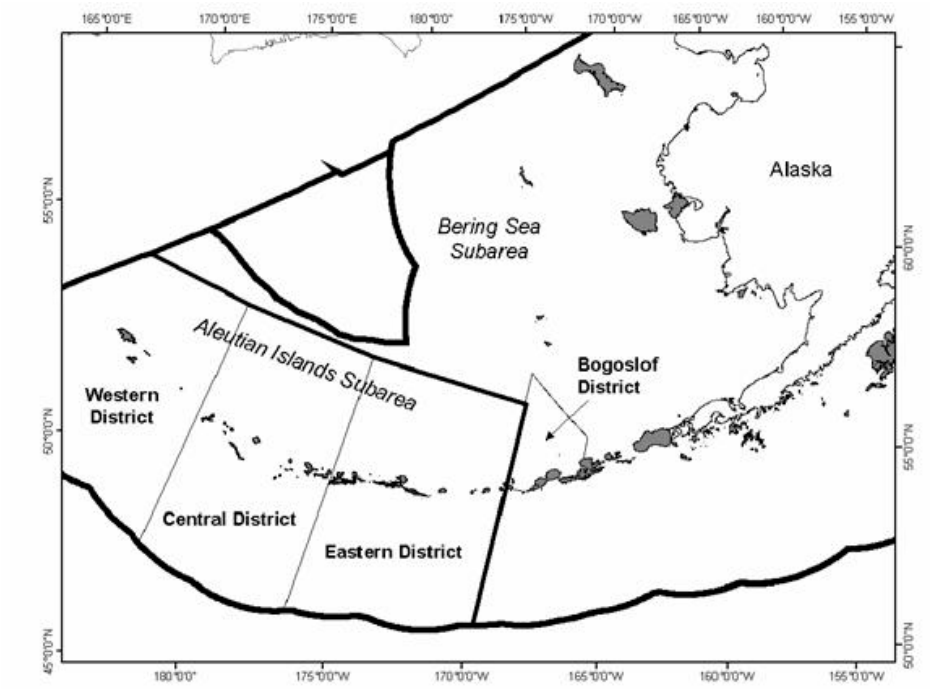
# STOCK ASSESSMENT AND FISHERY EVALUATION REPORT

# FOR THE GROUNDFISH RESOURCES OF THE BERING SEA/ALEUTIAN ISLANDS REGIONS

Compiled by:

**The Plan Team for the Groundfish Fisheries of the Bering Sea and Aleutian Islands**

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# Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Region

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# Summary

by

**The Plan Team for the Groundfish Fisheries of the Bering Sea and Aleutian Islands**

# Introduction

The *National Standard Guidelines for Fishery Management Plans* published by the National Marine Fisheries Service (NMFS) require that a stock assessment and fishery evaluation (SAFE) report be prepared and reviewed annually for each fishery management plan (FMP). The SAFE report summarizes the best available scientific information concerning the past, present, and possible future condition of the stocks, marine ecosystems, and fisheries that are managed under Federal regulation. It provides information to the Councils for determining annual harvest levels from each stock, documenting significant trends or changes in the resource, marine ecosystems, and fishery over time, and assessing the relative success of existing state and Federal fishery management programs. For the FMP for the Groundfish Fishery of the Bering Sea and Aleutian Islands (BSAI) Area, the SAFE report is published in three sections: a "Stock Assessment" section, which comprises the bulk of this document, and "Economic Status of Groundfish Fisheries off Alaska" and "Ecosystem Considerations" sections, which are bound separately.

The BSAI Groundfish FMP requires that a draft of the SAFE Report be produced each year in time for the December meeting of the North Pacific Fishery Management Council. Each stock or stock complex is represented in the SAFE Report by a chapter containing the latest stock assessment. New or revised stock assessment models are generally previewed at the September Plan Team meeting, and considered again by the Plan Team at its November meeting for recommending final specifications for the following two fishing years. This process is repeated annually. Full stock assessments are required for walleye pollock, Pacific cod, Atka mackerel, sablefish, and some flatfish stocks every year. All Rockfishes, some flatfishes, sharks, skates, octopus, squid, and sculpins require full stock assessment only during years in which the Aleutian Island bottom trawl survey is conducted. This survey typically occurs in even-numbered years.

This Stock Assessment section of the SAFE report for the BSAI groundfish fisheries is compiled by the BSAI Groundfish Plan Team from chapters contributed by scientists at NMFS Alaska Fisheries Science Center (AFSC). These chapters include a recommendation by the author(s) for overfishing level (OFL) and acceptable biological catch (ABC) for each stock and stock complex managed under the FMP for the next two fishing years. This introductory section includes the recommendations of the Plan Team (Table 1), along with a summary of each chapter, including the Ecosystems Considerations chapter and the Economic SAFE Report.

The OFL and ABC recommendations by the Plan Team are reviewed by the Scientific and Statistical Committee (SSC), which may confirm the Plan Team recommendations. The Plan Team and SSC recommendations, together with social and economic factors, are considered by the Council in determining total allowable catches (TACs) and other measures used to manage the fisheries. Neither the author(s), Plan Team, nor SSC recommends TACs.

Members of the BSAI Plan Team who compiled this SAFE report were: Mike Sigler (co- chair), Grant Thompson (co- chair), Jane DiCosimo (BSAI Groundfish FMP coordinator), Kerim Aydin, David Barnard, Lowell Fritz, Mary Furuness, Dana Hanselman, Alan Haynie, Brenda Norcross, Chris Siddon, and Leslie Slater.

# Background Information

The BSAI management area lies within the 200-mile U.S. Exclusive Economic Zone (EEZ) of the US (Figure 1). International North Pacific Fisheries Commission (INPFC) statistical areas 1 and 2 comprise the EBS. The Aleutian Islands (AI) region is INPFC Area 5.

Amendment 95 to the BSAI Groundfish FMP, which was implemented in 2010 for the start of the 2011 fishing year, defined three categories of species or species groups that are likely to be taken in the groundfish fishery. Species may be split or combined within the "target species" category according to procedures set forth in the FMP. The three categories of finfishes and invertebrates that have been designated for management purposes under two management classifications are listed below.

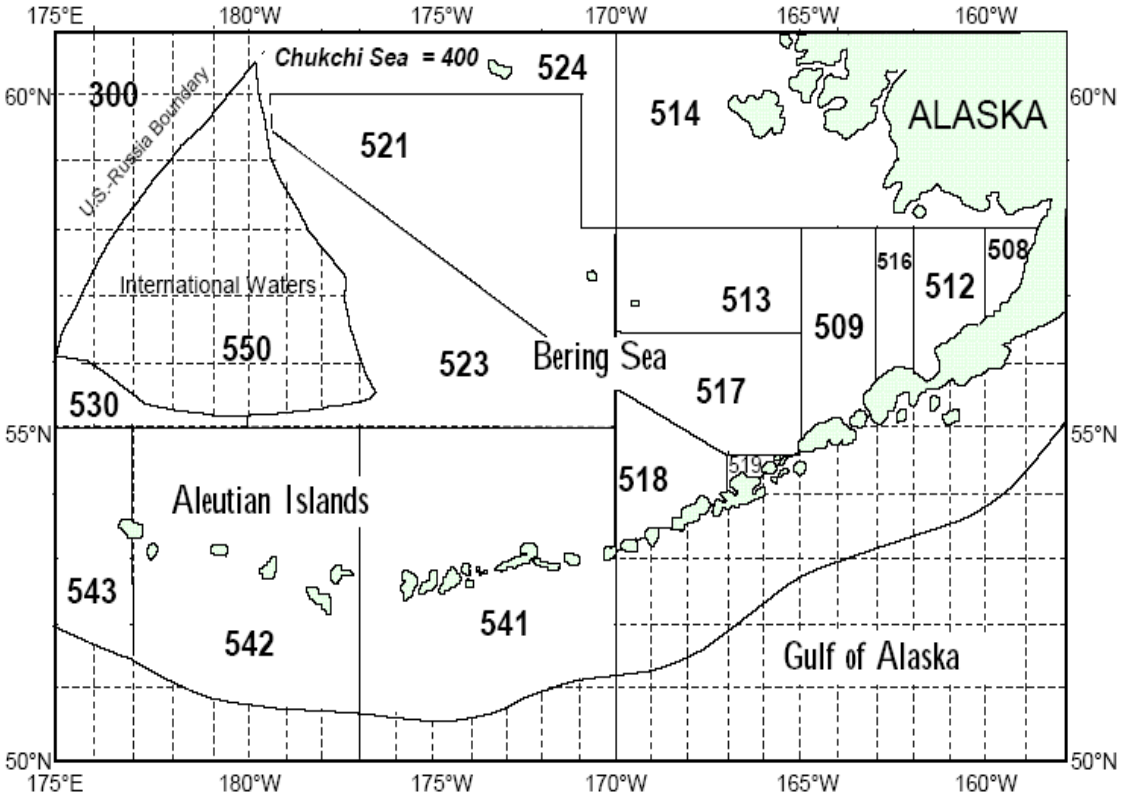


Figure 1. Bering Sea/Aleutian Islands statistical and reporting areas.

*In the Fishery:*

**Target species**–are those species that support either a single species or mixed species target fishery, are commercially important, and for which a sufficient data base exists that allows each to be managed on its own biological merits. Accordingly, a specific TAC is established annually for each target species or species assemblage. Catch of each species must be recorded and reported. Stocks/assemblages in the target category are listed below.

