, the bag and possession limit was lowered to 3 male Dungeness/Tanner crab in combination.

In 2012, the number of ring nets which could be fished in the sport Dungeness crab fishery was limited to 10 per person and 20 per vessel. Prior to 2012, there was no limit on the number of ring nets that could be fished.

In 2018, the board passed a department proposal closing the Dungeness crab sport fishery in the Yakutat area. Low Dungeness crab numbers in pot surveys despite closures since 2005 indicated a depleted stock. The proposal was amended to include the personal use fishery as well. While the subsistence fishery remains open, the department will not reopen the sport fishery until Dungeness crab stocks in the area have recovered.

## **Harvest**

The nonresident (sport) harvest of Dungeness crab in Southeast Alaska has averaged roughly 1% of the combined regional harvest of sport, personal use, and commercial fisheries. The cumulative sport and personal use harvest of Dungeness crab (excluding commercial harvest) in Southeast Alaska by residency is summarized in Table 11. Harvest occurs in every management area except Yakutat where the Dungeness crab sport fishery has been closed (Table 12). The sport fishery contributes an average of 29% of the mixed sport and personal use Dungeness crab harvest in Southeast Alaska estimated by the SWHS (2016–2020). Resident anglers harvesting Dungeness crab under personal use or subsistence regulations are the largest source of noncommercial harvest in Southeast Alaska.

## **2020 DUNGENESS CRAB PROPOSALS**

- **Proposal 200** would close the sport Dungeness crab fishery near Klawock.
- **Proposal 204** would close the sport Dungeness crab fishery in Coffman Cove.
- **Proposal 206** would close the sport Dungeness crab fishery in Whale Pass.
- **Proposal 209** would reduce the sport fishing bag limit for Dungeness crab and reduce the number of pots that may be used to sport fish for Dungeness crab in District 3 on the west side of Prince of Wales Island.

Table 11.—Estimates of Dungeness crab harvest from the Statewide Harvest Survey (SWHS) in the mixed sport and personal use fisheries of Southeast Alaska (numbers of crab), 1996–2020.

| Year <sup>a</sup>           | Dungeness crab harvest |          |        |
|-----------------------------|------------------------|----------|--------|
|                             | Nonresident            | Resident | Total  |
| 1996                        | 16,120                 | 71,433   | 87,553 |
| 1997                        | 11,685                 | 29,431   | 41,116 |
| 1998                        | 5,289                  | 26,248   | 31,537 |
| 1999                        | 22,382                 | 38,274   | 60,656 |
| 2000                        | 16,410                 | 46,355   | 62,765 |
| 2001                        | 18,770                 | 35,435   | 54,205 |
| 2002                        | 12,103                 | 21,717   | 33,820 |
| 2003                        | 19,484                 | 38,191   | 57,675 |
| 2004                        | 48,426                 | 40,199   | 88,625 |
| 2005                        | 27,561                 | 45,757   | 73,318 |
| 2006                        | 31,571                 | 48,135   | 79,706 |
| 2007                        | 26,545                 | 65,030   | 91,575 |
| 2008                        | 25,578                 | 54,192   | 79,770 |
| 2009                        | 17,589                 | 42,178   | 59,767 |
| 2010                        | 18,311                 | 37,952   | 56,263 |
| 2011                        | 15,557                 | 33,709   | 49,266 |
| 2012                        | 25,059                 | 36,563   | 61,622 |
| 2013                        | 16,059                 | 31,361   | 47,420 |
| 2014                        | 21,217                 | 51,448   | 72,665 |
| 2015                        | 19,731                 | 47,828   | 67,559 |
| 2016                        | 17,379                 | 29,937   | 47,316 |
| 2017                        | 16,598                 | 52,944   | 69,542 |
| 2018                        | 11,135                 | 27,483   | 38,618 |
| 2019                        | 27,288                 | 61,366   | 88,654 |
| 2020                        | 11,427                 | 34,434   | 45,861 |
| 10-year average (2011–2020) | 18,145                 | 40,707   | 58,852 |
| 5-year average (2016–2020)  | 16,765                 | 41,233   | 57,998 |

<sup>a</sup> Sport and personal use harvest estimates are based on the calendar year.