*Ecosystem Component:*

**Prohibited Species**–are those species and species groups the catch of which must be avoided while fishing for groundfish, and which must be immediately returned to sea with a minimum of injury except when their retention is authorized by other applicable law. Groundfish species and species groups under the FMP for which the quotas have been achieved shall be treated in the same manner as prohibited species.

**Forage fish species**–are those species listed below, which are a critical food source for many marine mammal, seabird and fish species. The forage fish species category is established to allow for the management of these species in a manner that prevents the development of a commercial directed fishery for forage fish. Management measures for this species category will be specified in regulations and may include such measures as prohibitions on directed fishing, limitations on allowable bycatch retention amounts, or limitations on the sale, barter, trade or any other commercial exchange, as well as the processing of forage fish in a commercial processing facility.

| In the Fishery | Ecosystem Component | |
|---|---|---|
| **Target Species1** | **Prohibited Species2** | **Forage Fish Species3** |
| Walleye pollock | Pacific halibut | Osmeridae family (eulachon, capelin, and other smelts) |
| Pacific cod | Pacific herring | Myctophidae family (lanternfishes) |
| Sablefish | Pacific salmon | Bathylagidae family (deep-sea smelts) |
| Yellowfin sole | Steelhead trout | Ammodytidae family (Pacific sand lance) |
| Greenland turbot | King crab | Trichodontidae family (Pacific sand fish) |
| Arrowtooth flounder | Tanner crab | Pholidae family (gunnels) |
| Kamchatka flounder | | Stichaeidae family |
| Northern rock sole | | (pricklebacks, warbonnets, eelblennys, cockscombs, shannys) |
| Flathead sole | | Gonostomatidae family |
| Other flatfish assemblage | | (bristlemouths, lightfishes, and anglemouths) |
| Alaska plaice | | Order Euphausiacea (krill) |
| Pacific ocean perch | | |
| Northern rockfish | | |
| Shortraker rockfish | | |
| Blackspotted/Rougheye rockfish assemblage | | |
| Other rockfish assemblage | | |
| Atka mackerel | | |
| Skate assemblage | | |
| Sculpin assemblage | | |
| Shark assemblage | | |
| Squid assemblage | | |
| Octopus assemblage | | [1] |

TAC for each listing. Species and species groups may or may not be targets of directed fisheries.

[2] Must be immediately returned to the sea, except when retention is required or authorized.

[3] Management measures for forage fish are established in regulations implementing the FMP.

## Historical Catch Statistics

Catch statistics since 1954 are shown for the Eastern Bering Sea (EBS) subarea in Table 2. The initial target species in the BSAI commercial fisheries was yellowfin sole. During this period, total catches of groundfish peaked at 674,000 t in 1961. Following a decline in abundance of yellowfin sole, other species (principally walleye pollock) were targeted, and total catches peaked at 2.2 million t in 1972. Pollock is now the principal fishery, with catches peaking at approximately 1.4-1.5 million t due to years of high recruitment. After the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was adopted in 1976, catch restrictions and other management measures were placed on the fishery and total groundfish catches have since varied from one to two million t. In 2005, Congress implemented a statutory cap on TACs for BSAI groundfish of 2 million t, which had previously been a policy adopted by the Council. Catches generally total well below the 2 million t optimal yield (OY) cap. Catches in the EBS in 2011 totaled 1,721,656 t; catches through November 3, 2012 totaled 1,713,224 t. Pollock catches in 2011 totaled 1,199,243 t; catches through November 3, 2012 totaled 1,202,639 t.

Catches in the Aleutian Islands (AI) subarea always have been much smaller than in the EBS. Target species have also differed (Table 3). Pacific ocean perch (POP) was the initial target species. As POP abundance declined, the fishery diversified to different species. During the early years of exploitation, total AI groundfish catches peaked at 112,000 t in 1965. Atka mackerel was the largest fishery in the AI at 50,600 t in 2011 (down from 72,653 t in 2010) and 46,860 t through November 3, 2012. Pacific ocean perch is the second largest fishery at 18,402 t in 2011 and 18,557 t through November 3, 2012. Pacific ocean perch displaced Pacific cod as the second largest fishery beginning in 2011, when lower Pacific cod (10,862 t in 2011 and 12,991 t to date in 2012) and Atka mackerel harvest resulted from Steller sea lion protection measures. Total AI catches were 148,520 t in 2010, 96,622 t in 2011, and 98,716 t through November 3, 2012. Recent total AI catches peaked at 190,750 t in 1996.

Total catches since 1954 for the BSAI, combined, are in Table 4. Total 2011 BSAI catches were 1,818,278 t in 2011 (91 percent of total TACs which equaled the OY), compared with 1,355,200 t in 2010 (80 percent of 1,677,154 t total TACs and 68 percent of the OY); BSAI catches through November 3, 2012 totaled 1,811,908 t (91 percent of total TACs which equaled the OY). The relationship of the various biological reference points (biomass, OFL, ABC, TAC, and catch) is depicted in Figure 2.

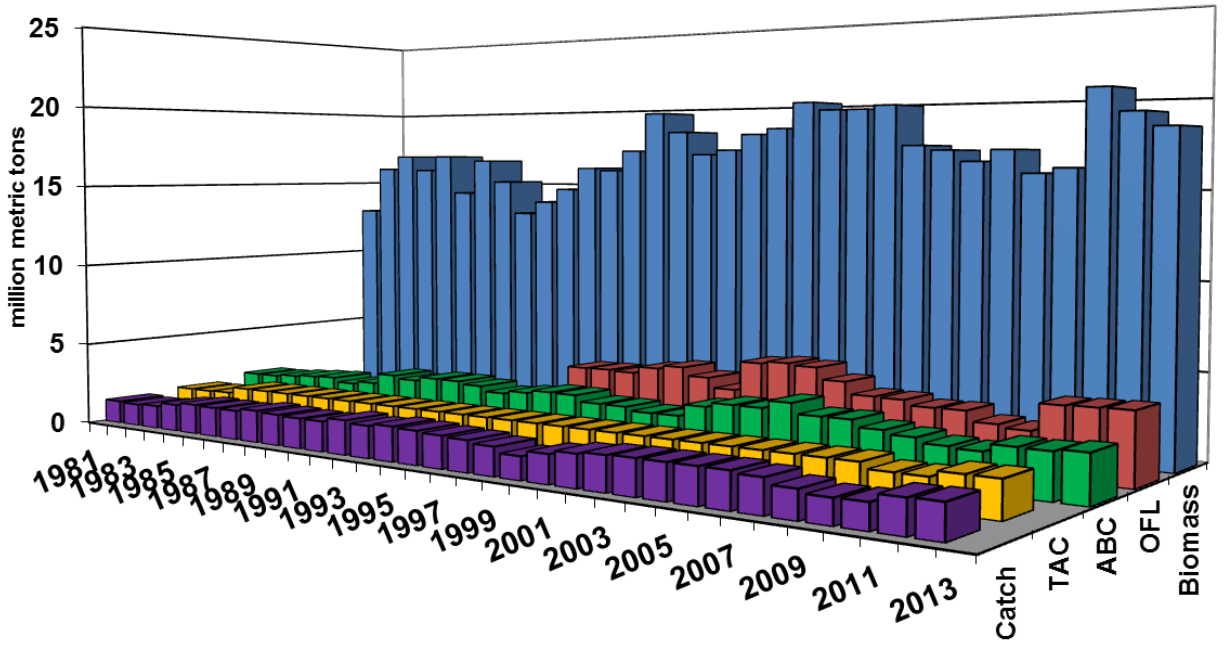


Figure 2. Biomass, Overfishing Level, Acceptable Biological Catch, and Total Allowable Catch for 1981-2013* and Catch, 1981-2012 (*2013, as recommended by the Plan Team and assuming total TACs = OY)

### Recent Total Allowable Catches

Amendment 1 to the BSAI Groundfish FMP provided the framework to manage the groundfish resources as a complex. Maximum sustainable yield (MSY) for the BSAI groundfish complex was estimated at 1.8 to 2.4 million t. The OY range was set at 85 percent of the MSY range, or 1.4 to 2.0 million t. The sum of the TACs equals OY for the groundfish complex, which is constrained by the 2.0 million t cap on OY. Due to recent declines in biomasses of walleye pollock and Pacific cod, for example, and prohibited species catch (PSC) limits, the cap has not been met. The BSAI groundfish TACs totaled 1,840,000 t in 2008 and dropped further to 1,680,000 t in 2009 and 2010, approximately 16 percent below the OY due to decreased biomasses of pollock and cod. The TACs in 2011 and 2012 were set equal to OY, as biomasses of pollock and Pacific cod increased.

Establishment of the Western Alaska Community Development Quota (CDQ) Program annual groundfish reserves is concurrent with the annual BSAI groundfish harvest specifications. Once annual BSAI groundfish TACs are established, the CDQ Program is allocated set portions of the TACs for certain species and species assemblages. This includes 10 percent of the BS and AI pollock TACs, 20 percent of the fixed gear sablefish TAC, and 7.5 percent of the sablefish trawl gear allocation. It also receives 10.7 percent of the TACs (up from 7.5 percent prior to 2008) for Pacific cod, yellowfin sole, rock sole, flathead sole, Atka mackerel, AI Pacific ocean perch, arrowtooth flounder, and BS Greenland turbot. The program also receives allocations of PSC limits.

The TAC specifications for the primary allocated species, and PSC limit specifications, are recommended by the Council at its December meetings. For the non-specified reserve, 15 percent of the TAC for each target species, except for pollock, the hook-and-line and pot gear allocation of sablefish, and the Amendment 80 species (Pacific cod, Atka mackerel, flathead sole, rock sole, yellowfin sole, and Aleutian Islands Pacific ocean perch), are placed in a non-specified reserve. Apportionments to this reserve range from 4.3 to 15 percent of applicable TAC limits. The reserve is used for (1) correction of operational problems in the fishing fleets, (2) to promote full and efficient use of groundfish resources, (3) adjustments of species TACs according to changing conditions of stocks during fishing year, (4) apportionments, and Community Development Quota allocations. The initial TAC (ITAC) for each species is the remainder of the TAC after the subtraction of the reserves.

## Biological Reference Points

A number of biological reference points are used in this SAFE report. Among these are the fishing mortality rate (F) and stock biomass level (B) associated with MSY ($F_{MSY}$ and $B_{MSY}$, respectively), and the fishing mortality rates reduce the level of spawning biomass per recruit to some percentage of the pristine level ($F_{P\%}$). The fishing mortality rate used to compute ABC is designated $F_{ABC}$, and the fishing mortality rate used to compute the OFL is designated $F_{OFL}$.

## Definition of Acceptable Biological Catch and the Overfishing Level

Amendment 56 to the BSAI Groundfish FMP, which was implemented in 1999, defines ABC and OFL for the BSAI groundfish fisheries. The definitions are shown below, where the fishing mortality rate is denoted *F*, stock biomass (or spawning stock biomass, as appropriate) is denoted *B*, and the *F* and *B* levels corresponding to MSY are denoted $F_{MSY}$ and $B_{MSY}$ respectively.

Acceptable Biological Catch is a preliminary description of the acceptable harvest (or range of harvests) for a given stock or complex. Its derivation focuses on the status and dynamics of the stock, environmental conditions, other ecological factors, and prevailing technological characteristics of the fishery. The fishing mortality rate used to calculate ABC is capped as described under "overfishing" below.

Overfishing is defined as any amount of fishing in excess of a prescribed maximum allowable rate. This maximum allowable rate is prescribed through a set of six tiers which are listed below in descending order of preference, corresponding to descending order of information availability. The SSC will have final authority for determining whether a given item of information is reliable for the purpose of this definition, and may use either objective or subjective criteria in making such determinations. For Tier (1), a pdf refers to a probability density function. For Tiers (1-2), if a reliable pdf of $B_{MSY}$ is available, the preferred point estimate of $B_{MSY}$ is the geometric mean of its pdf. For Tiers (1-5), if a reliable pdf of *B* is available, the preferred point estimate is the geometric mean of its pdf. For Tiers (1-3), the coefficient 'α' is set at a default value of 0.05, with the understanding that the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific information. For Tiers (2-4), a designation of the form "$F_{X\%}$" refers to the F associated with an equilibrium level of spawning per recruit (SPR) equal to X percent of the equilibrium level of spawning per recruit in the absence of any fishing. If reliable information sufficient to characterize the entire maturity schedule of a species is not available, the SSC may choose to view SPR calculations based on a knife-edge maturity assumption as reliable. For Tier (3), the term $B_{40\%}$ refers to the long-term average biomass that would be expected under average recruitment and $F=F_{40\%}$.

Overfished or approaching an overfished condition is determined for all age-structured stock assessments by comparison of the stock level in relation to its MSY level according to harvest scenarios 6 and 7 described in the next section (for Tier 3 stocks, the MSY level is defined as $B_{35\%}$). For stocks in Tiers 4-6, no determination can be made of overfished status or approaching an overfished condition as information is insufficient to estimate the MSY stock level

**Tier**

1) Information available: *Reliable point estimates of B and $B_{MSY}$ and reliable pdf of $F_{MSY}$.*

1a) Stock status: $B/B_{MSY} > 1$

$F_{OFL} = \mu_A$, *the arithmetic mean of the pdf*

$F_{ABC} \leq \mu_H$, *the harmonic mean of the pdf*

1b) Stock status: $\alpha < B/B_{MSY} \leq 1$

$F_{OFL} = \mu_A \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

$F_{ABC} \leq \mu_H \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

1c) Stock status: $B/B_{MSY} \leq \alpha$

$F_{OFL} = 0$

$F_{ABC} = 0$

2) Information available: *Reliable point estimates of B, $B_{MSY}$, $F_{MSY}$, $F_{35\%}$, and $F_{40\%}$.*

2a) Stock status: $B/B_{MSY} > 1$

$F_{OFL} = F_{MSY}$

$F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%})$

2b) Stock status: $\alpha < B/B_{MSY} \leq 1$

$F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

$F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

2c) Stock status: $B/B_{MSY} \leq \alpha$

$F_{OFL} = 0$

$F_{ABC} = 0$

3) Information available: *Reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.*

*3a) Stock status:* $B/B_{40\%} > 1$

$F_{OFL} = F_{35\%}$

$F_{ABC} \leq F_{40\%}$

*3b) Stock status:* $\alpha < B/B_{40\%} \leq 1$

$F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

$F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

*3c) Stock status:* $B/B_{40\%} \leq \alpha$

$F_{OFL} = 0$

$F_{ABC} = 0$

4) Information available: *Reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.*

$F_{OFL} = F_{35\%}$

$F_{ABC} \leq F_{40\%}$

5) Information available: *Reliable point estimates of B and natural mortality rate M.*

$F_{OFL} = M$

$F_{ABC} \leq 0.75 \times M$

6) Information available: *Reliable catch history from 1978 through 1995.*

*OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information*

$ABC \leq 0.75 \times OFL$

## Standard Harvest and Recruitment Scenarios and Projection Methodology

A standard set of projections is required for each stock managed under Tiers 1, 2, or 3 of Amendment 56. This set of projections encompasses seven harvest scenarios designed to satisfy the requirements of Amendment 56, the National Environmental Policy Act, and the MSFCMA.

For each scenario, the projections begin with an estimated vector of 2012 numbers at age. In each subsequent year, the fishing mortality rate is prescribed on the basis of the spawning biomass in that year and the respective harvest scenario. In each year, recruitment is drawn from an inverse Gaussian distribution whose parameters consist of maximum likelihood estimates determined from recruitments estimated in the assessment. Spawning biomass is computed in each year based on the time of peak spawning and the maturity and weight schedules described in the assessment. Total catch is assumed to equal the catch associated with the respective harvest scenario in all years. This projection scheme is run 1000 times to obtain distributions of possible future stock sizes, fishing mortality rates, and catches.

Five of the seven standard scenarios will be used in an Environmental Assessment prepared in conjunction with the final SAFE. These five scenarios, which are designed to provide a range of harvest alternatives that are likely to bracket the final TACs for 2012 and 2013, are as follow ("*max* $F_{ABC}$" refers to the maximum permissible value of $F_{ABC}$ under Amendment 56):

*Scenario 1*: In all future years, *F* is set equal to *max* $F_{ABC}$. (Rationale: Historically, TAC has been constrained by ABC, so this scenario provides a likely upper limit on future TACs.)

*Scenario 2*: In all future years, *F* is set equal to a constant fraction of *max* $F_{ABC}$, where this fraction is equal to the ratio of the $F_{ABC}$ value for 2012 recommended in the assessment to the *max* $F_{ABC}$ for 2012. (Rationale: When $F_{ABC}$ is set at a value below *max* $F_{ABC}$, it is often set at the value recommended in the stock assessment.)

*Scenario 3*: In all future years, *F* is set equal to the 2006-2010 average *F*. (Rationale: For some stocks, TAC can be well below ABC, and recent average *F* may provide a better indicator of $F_{TAC}$ than $F_{ABC}$.)

*Scenario 4*: In all future years, the upper bound on $F_{ABC}$ is set at $F_{60\%}$. (Rationale: This scenario provides a likely lower bound on $F_{ABC}$ that still allows future harvest rates to be adjusted downward when stocks fall below reference levels.)

*Scenario 5*: In all future years, *F* is set equal to zero. (Rationale: In extreme cases, TAC may be set at a level close to zero.)

Two other scenarios are needed to satisfy the MSFCMA's requirement to determine whether a stock is currently in an overfished condition or is approaching an overfished condition. These two scenarios are as follow (for Tier 3 stocks, the MSY level is defined as $B_{35\%}$):

*Scenario 6*: In all future years, *F* is set equal to $F_{OFL}$. (Rationale: This scenario determines whether a stock is overfished. If the stock is 1) above its MSY level in 2011 or 2) above 1/2 of its MSY level in 2011 and expected to be above its MSY level in 2021 under this scenario, then the stock is not overfished.)

*Scenario 7*: In 2012 and 2013, *F* is set equal to *max* $F_{ABC}$, and in all subsequent years, *F* is set equal to $F_{OFL}$. (Rationale: This scenario determines whether a stock is approaching an overfished condition. If the stock is expected to be above its MSY level in 2024 under this scenario, then the stock is not approaching an overfished condition.)