Table 12.—Statewide Harvest Survey (SWHS) estimates of nonresident Dungeness crab harvest by survey area in Southeast Alaska, 2016–2020.

| Year    | Ketchikan | Prince of Wales Island | Petersburg / Wrangell | Sitka | Juneau | Southeast Region nonresident total <sup>a</sup> |
|---------|-----------|------------------------|-----------------------|-------|--------|---|
| 2016    | 2,448     | 6,943                  | 4,526                 | 941   | 1,552  | 17,379  |
| 2017    | 3,062     | 4,199                  | 4,795                 | 1,914 | 1,356  | 16,598  |
| 2018    | 1,972     | 3,393                  | 2,510                 | 1,177 | 1,404  | 11,135  |
| 2019    | 4,896     | 7,437                  | 5,325                 | 2,635 | 5,128  | 27,288  |
| 2020    | 1,617     | 3,241                  | 2,966                 | 1,421 | 1,249  | 11,427  |
| Average | 2,799     | 5,043                  | 4,024                 | 1,618 | 2,138  | 16,765  |

Note: SWHS survey area boundaries do not correspond exactly with management area boundaries, although these are generally minor discrepancies.

<sup>a</sup> Includes harvest from the remainder of Southeast Alaska in the Haines, Skagway, and Glacier Bay areas not otherwise presented in this table; low response rates prohibit survey area harvest estimates for these locations.

## OTHER SHELLFISH SPECIES

### Introduction

In addition to Dungeness crab and shrimp discussed previously, the Southeast Alaska sport shellfish fishery provides opportunity to harvest a wide variety of shellfish species, although angler interest in these species is very low. Specific provisions for shrimp, Dungeness crab, Tanner crab, razor clams, and scallops have been adopted, while the sport fishery is closed to the taking of king crab, geoducks, and abalone. All other shellfish species, including squid, may be harvested with no bag or possession limits, although gear restrictions apply. Clams, other than razor clams, are the most commonly harvested shellfish species with no bag or possession limit, whereas species such as octopus and squid are harvested in small numbers. In recent years, there has been increased interest and effort in sport fishing for squid although harvest numbers are unknown.

### Regulatory History

When sport fishing regulations for shellfish were adopted in Southeast Alaska in 1989, bag and possession limits were established for razor clams, Dungeness and Tanner crab, shrimp, and abalone. The taking of king crab and geoducks was prohibited, and for all other shellfish there was no bag or possession limit. Since 1989, in addition to Dungeness crab and shrimp (see previous sections in this report), specific provisions have been added for the following species:

**Scallops:** In 1994, a bag and possession limit for scallops was established with a bag and possession limit of 10 weathervane scallops and 5 rock scallops.

**Razor clams:** The taking of razor clams was prohibited in waters near Sitka in 1994. A bag and possession limit of 10 continues in the remainder of Southeast Alaska.

**Tanner crab:** In 2009, the bag and possession limit was lowered from 5 to 3 Dungeness and Tanner crab in combination and a requirement for escape rings in Tanner crab pots was established. Also in 2009, a 2-week closed season (June 16–June 30) was established by the board for sport and personal use Tanner crab fisheries to discourage prospecting and illegal harvest in the personal use red king crab fishery. In 2012, ring net limits were established at 10 per vessel for Tanner crab.

Abalone: In 2012 the board took action to close the Southeast Alaska sport abalone fishery after hearing concern that abalone stocks were in low abundance. Bag and possession limits were also reduced in the personal use and subsistence fishery at this time.

Squid: No squid sport fishery proposals have previously been submitted; therefore, no board action has been taken to date.

## Management

The SWHS collects sport fish effort, catch, and harvest information for clams, razor clams, Tanner crab and “other shellfish” in addition to Dungeness crab and shrimp discussed above. With the exception of clams, angler interest in these species is extremely low. The number of responses to the SWHS which report harvest of these species is below thresholds to derive reliable harvest estimates, with the exception of the regional harvest of clams and Tanner crab and these estimates includes a mix of sport and personal use harvest (Table 13). Although harvest estimates may not be available, the SWHS response rates can be useful to monitor trends in the fishery and identify if effort is growing across the region.

Table 13.—Statewide Harvest Survey (SWHS) estimated harvest of hardshell clams and Tanner crab in the mixed personal use and sport fisheries in Southeast Alaska, 2016–2020.

| Year    | Hardshell clams (other than razor clams) | Tanner crab |
|---------|--|-------------|
| 2016    | 17,800                                   | 847         |
| 2017    | 14,153                                   | 1,590       |
| 2018    | 9,077                                    | 805         |
| 2019    | 17,416                                   | 880         |
| 2020    | 12,754                                   | 567         |
| Average | 14,240                                   | 938         |

## 2020 GENERAL SHELLFISH PROPOSALS

There are 2 shellfish proposals related to sport fishing for squid:

- **Proposal 185** seeks to allow the use of artificial lights when targeting squid in the sport fishery.
- **Proposal 186** would allow the use of an unlimited number of hooks while sport fishing for squid.