## Overview of "Stock Assessment" Section

The current status of individual groundfish stocks managed under the FMP is summarized in this section. Plan Team recommendations for 2013 and 2014 ABCs and OFLs are summarized in Tables 1, 5, and 6.

The sum of the recommended ABCs for 2013 and 2014 are 2.64 million t and 2.70 million t, respectively. These compare with the sums of the 2012 ABCs (2.51 million t) and 2011 ABCs (2.53 million t), indicating relative stability, following declines in 2009 and 2010.

Overall, the status of the stocks continues to appear favorable (Figure 3). In fact, nearly all stocks are above $B_{MSY}$ or the $B_{MSY}$ proxy of $B_{35\%}$. The abundances of EBS pollock; Pacific cod; sablefish; all rockfishes managed under Tier 3; and all flatfishes managed under Tiers 1 or 3 are projected to be above the $B_{MSY}$ or the $B_{MSY}$ proxy of $B_{35\%}$ in 2013. The abundance of two stocks is projected to be below $B_{35\%}$ for 2013: AI pollock by about 2 percent, and Greenland turbot by about 44 percent. The abundance of two stocks is projected to be below $B_{40\%}$ for 2013: Sablefish by about 9 percent, and Atka mackerel by about 7 percent.

The sum of the biomasses for 2013 listed in Table 5 (18.4 million t) is 5 percent less than total biomasses reported for 2012 (19.3 million t), following a six percent decline in total biomasses as reported in 2012 and 2011 (20.6 million t). Pollock and Pacific cod biomasses were fairly flat at increased levels, after a period of decline. Pollock biomass was 8.34 million t for 2012, compared with 8.14 million t for 2013. Pacific cod biomass was 1.62 million t for 2012, compared with 1.51 million t for 2013. Flatfish are generally increasing. Due to recent high recruitments however biomass of Greenland turbot is increasing from 69,000 t in 2012 to 81,000 t in 2013, but is still much lower (16 percent) than its historic high of 494,000 t in 1972. Biomass of Atka mackerel for 2013 is estimated at 289,000 t, down 29 percent from 2012.

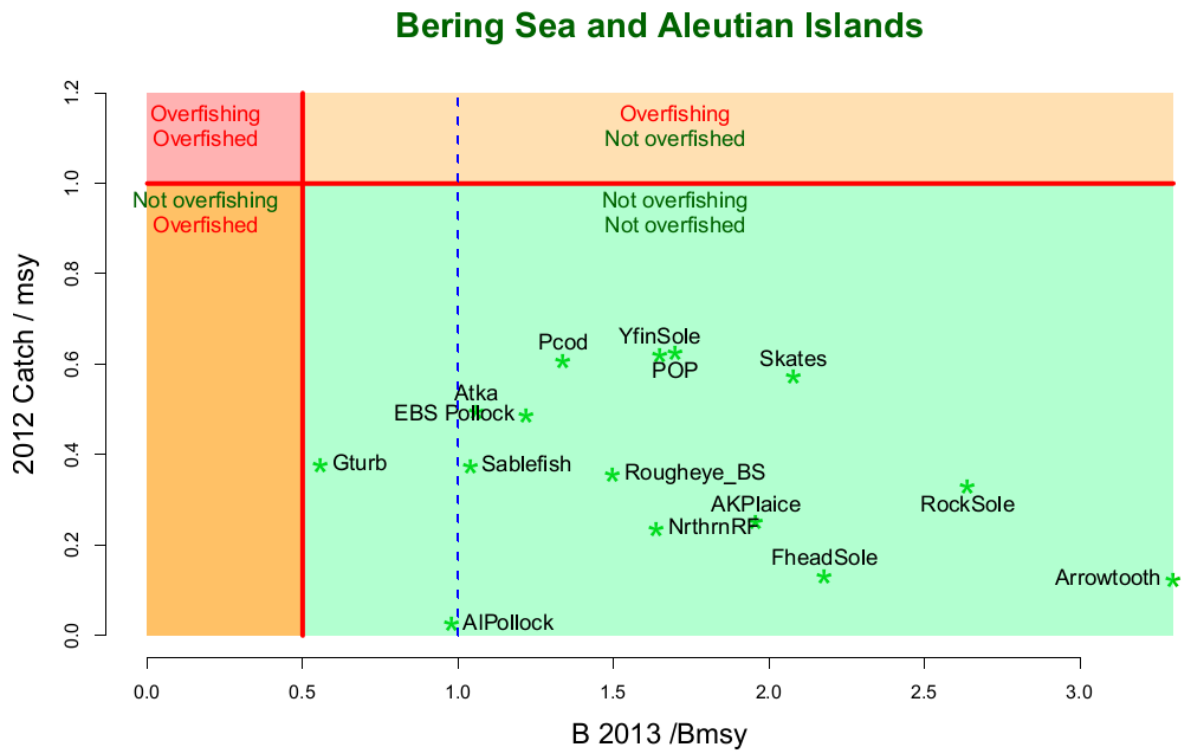


Figure 3. Summary status of age-structured BSAI species as measured by 2012 catch level relative to OFL (vertical axis) and projected 2013 spawning biomass relative to $B_{MSY}$.

## Summary and Use of Terms

Stock status is summarized and OFL and ABC recommendations are presented on a stock-by-stock basis in the remainder of this section, with the following conventions observed:

"Fishing mortality rate" refers to the full-selection F (i.e., the rate that applies to fish of fully selected sizes or ages), except in the cases of stocks managed under Tier 1 (EBS pollock, yellowfin sole, and northern rock sole). For these stocks, the fishing mortality rate consists of the ratio between catch (in biomass) and biomass at the start of the year. EBS pollock uses "fishable biomass" whereas yellowfin sole and northern rock sole use age 6+ biomass for this calculation.

"Projected age+ biomass" refers to the total biomass of all cohorts of ages greater than or equal to some minimum age, as projected for January 1 of the coming year. The minimum age varies from species to species. When possible, the minimum age corresponds to the age of recruitment listed in the respective stock assessment. Otherwise, the minimum age corresponds to the minimum age included in the assessment model, or to some other early age traditionally used for a particular species. When a biomass estimate from the trawl survey is used as a proxy for projected age+ biomass, the minimum age is equated with the age of recruitment, even though the survey may not select that age fully and undoubtedly selects fish of younger ages to some extent.

Projected ABC, OFL, and biomass levels are typically reported to three significant digits, except when quoting a Council-approved value with more than three significant digits or when a stock-specific ABC is apportioned among areas on a percentage basis, in which case four significant digits may be used if necessary to avoid rounding error. The main exceptions to this rule are the Team's recommended 2013 and 2014 ABCs, which are reported to four significant digits. Fishing mortality rates are typically reported to two significant digits.

The reported ABCs and OFLs for past years correspond to the values approved by the Council. Projected ABCs and OFLs listed for the next two years are the Plan Team's recommendations.

Reported catches are as of November 3, 2012.

## Two-Year OFL and ABC Projections

Proposed and final harvest specifications are adopted annually for a two year period. This requires the Team to provide OFLs and ABCs for the next two years in this cycle (Table 1). The 2013 harvest specifications (from Council recommendations in December 2011) are in place to start the fishery on January 1, 2013, but these will be replaced by final harvest specifications that will be recommended by the Council in December 2012. The final 2013 and 2014 harvest specifications will become effective when final rulemaking occurs in February or March 2013. This process allows the Council to use the most current survey and fishery data in stock assessment models for setting quotas for the next two years, while having no gap in harvest specifications.

The 2014 ABC and OFL values recommended in next year's SAFE report are likely to differ from this year's projections for 2014 because of new (e.g., survey) information that is incorporated into the assessments. In the case of stocks managed under Tier 3, ABC and OFL projections for the second year in the cycle are typically based on the output for Scenarios 1 or 2 from the standard projection model using assumed (best estimates) of actual catch levels. For stocks managed under Tiers 4-6, projections for the second year in the cycle are set equal to the Plan Team's recommended values for the first year in the cycle.

## Ecosystem Considerations

The Ecosystem Assessment provided streamlined Report Cards for both the Bering Sea and Aleutian Islands, 44 indices were updated, and 7 new indices were added. The Plan Teams developed the following synthesis from those report cards.

**Eastern Bering Sea** The Bering Sea had the most extensive cold pool on record in 2012. Earlier predictions of an El Niño have weakened, so initial predictions of warming for 2013 may be more neutral than expected. Total EBS productivity appears favorable, with increases in zooplankton, pelagic foragers (pollock and capelin), and apex predators (driven by Pacific cod biomass increases since 2012). Benthic guilds, as a total group, remain stable. The exception is the continued long-term decline in northern fur seal populations in the Pribilof Islands. Although zooplankton has increased, seabird response has been variable. A noted "Hot Topic" was the failure of commercial king salmon fisheries in the Yukon. The Ecosystem Assessment did not identify broad ecosystem concerns as having potential impacts for reducing EBS groundfish quotas.

**Aleutian Islands** Both limited data and limited synthesis of factors governing the dynamics of the Aleutian Islands has led to clear signals for that area. Groundfish survey biomasses were low in all AI subregions in 2012. However, this was one of the coldest years on record in the Aleutian Islands, and it is not clear whether these decreased survey results were due to lower abundance or decreased catchability due to cold-water induced behavioral changes. Rockfish abundance, especially for POP, has increased. Abundances of planktivorous birds are about average (but had been declining). Steller sea lion pup counts remain low.

Seabird bycatch was also reported. No short-tailed albatross were caught in 2012. Overall, 2011 seabird bycatch in the longline fishery were 30 percent above the 2007-2010 average, with bycatch increases in fulmars (from 2,000 to 6,000 birds), gulls (1,000 to 2,000), and black-footed albatross; but fewer shearwaters were caught.

## Economic Summary of the BSAI Commercial Groundfish Fisheries in 2010-11

The domestic groundfish fishery off Alaska is the largest fishery by volume in the U.S. With a total catch of 2.07t, a retained catch of 1.99 million t, and an ex-vessel value of $992 million in 2011, it accounted for 55.4% of the weight and 18.1% of the ex-vessel value of total U.S. domestic landings as reported in Fisheries of the United States, 2010. The ex-vessel value of all Alaska domestic fish and shellfish catch, including the imputed value of fish caught almost exclusively by catcher/processors, increased from $1.74 billion in 2010 to $1.87 billion in 2011. The value of 2011 groundfish catch after primary processing was $2.52 billion (F.O. B., Alaska). The 2011 total catch increased by 26% and the total value of primary processed catch increased by 34% relative to 2010. The groundfish fisheries accounted for the largest share (44%) of the ex-vessel value of all commercial fisheries off Alaska, while the Pacific salmon (*Oncorhynchus spp*.) fishery was second with $565 million or 30% of the total Alaska ex-vessel value. The value of the shellfish fishery amounted to $266 million or 14% of the total for Alaska and exceeded the value of Pacific halibut (*Hippoglossus stenolepis*) with $205 million or 11% of the total for Alaska (Figure 4).

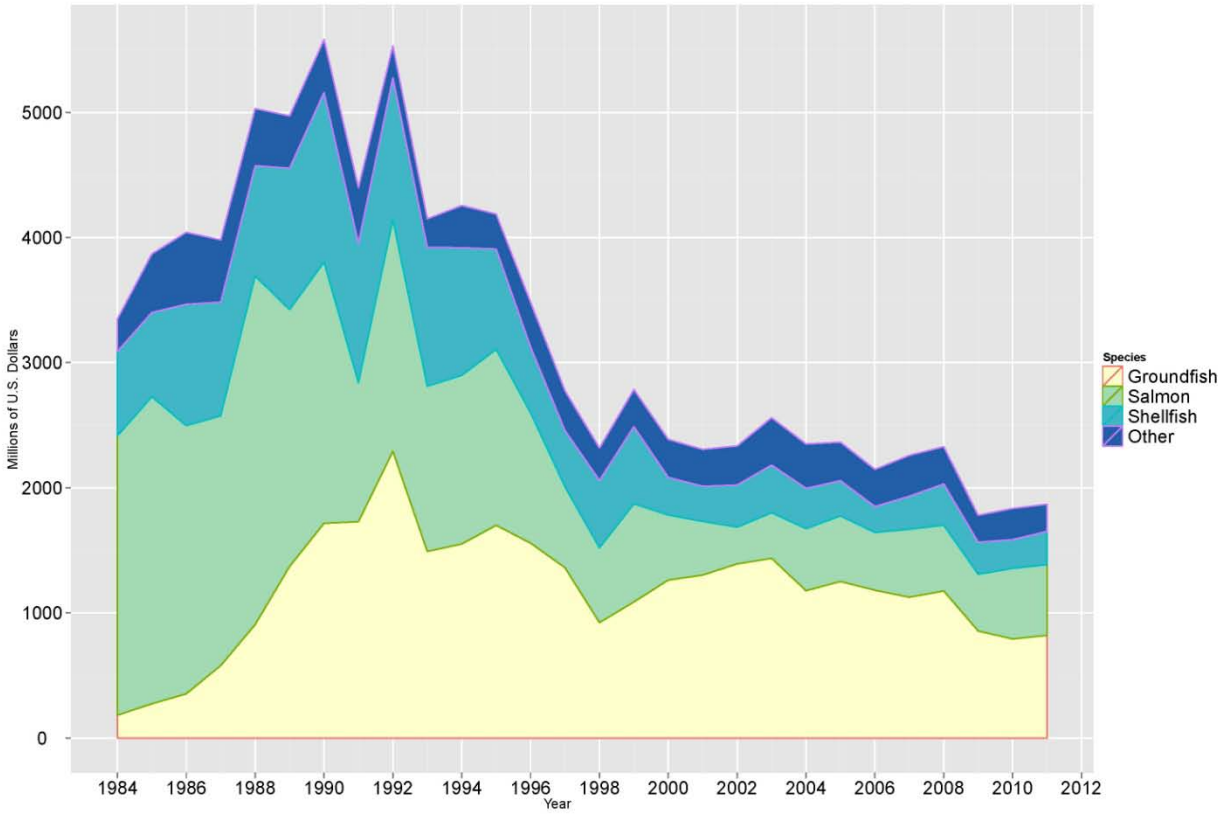


Figure 4. Real ex-vessel value of the domestic fish and shellfish catch off Alaska (GOA and BSAI) by species group, 1984-2011 (base year = 2011).

The Economic SAFE report contains detailed information about economic aspects of the fishery, including figures and tables, market profiles for the most commercially valuable species, a summary of the relevant research being undertaken by the Economic and Social Sciences Research Program (ESSRP) at the Alaska Fisheries Science Center (AFSC) and a list of recent publications by ESSRP analysts. The figures and tables in the report provide estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, the ex-vessel value of the groundfish catch, the ex-vessel value of the catch in other Alaska fisheries, the gross product value (F.O.B. Alaska) of the resulting groundfish seafood products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, vessel activity, and employment on at-sea processors. Generally, the data cover 2006 through 2011, but limited catch and ex-vessel value data are reported for earlier years in order to illustrate the rapid development of the domestic groundfish fishery in the 1980s and to provide a more complete historical perspective on catch.

In addition, the Economic SAFE Report contains links to data on some of the external factors that impact the economic status of the fisheries. Such factors include foreign exchange rates, the prices and price indices of products that compete with products from these fisheries, domestic per capita consumption of seafood products, and fishery imports.

The Economic SAFE Report also updates the set of market profiles for pollock, Pacific cod, sablefish, and flatfish published in the last four reports. These analyses discuss the relatively recent states of the markets for these species in terms of pricing, volume, supply and demand. Trade patterns and market share are also discussed.

This is the second year in which the Economic SAFE Report has added a new section that analyzes economic performance of the groundfish fisheries using indices. These indices are created for different sectors of the North Pacific, and relate changes in value, price, and quantity across species, product and gear types to aggregate changes in the market. The tables from this and past Economic SAFE reports are available online at http://www.afsc.noaa.gov/REFM/Socioeconomics/documents.php.

### A Decomposition of the Change in First-Wholesale Revenues from 2010-11 in the BSAI Area

The following brief analysis summarizes the overall changes that have occurred in the quantity produced, value, and revenue generated from BSAI groundfish. The 2012 Economic SAFE Report provides the ex-vessel value of Alaska groundfish in the BSAI, which grew from approximately $492 million in 2010 to approximately $758 million in 2011, an increase of 54% (Figure 5), first-wholesale revenues from the processing and production of Alaska groundfish in the BSAI area grew from approximately $1.6 billion in 2010 to $2.1 billion in 2011, an increase of 34.5% (Figure 6). During that same time-period, the total quantity of groundfish products from the BSAI increased by 9.3 % from 625,000 t to 791,000 t, an increase of 166,000 t. Overall, first-wholesale revenues from Alaska groundfish fisheries increased by 34.0% in 2011, relative to 2010 levels.