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**APPENDIX A: REGULATIONS AND BAROTRAUMA  
STUDIES FOR ROCKFISH**

Appendix A1.—Summary of sport fish regulations for nonpelagic rockfish in Southeast Alaska, 1989–2020.

| Year                | Bag, possession, and annual limits  |
|---------------------|---|
| 1989–1993           | Daily bag limit of 5 fish (all rockfish), of which only 2 may be a yelloweye rockfish, possession limit of 10, of which only 4 may be a yelloweye rockfish.<br><br>Sitka and Ketchikan bag and possession limit of 3 rockfish, of which only 1 could be a yelloweye rockfish. |
| 1994–2005           | Daily bag limit of 5 fish, of which only 2 may be a yelloweye rockfish, possession limit of 10 fish, of which only 4 may be a yelloweye rockfish.<br><br>Sitka and Ketchikan bag and possession limit of 3 rockfish, of which only 1 could be a yelloweye rockfish.           |
| 2006 <sup>a,b</sup> | Daily bag limit of 3 fish, of which only 1 may be a yelloweye rockfish, possession limit of 6 fish, of which only 2 may be a yelloweye rockfish.<br><br>Sitka and Ketchikan bag and possession limit of 3 rockfish, of which only 1 could be a yelloweye rockfish.            |

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Appendix A1.–Page 2 of 3.

| Year                       | Bag, possession, and annual limits   |   |
|----------------------------|--|---|
| 2007–2010 <sup>a,b</sup>   | <u>Resident</u><br>Bag limit of three fish, only 1 of which may be a yelloweye rockfish; possession limit of 6.  | <u>Nonresident</u><br>Bag limit of 2 fish, only 1 of which can be a yelloweye rockfish, possession limit of 4, which only 2 may be a yelloweye rockfish; annual limit of 3 yelloweye rockfish.  |
|                            | <u>Resident</u><br><u>Southeast Outside Waters:</u> bag limit of 2 fish, only 1 of which may be a yelloweye rockfish; possession limit of 4 fish, of which only 2 may be a yelloweye rockfish. | <u>Nonresident</u><br><u>Southeast Outside Waters:</u> bag limit of 2 fish, only 1 of which can be a yelloweye rockfish, possession limit of 4 fish, of which only 1 may be a yelloweye rockfish; annual limit of 1 yelloweye rockfish. |
| 2011–2012 <sup>a,b</sup>   | <u>Southeast Inside Waters:</u> bag limit of 3 fish, only 1 of which may be a yelloweye rockfish; possession limit of 6 fish, of which only 2 may be a yelloweye rockfish.                     | <u>Southeast Inside Waters:</u> bag limit of 2 fish, only 1 of which can be a yelloweye rockfish, possession limit of 4 fish, of which only 2 may be a yelloweye rockfish; annual limit of 2 yelloweye rockfish.                        |
|                            | <u>Resident</u><br><u>Southeast Outside Waters:</u> bag limit of 2 fish, only 1 of which may be a yelloweye rockfish; possession limit of 4 fish, of which only 2 may be a yelloweye rockfish. | <u>Nonresident</u><br><u>Southeast Outside Waters:</u> bag limit of 2 fish, only 1 of which can be a yelloweye rockfish, possession limit of 4 fish, of which only 1 may be a yelloweye rockfish; annual limit of 1 yelloweye rockfish. |
| 2013–2015 <sup>a,b,c</sup> | <u>Southeast Inside Waters:</u> bag limit of 3 fish, only 1 of which may be a yelloweye rockfish; possession limit of 6 fish, of which only 2 may be a yelloweye rockfish.                     | <u>Southeast Inside Waters:</u> bag limit of 2 fish, only 1 of which can be a yelloweye rockfish, possession limit of 4 fish, of which only 2 may be a yelloweye rockfish; annual limit of 2 yelloweye rockfish.                        |
|                            | <u>Resident</u><br><u>Southeast Outside Waters:</u> bag limit of 2 fish, only 1 of which may be a yelloweye rockfish; possession limit of 4 fish, of which only 2 may be a yelloweye rockfish. | <u>Nonresident</u><br><u>Southeast Outside Waters:</u> bag limit of 1 fish, only 1 of which can be a yelloweye rockfish, possession limit of 2 fish, of which only 1 may be a yelloweye rockfish; annual limit of 1 yelloweye rockfish. |
| 2016 <sup>a,b,c</sup>      | <u>Southeast Inside Waters:</u> bag limit of 3 fish, only 1 of which may be a yelloweye rockfish; possession limit of 6 fish, of which only 2 may be a yelloweye rockfish.                     | <u>Southeast Inside Waters:</u> bag limit of 2 fish, only 1 of which can be a yelloweye rockfish, possession limit of 4 fish, of which only 2 may be a yelloweye rockfish; annual limit of 2 yelloweye rockfish.                        |