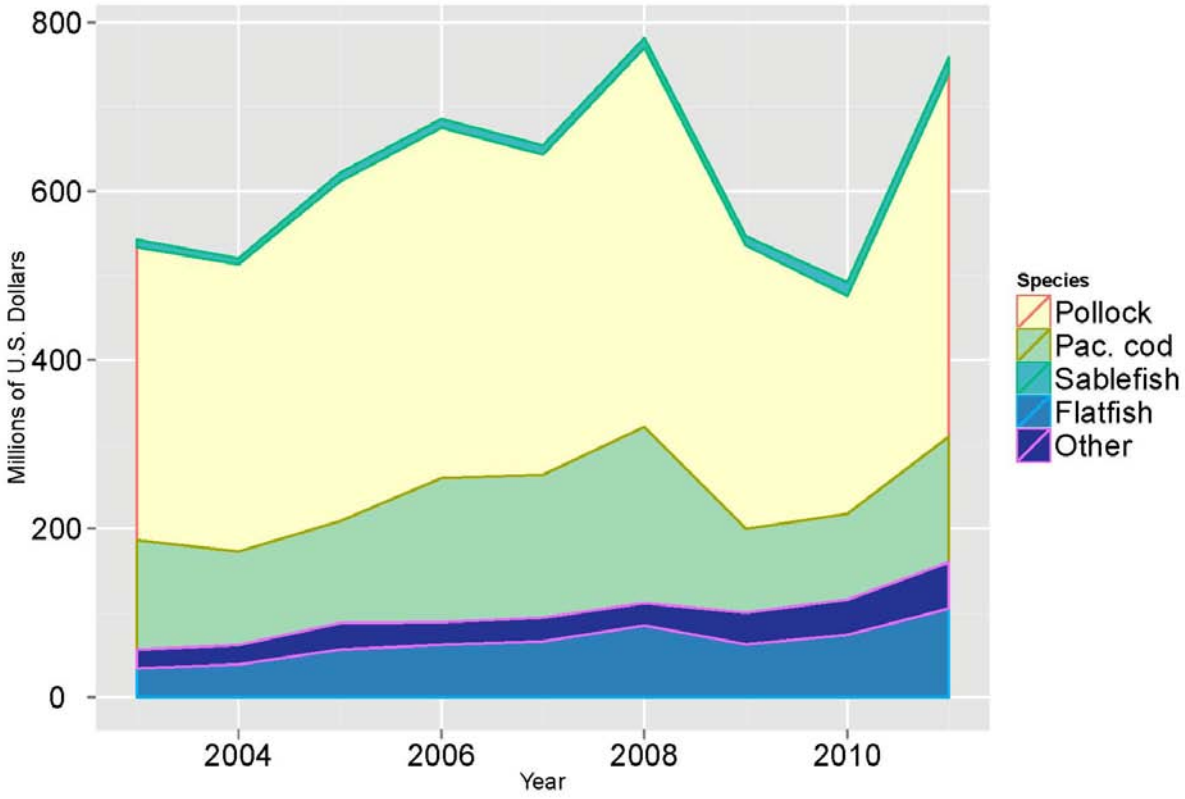


Figure 5. Real ex-vessel value of the groundfish catch in the domestic commercial fisheries in the BSAI area by species, 2003-2011 (base year = 2011).

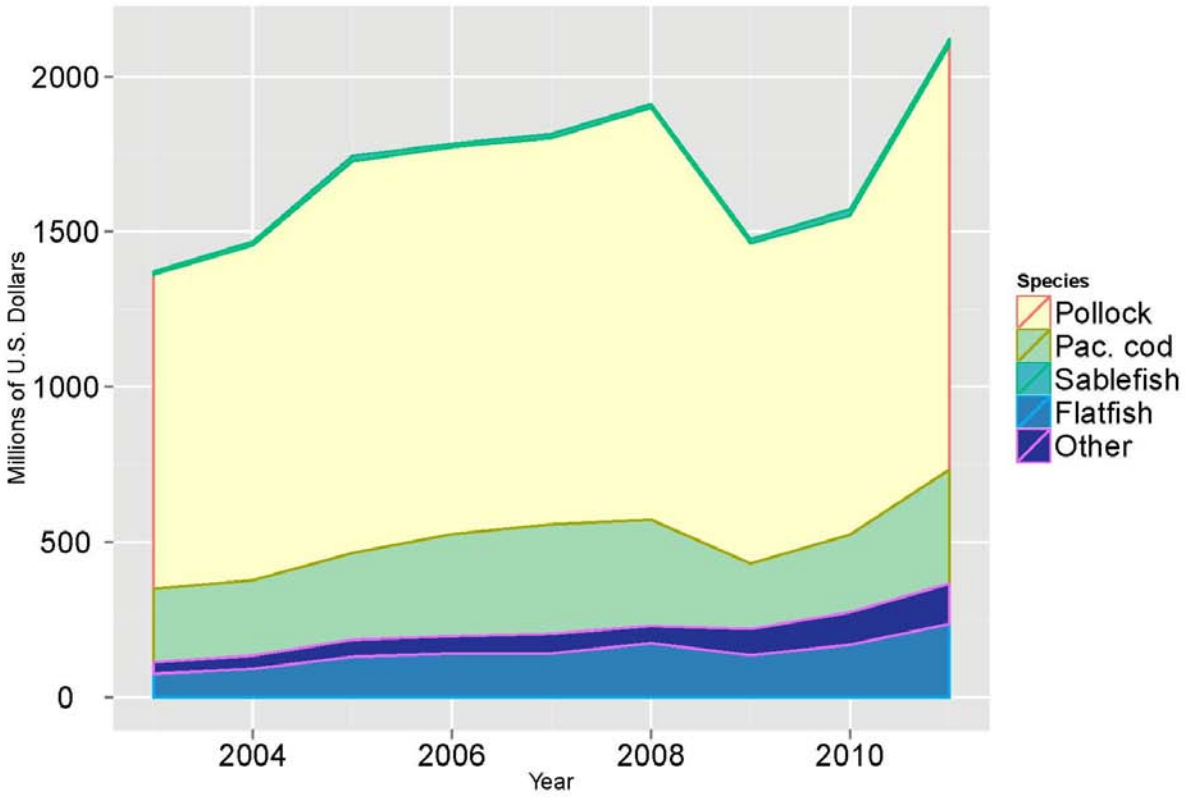


Figure 6. Real gross product value of the groundfish catch in the BSAI area by species, 2003-2011 (base year = 2011).

By species, a positive quantity effect of $391 million for pollock dominated results of the BSAI first-wholesale revenue decomposition for 2010-11 (Figure 7). Positive price and quantity effects for cod, and flatfish, contributed another $118 million, and $63 million, respectively, to the change in first-wholesale revenues for the BSAI area from 2010-11.

The fillet product group exhibited the largest positive quantity effect, $201 million, which was offset slightly by a negative price effect. A quantity effect of $138 million for the surimi product group was partially offset by a price effect of -$77.5 million. A relatively modest quantity effect of $80 million for the whole head & gut product group was reinforced by a large price effect of $124 million, giving this group the largest net effect in the BSAI first-wholesale revenue decomposition for 2010-11.

In summary, first-wholesale revenues from the BSAI groundfish fisheries increased by $543 million from 2010-11. This increase was dominated by a large quantity effect for pollock. In comparison, first-wholesale revenues increased by $97 million from 2010-11 in the GOA, where price effects for cod and sablefish were the largest contributors.

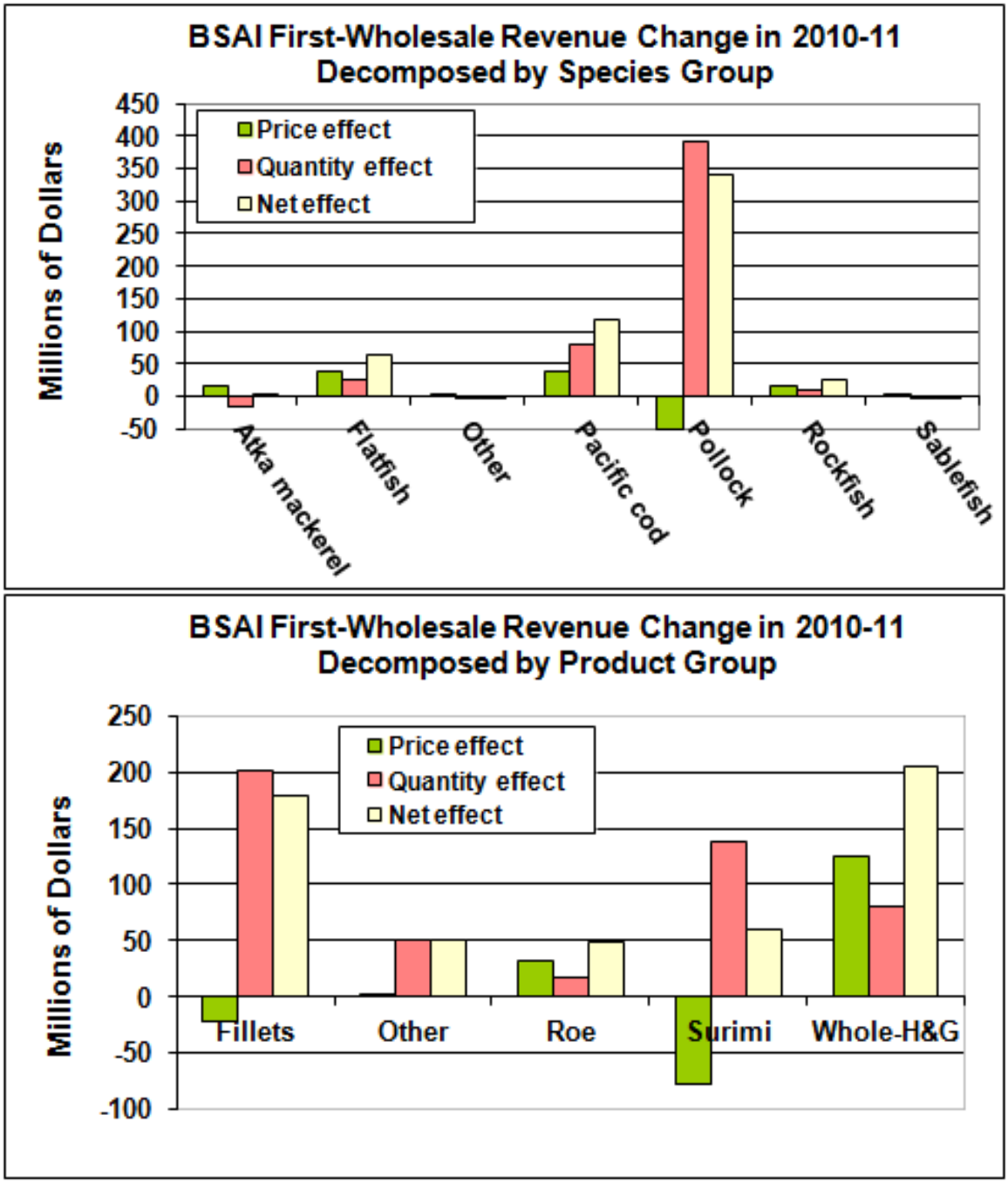


Figure 7. Decomposition of the change in first-wholesale revenues from 2010-11 in the BSAI area. The first decomposition is by the species groups used in the Economic SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the change in the first-wholesale price index (current dollars per metric ton) for each group. The quantity effect refers to the change in revenues due to the change in production (in metric tons) for each group. The net effect is the sum of price and quantity effects.