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Appendix A1.–Page 3 of 3.

| Year                  | Bag, possession, and annual limits   |
|-----------------------|--|
|                       | <u>All Anglers</u>   |
| 2017 <sup>a,b,c</sup> | Bag and possession limit of 1 fish. Nonresident annual limit of 1 yelloweye rockfish. <u>Southeast Outside Waters</u> : No retention from August 1 through August 21. All anglers must have release device (regardless of target species) and all nonpelagic rockfish must be released at depth. |
|                       | <u>All Anglers</u>   |
| 2018 <sup>a,b,c</sup> | Bag and possession limit of 1 fish. Nonresident annual limit of 1 yelloweye rockfish. <u>Southeast Outside Waters</u> : No retention from August 1 through August 31. All anglers must have release device (regardless of target species) and all nonpelagic rockfish must be released at depth. |
|                       | <u>All Anglers</u>   |
| 2019 <sup>a,b,c</sup> | Bag and possession limit of 1 fish. Nonresident annual limit of 1 yelloweye rockfish. <u>Southeast Outside Waters</u> : No retention from July 25 through August 31. All anglers must have release device (regardless of target species) and all nonpelagic rockfish must be released at depth.  |
|                       | <u>All Anglers</u>   |
| 2020 <sup>a,b,c</sup> | Retention of all DSR rockfish prohibited. Bag and possession limit of 1 slope rockfish. All anglers must have release device (regardless of target species) and all rockfish must be released at depth.  |

<sup>a</sup> Charter operators and crew are not allowed to retain nonpelagic rockfish.

<sup>b</sup> All nonpelagic rockfish caught must be retained until the bag limit is reached.

<sup>c</sup> Persons sport fishing from a charter vessel when releasing nonpelagic rockfish (e.g., after an angler reaches their bag limit) must be in possession of and utilize a deepwater release mechanism to return the fish to the depth it was hooked or to a depth of at least 100 feet.

Appendix A2.–List of references for barotrauma studies on rockfish species survival when returned to depth.

| Citation                 | Species of rockfish studied                          | Depth of study | Location         | Method summary   | Survival rate examined  | Survival rate reported                              | Species examined exists in Alaska sport fishery              |
|--------------------------|--|----------------|------------------|--|---|---|--|
| Hochhalter and Reed 2011 | Yelloweye  | 18–72 m        | Alaska           | Released fish in environment directly as anglers would likely use recompression devices.                       | Yes   | 17-day survival of 98.8%                            | Yes  |
| Jarvis and Lowe 2008     | Vermilion, bocaccio, flag, squarespot, and honeycomb | 55–89 m        | California       | Released fish into cages first.  | Yes   | 2-day survival of 62–73%; 690-day survival detected | Yes, but small sample sizes (17–73 samples per species)      |
| Pribyl et al. 2010       | Black rockfish                                       | 35 m           | Oregon           | Compression chamber in laboratory.   | Yes   | 31-day survival of 100%                             | Yes  |
| Parker et al. 2006       | Black rockfish                                       | up to 30 m     | Oregon           | Used compression chamber in laboratory only. Used pressures up to 4 atmospheres equivalent to 30 meters depth. | Yes   | 9-day survival of 97%                               | Yes  |
| Hannah and Rankin 2011   | Canary, yelloweye, quillback, China, copper          | 20–69 m        | Oregon           | Surgically implanted acoustic tags in fish and released at depth.  | Yes, inferred from those individuals that displayed movement throughout duration of the study | 30+ day survival of 70–100%                         | Yes, but very small sample sizes (1–23 samples per species). |
| GMT 2014                 | Cowcod, canary, yelloweye                            | 0–75 fathoms   |                  | Examined use of release devices.   | Yes   | Yes   | Yes  |
| Hannah et al. 2014       | Canary, yelloweye                                    |                |                  | Post recompression of rockfish 2-days.   | Yes   | 90–100%   | Yes  |
| Berry 2001               | Quillback  | Unknown        | British Columbia | Released fish with cages at 15 meters no information on depth of capture given.                                | Yes   | 35-day survival of 86%                              | Yes  |