# Stock Status Summaries

## 1. Walleye Pollock

Status and catch specifications (t) of walleye pollock in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The age grouping is 3+ for eastern Bering Sea, 2+ for the Aleutian Islands and the survey biomass for Bogoslof, as reported in the respective assessments. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| Eastern Bering Sea | 2011 | 9,620,000 | 2,450,000 | 1,270,000 | 1,252,000 | 1,199,243 |
| | 2012 | 8,340,000 | 2,470,000 | 1,220,000 | 1,186,000 | 1,202,560 |
| | 2013 | 8,140,000 | 2,550,000 | 1,375,000 | n/a | n/a |
| | 2014 | 8,080,000 | 2,730,000 | 1,430,000 | n/a | n/a |
| Aleutian Islands | 2011 | 298,000 | 44,500 | 36,700 | 19,000 | 1,208 |
| | 2012 | 251,000 | 39,600 | 32,500 | 19,000 | 972 |
| | 2013 | 266,000 | 45,600 | 37,300 | n/a | n/a |
| | 2014 | 293,000 | 48,600 | 39,800 | n/a | n/a |
| Bogoslof | 2011 | 110,000 | 22,000 | 156 | 150 | 140 |
| | 2012 | 110,000 | 22,000 | 16,500 | 500 | 79 |
| | 2013 | 67,100 | 13,400 | 10,100 | n/a | n/a |
| | 2014 | 67,100 | 13,400 | 10,100 | n/a | n/a |

### Eastern Bering Sea

*Changes from previous assessment*

New data in this year's assessment include the following:

- 2012 summer bottom trawl survey abundance at age
- 2012 summer acoustic-trawl survey abundance at age, estimated using age samples primarily from the bottom trawl survey
- Finalized catch at age and average weight at age from the 2011 fishery
- Preliminary 2012 fishery catch at age, estimated using bottom trawl survey age-length keys
- Updated total catch, including preliminary value for 2012

There were no changes in the assessment model.

*Spawning biomass and stock status trends*

Spawning biomass in 2008 was at the lowest level since 1980, but has increased by 44 percent since then, with a further increase projected for next year. The 2008 low was the result of extremely poor recruitments from the 2002-2005 year classes. Recent and projected increases are fueled by strong recruitments from the 2006 and 2008 year classes along with reductions in catch from 2008-2010 to well below the historical average. Spawning biomass is projected to be 22 percent and 19 percent above $B_{MSY}$ in 2013 and 2014, respectively.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that EBS pollock qualifies for management under Tier 1 because there are reliable estimates of $B_{MSY}$ and the probability density function for $F_{MSY}$. The Plan Team concurs with the assessment authors' conclusion that the Tier 1 reference points continue to be reliably estimated.

The updated estimate of $B_{MSY}$ from the present assessment is 2.11 million t, up 4 percent from last year's estimate of 2.03 million t. Projected spawning biomass for 2013 is 2.58 million t, placing EBS walleye pollock in sub-tier "a" of Tier 1. As in recent assessments, the maximum permissible ABC harvest rate was based on the ratio between MSY and the equilibrium biomass corresponding to MSY. The harmonic mean of this ratio from the present assessment is 0.491, down 8 percent from last year's value of 0.533. The harvest ratio of 0.491 is multiplied by the geometric mean of the projected fishable biomass for 2013 (4.69 million t) to obtain the maximum permissible ABC for 2013, which is 2.31 million t, up 5 percent and down 9 percent from the maximum permissible ABCs for 2012 and 2013 projected in last year's assessment.

However, as with other recent EBS pollock assessments, the authors recommend setting ABCs well below the maximum permissible levels. They list 10 reasons for doing so in the SAFE chapter.

To aid in identifying a set of recommended ABC values, the authors provided a "decision table" showing, in probabilistic terms, the outcomes of seven short-term harvest policies with respect to 12 decision metrics, including various measures related to spawning biomass, population age structure, fishing effort and mortality, and Chinook salmon bycatch.

After considering the results shown in the decision table, the authors recommend setting 2013 ABC at 1.200 million t and 2014 ABC at 1.547 million t. This recommendation results primarily from a harvest policy of achieving a 50% (approximate) probability that spawning biomass will return to the long-term average in five years. The authors' recommended 2013 ABC is almost identical to the 2012 ABC. The 2012 ABC was based on a policy of keeping fishing mortality constant at the most recent 5-year average.

The Team agreed that the authors had provided compelling reasons to set the 2013-2014 ABCs below the maximum permissible levels. In particular: 1) the decision table shows that catches even at a 2 million t level (well below the maximum permissible ABC) would result in a significant probability of exceeding FMSY; 2) the estimated strength of the 2006 year class is reduced in the current assessment (although it is still estimated to be well above average), thereby increasing the extent to which the stock and fishery are dependent on a single year class (2008); 3) the CV of the very strong 2008 year class is large relative to earlier year classes; and 4) past experience indicates that model estimates of recent year classes tend to decrease over time.

However, the Team was not prepared to adopt the authors' recommended policy of basing ABC on the probability of spawning biomass equaling the long-term average in five years. While such a policy would result in reasonable ABCs for 2013-2014, the Team was concerned that the policy might not be robust in the long term. Instead, the Team recommends retaining the current policy of keeping fishing mortality constant at the most recent 5-year average (0.38). This policy results in ABCs of 1.375 million t for 2013 and 1.430 million t for 2014.

The OFL harvest ratio under Tier 1a is 0.543, the arithmetic mean of the ratio between MSY and the equilibrium fishable biomass corresponding to MSY. The product of this ratio and the geometric mean of the projected fishable biomass for 2013 gives the OFL for 2013, which is 2.55 million t. The current projection for OFL in 2014 given a 2013 catch equal to the Team's recommended ABC is 2.73 million t.

### *Status determination*

The walleye pollock stock in the EBS is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## Aleutian Islands

### *Changes from previous assessment*

The new data in the model consist of updated catch information from 1978 through 2012 and inclusion of the 2012 Aleutian Islands bottom trawl survey. There were no changes in the assessment methodology. This year's model estimate of natural mortality was 0.18, down from 0.19 last year.

*Spawning biomass and stock status trends*

This year's assessment estimates that spawning biomass reached a minimum level of about $B_{23\%}$ in 1999 and then has generally increased to about $B_{34\%}$ at present. The increase in spawning biomass since 1999 has resulted more from a dramatic decrease in harvest than from good recruitment, as there have been no above-average year classes spawned since 1989. Spawning biomass for 2013 is projected to be 85,200 t.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that this stock qualifies for management under Tier 3. The Plan Team concurs and supports continued use of last year's model for evaluating stock status and recommending ABC. The model estimates $B_{40\%}$ at a value of 99,800 t, placing the AI pollock stock in sub-tier "b" of Tier 3. The model estimates the values of $F_{35\%}$ as 0.42 and $F_{40\%}$ as 0.33. Under Tier 3b, with the adjusted value of $F_{40\%}$=0.27, the maximum permissible ABC is 37,300 t for 2013. The Plan Team recommends setting 2013 ABC at this level. Following the Tier 3b formula with the adjusted value of $F_{35\%}$=0.34, OFL for 2013 is 45,600 t. Given a 2013 catch of 19,000 t, the maximum permissible ABC would be 33,800 for 2014 and the projected OFL would be 41,400 t. If the 2013 catch is only 1,610 t (i.e., equal to the five year average), the 2014 maximum permissible ABC would be 39,800 t and the 2014 OFL would be 48,600 t. The Plan Team recommends setting 2014 ABC and OFL at the latter levels.

*Status determination*

The walleye pollock stock in the Aleutian Islands is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## Bogoslof

*Changes from previous assessment*

The 2012 Bogoslof pollock acoustic-trawl survey resulted in the lowest estimate of biomass (67,100 t) in the region since the survey began in 1988.

*Spawning biomass and stock status trends*

Survey biomass estimates since 2000 have all been lower than estimates prior to 2000, ranging from a low of 67,100 t in 2012 to a high of 301,000 t in 2000.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that this stock qualifies for management under Tier 5. The maximum permissible ABC value for 2013 would be 10,100 t (assuming M = 0.2 and $F_{ABC}$ = 0.75 x M = 0.15): ABC = $B_{2012}$ x M x 0.75 = 67,100 x 0.2 x 0.75 = 10,100 t. The projected ABC for 2014 is the same.

Following the Tier 5 formula with *M*=0.20, OFL for 2013 is 13,400 t. The OFL for 2014 is the same.

*Status determination*

The walleye pollock stock in the Bogoslof district is not being subjected to overfishing. It is not possible to determine whether this stock is overfished or whether it is approaching an overfished condition because it is managed under Tier 5.