## **APPENDIX B: LINGCOD SPORT FISHERY REGULATIONS**

Appendix B1.–Summary of sport fishery lingcod regulations in Southeast Alaska, 1994–2020.

| Year         | SSEI   | SSEO   | CSEO/NSEO/NSEI  | IBS/EYKT   |
|--------------|--|--|---|--|
| 1994 to 1999 | season: May 1–Nov 30<br>2 fish per day, 4 in possession  | season: May 1–Nov 30<br>2 fish per day, 4 in possession  | season: May 1–Nov 30<br>2 fish per day, 4 in possession   | season: May 1–Nov 30<br>2 fish per day, 4 in possession  |
| 2000         | season: May 16–Nov 30<br>2 fish per day, 4 in possession<br>no size limit  | season: May 16–Nov 30<br>2 fish per day, 4 in possession<br>no size limit  | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>2 per day, 4 in possession prior to<br>June 6, 2000<br>After June 6: 1 per day, 2 in<br>possession and:<br>unguided residents: no size limit<br>guided and nonresidents:<br>38 in minimum size | season: May 16–Nov 30<br>2 fish per day, 4 in possession<br>no size limit  |
| 2001         | season: May 16–Nov 30<br>1 per day, 2 in possession<br>no size limit   | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>34 in minimum size                     | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>39 in minimum size  | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>39 in minimum size |
| 2002         | season: May 16–Nov 30<br>1 per day, 2 in possession<br>no size limit   | season: May 16–June 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit   | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>32–42 in slot limit                  |
| 2003         | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size<br>limit<br>guided and nonresidents:<br>30–40 in slot limit | season: May 16–June 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit   | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>32–42 in slot limit                  |

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Appendix B1.–Page 2 of 5.

| Year | SSEI  | SSEO   | CSEO/NSEO/NSEI   | IBS/EYKT   |
|------|---|--|--|--|
| 2004 | season: May 16–Nov 30<br>1 per day, 2 in possession<br>no size limit  | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit  | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit  | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>32–42 in slot limit  |
| 2005 | season: May 16–Nov 30<br>1 per day, 2 in possession<br>no size limit  | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit  | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit  | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>32–42 in slot limit  |
| 2006 | season: May 16–Nov 30<br>1 per day, 2 in possession<br>no size limit<br>guided and nonresidents:<br>annual limit of 2 fish<br>no retention by charter<br>operators/crew | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit<br>guided and nonresidents: annual<br>limit of 2 fish<br>no retention by charter<br>operators/crew | season: May 16–Jun 15,<br>Aug 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>30–40 in slot limit<br>guided and nonresidents: annual limit<br>of 2 fish<br>no retention by charter<br>operators/crew | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents:<br>32–42 in slot limit<br>no retention by charter<br>operators/crew |

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Appendix B1.–Page 3 of 5.

| Year      | SSEI  | SSEO  | CSEO/NSEO/NSEI   | IBS/EYKT  |
|-----------|---|---|--|---|
| 2007–2008 | season: May 16–Nov 30<br>unguided resident: 1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents: 30–40 in slot limit<br>guided and nonresidents: annual limit of 1 fish<br>no retention by charter operators/crew  | season: May 16–Jun 15, Aug 16–Nov 30<br>unguided resident: 1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents: 30–35 in slot limit<br>guided and nonresidents: annual limit of 1 fish<br>no retention by charter operators/crew   | season: May 16–Jun 15, Aug 16–Nov 30<br>unguided resident: 1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents: 30–35 in slot limit<br>guided and nonresidents: annual limit of one<br>no retention by charter operators/crew   | season: May 16–Nov 30<br>1 per day, 2 in possession<br>unguided residents: no size limit<br>guided and nonresidents: 32–42 in slot limit<br>no retention by charter operators/crew  |
| 2009      | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, one of which is 30–35 inches in length and one that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of two lingcod, 1 of which is 30–35 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Jun 15, Aug 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–35 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–35 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel |

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| Year | SSEI  | SSEO  | CSEO/NSEO/NSEI   | IBS/EYKT  |
|------|---|---|--|---|
| 2010 | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–35 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel   | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, one of which is 30–35 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Jun 15, Aug 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–35 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel   | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–40 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–40 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel |
| 2011 | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–40 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–40 inches in length and one that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–40 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–40 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel   | season: May 16–Jun 30, Aug 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–35 inches in length and one that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–45 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–45 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel |

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Appendix B1.–Page 5 of 5.

| Year      | SSEI  | SSEO  | CSEO/NSEO/NSEI  | IBS/EYKT  |
|-----------|---|---|---|---|
| 2012–2020 | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–45 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–45 inches in length and one that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–45 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–45 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–35 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–35 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel | season: May 16–Nov 30<br>resident: 1 per day, 2 in possession, no size limit<br>nonresidents: 1 per day, 1 in possession, 30–45 in slot limit OR 55 inches or greater.<br>must land lingcod by hand or with a landing net<br>nonresident angler annual limit of 2 lingcod, 1 of which is 30–45 inches in length and 1 that is 55 inches or greater in length<br>no captain/crew lingcod retention while clients are on board the vessel |

*Note:* SSEI = Southern Southeast Inside Subdistrict; SSEO = Southern Southeast Outside Section; CSEO = Central Southeast Outside Section; NSEO = Northern Southeast Outside Section; NSEI = Northern Southeast Inside Subdistrict; IBS = Icy Bay Subdistrict; EYKT = East Yakutat Section.

**APPENDIX C: SABLEFISH SPORT FISHERY  
REGULATIONS**

Appendix C1.–Summary of sablefish sport fishery regulations in Southeast Alaska, 2009–2020.

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| Year      | Bag and Possession Limits   |
|-----------|---|
| 2009      | Bag limit of 2 fish, 4 in possession, annual limit of 8 fish for all anglers.   |
| 2009–2011 | Bag limit of 4 fish, 4 in possession, annual limit of 8 for nonresidents.   |
| 2012–2017 | Bag limit of 4 fish, 4 in possession, no annual limit <i>except</i> in District 12, where there was an annual limit of 8 fish for nonresidents. |
| 2018–2020 | Bag limit of 4 fish, 4 in possession, annual limit of 8 for nonresidents.   |

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**APPENDIX D: REGULATORY HISTORY OF GUIDED  
SPORT ECOTOURISM DUNGENESS CRAB FISHERY**

Appendix D1.–Regulatory history of the George Inlet and Nakwasina Sound superexclusive guided sport ecotourism Dungeness crab fishery in Southeast Alaska, 2003–2020.

| Year      | Description  |
|-----------|--|
| 2003–2007 | Experience Alaska Tours/George Inlet Lodge in Ketchikan conducted Dungeness Crab ecotourism tours under the Commissioner’s authority to issue permits for scientific and educational purposes.   |
| 2007      | After additional operators expressed interest in the George Inlet fishery, department review determined that scientific and educational permits to conduct ecotourism were erroneously issued and there was a need to establish regulatory framework.  |
| 2008      | Statewide sport ecotourism regulations in 5 AAC 75.085 were adopted and specific provisions for the George Inlet superexclusive guided sport ecotourism Dungeness crab fishery was established in 5 AAC 47.090.  |
| 2009      | Regulations were modified by the board allowing greater flexibility for the department to limit the number of pots and pot lifts when more than three vessels registered for the George Inlet fishery.   |
| 2012      | Registration requirements were amended by allowing a guide to register for the George Inlet fishery at any time prior to participating. Prior to this amendment, guides were required to register between December 1 and January 3 in order to participate in this fishery.  |
| 2015      | Further clarification was needed in regulation for the George Inlet Fishery. Pot limits were modified from 2 per vessel to 6 per operator, buoy marking requirements were modified, a definition of “operator” was established, management provisions were modified to allow the department to reduce pot limits and/or number of lifts if more than 1 operator registered, and language was added to identify the responsible party in the event a fishery violation occurred in this fishery. Guide registration requirements were modified to allow guides to deregister from this fishery in order to allow participation in other guided sport or Dungeness crab fisheries. Prior to this time sport fishing guides registered in this fishery were prohibited from participating in any other guided sport fishery or Dungeness crab fishery during the same year. |
| 2018      | Regulations were established for a Nakwasina Sound fishery in Sitka, 5 AAC 47.091. The regulations were modelled after the George Inlet fishery in Ketchikan.  |