## 2. Pacific cod

Status and catch specifications (t) of Pacific cod in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 3+ biomass | OFL | ABC | TAC* | Catch |
|---|---|---|---|---|---|---|
| BS/AI | 2011 | 1,560,000 | 272,000 | 235,000 | 227,950 | 219,866 |
| | 2012 | 1,620,000 | 369,000 | 314,000 | 275,000 | 223,939 |
| | 2013 | 1,510,000 | 359,000 | 307,000 | n/a | n/a |
| | 2014 | 1,670,000 | 379,000 | 323,000 | n/a | n/a |

*The Council sets the Federal TAC to account for the State of Alaska Aleutian Islands Guideline Harvest Level fishery that is set equal to 3 percent of the BSAI ABC. Catch only includes that which accrues to the Federal TAC.

### *Changes in assessment data*

All survey and commercial data series on CPUE, catch at age, and catch at length were updated. The 2012 Bering Sea trawl survey biomass estimate was almost the same as in 2011, while the estimate of abundance in number was up by 18%. The survey biomass estimate has increased by more than 100% since 2005.

### *Change in assessment methods*

As in the last several years, a number of alternative candidate models were considered at Team/SSC meetings in May/June and September/October, but in November the winning candidate was the incumbent, namely last year's base model (Model 1), so there were no changes in assessment methods. The author has developed an exploratory model (Model 4) that has some attractive features (better modeling of weight at length, length-specific survey selectivity), but the author believes it needs more work. It will be brought forward again next year.

At present the assessment is done for the eastern Bering Sea (EBS) and the EBS abundance estimate is expanded to the entire Bering Sea/Aleutian Islands region (BSAI) according to a survey-based estimate of the proportion of the total located in the Aleutians (presently 7%). A single OFL, ABC, and TAC are then set for the entire region. The Team and the SSC have recommended developing a separate age-structured assessment for the AI. The assessment author presented preliminary versions this fall of an AI model, which tended to produce estimates of ABC substantially lower than recent catches. The SSC has given notice that it will adopt a separate AI model for setting OFL and ABC in the Aleutians when model development is complete, possibly as soon as next year for 2014 specifications.

### *Tier determination/ Plan Team discussion and resulting ABC and OFL recommendations*

$B_{40\%}$ for this stock is estimated to be 358,000 t and projected spawning biomass in 2013 according to Model 1 is 422,000 t, so this stock is assigned to Tier 3a. There remains some concern about the fixed value of trawl survey catchability used in the assessment, and the retrospective behavior reported this year was not good, but neither the author nor the Team saw any compelling reason to recommend OFL or ABC values lower than prescribed by the standard control rule.

### *Status determination*

Pacific cod is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

### *Spawning biomass and stock status trends*

Recent catches have been well below OFL. The 2006, 2008, and 2010 year classes appear to be strong, and stock abundance is expected to increase in the near term.

### *Ecosystem considerations*

No special features were identified that would require adjustments to the recommended ABCs and reference points.

*Area apportionment*

The stock assessment is done for the EBS and the abundance estimates are then expanded to the Aleutians by the ratio of survey abundance estimates. Present Aleutian biomass is estimated to be 7% of EBS abundance. A single ABC and OFL are set for the entire region. It is expected that separate ABC and OFL values will be set for the Aleutians in the near future.

## 3. Sablefish

Status and catch specifications (t) of sablefish in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 4+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| Bering Sea | 2011 | 37,000 | 3,360 | 2,850 | 2,850 | 695 |
| | 2012 | 30,000 | 2,640 | 2,230 | 2,230 | 717 |
| | 2013 | 19,000 | 1,870 | 1,580 | n/a | n/a |
| | 2014 | 19,000 | 1,760 | 1,480 | n/a | n/a |
| Aleutian Islands | 2011 | 25,000 | 2,250 | 1,900 | 1,900 | 1,019 |
| | 2012 | 26,000 | 2,430 | 2,050 | 2,050 | 1,180 |
| | 2013 | 26,000 | 2,530 | 2,140 | n/a | n/a |
| | 2014 | 28,000 | 2,370 | 2,010 | n/a | n/a |

*Changes from previous assessment*

The assessment model incorporates the following new data into the model:

- relative abundance and length data from the 2012 longline survey
- relative abundance and length data from the 2011 longline and trawl fisheries
- age data from the 2011 longline survey and 2011 fixed gear fishery
- updated 2011 catch and estimated 2012 catch.

There were no model changes.

*Assessment results*

The 2011 fishery abundance index was flat from 2010 to 2011 (the 2012 data are not available yet). The longline survey abundance index decreased 21% from 2011 to 2012 following an 18% increase from 2008 to 2011. Spawning biomass is projected to decrease from 2013to 2017, and then stabilize

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

Sablefish are managed under Tier 3 of NPFMC harvest rules. Reference points are calculated using recruitments from 1979-2011. The updated point estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ from this assessment are 106,506 t (combined across the EBS, AI, and GOA), 0.095, and 0.113, respectively. Projected female spawning biomass (combined areas) for 2013 is 97,193 t (91% of $B_{40\%}$), placing sablefish in sub-tier "b" of Tier 3. The maximum permissible value of $F_{ABC}$ under Tier 3b is 0.086, which translates into a 2013 ABC (combined areas) of 16,230 t. The OFL fishing mortality rate is 0.102 which translates into a 2013 OFL (combined areas) of 19,180 t.

*Area allocations*

Using established procedures for determining area apportionments, the OFL and ABC for Bering Sea sablefish are 1,870 t and 1,580 t in 2013, and 1,760 t and 1,480 t in 2014. The OFL and ABC for Aleutian Island sablefish are 2,350 t and 2,140 t in 2013, and 2,370 t and 2,010 t in 2014.

*Status determination*

Sablefish is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## 4. Yellowfin sole

Status and catch specifications (t) of yellowfin sole in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 6+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 1,960,000 | 262,000 | 239,000 | 196,000 | 151,167 |
| | 2012 | 1,950,000 | 222,000 | 203,000 | 202,000 | 137,716 |
| | 2013 | 1,960,000 | 220,000 | 206,000 | NA | NA |
| | 2014 | 1,960,000 | 219,000 | 206,000 | NA | NA |

### *Changes from previous assessment*

Changes to the input data for this year's assessment include:

- 2011 fishery age composition.
- 2011 survey age composition.
- 2012 trawl survey biomass point estimate and standard error.
- Estimate of the discarded and retained portions of the 2011 catch.
- Estimate of total catch made through the end of 2012.

### *Changes to the assessment methodology*

No changes to the assessment methodology.

### *Spawning biomass and stock status trends*

The projected female spawning biomass estimate for 2013 is 582,000 t. Projected spawning biomass for 2013 and beyond suggests a leveling off of the generally monotonic decline in spawning biomass that has prevailed since 1994. An upward trend in the population may be expected due to high recruitment from the 2003 year class.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that reliable estimates of $B_{MSY}$ and the probability density function for $F_{MSY}$ exist for this stock. Accordingly, yellowfin sole qualify for management under Tier 1. The estimate of $B_{MSY}$ from the present assessment is 353,000 t. Corresponding to the approach used in recent years, the 1978-2006 stock-recruitment data were used this year to determine the Tier 1 harvest recommendation. This provided a maximum permissible ABC harvest ratio (the harmonic mean of the $F_{MSY}$ harvest ratio) of 0.11. The current value of the OFL harvest ratio (the arithmetic mean of the $F_{MSY}$ ratio) is 0.12. The product of the maximum permissible ABC harvest ratio and the geometric mean of the 2013 biomass estimate produces the author- and Plan Team-recommended 2013 ABC of 206,000 t, and the corresponding product using the OFL harvest ratio produces the 2013 OFL of 220,000 t. For 2014, the corresponding quantities are 206,000 t and 219,000 t, respectively.

### *Status determination*

Yellowfin sole is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

### *Ecosystem Considerations summary*

As in previous years, this assessment contains an ecosystem feature that represents catchability of the EBS shelf trawl survey as an exponential function of average annual bottom temperature.

## 5. Greenland turbot

Status and catch specifications (t) of Greenland turbot in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 1+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| EBS | 2011 | | | 4,590 | 3,500 | 3,111 |
| AI | 2011 | | | 1,550 | 1,550 | 531 |
| BSAI | 2011 | 74,000 | 7,220 | 6,140 | 5,050 | 3,642 |
| EBS | 2012 | | | 7,230 | 6,230 | 2,744 |
| AI | 2012 | | | 2,430 | 2,430 | 1,657 |
| BSAI | 2012 | 76,900 | 11,700 | 9,660 | 8,660 | 4,401 |
| EBS | 2013 | | | 1,610 | n/a | n/a |
| AI | 2013 | | | 450 | n/a | n/a |
| BSAI | 2013 | 81,000 | 2,540 | 2,060 | n/a | n/a |
| EBS | 2014 | | | 2,070 | n/a | n/a |
| AI | 2014 | | | 580 | n/a | n/a |
| BSAI | 2014 | 94,800 | 3,270 | 2,650 | n/a | n/a |

### *Changes from previous assessment*

Changes to the input data for this year's assessment include:

- The pre-2002 slope survey biomass estimates were removed from the data file.
- Abundance estimates from the 2012 slope, shelf, and longline surveys were included.
- Length composition data from the 2012 slope and shelf surveys and the 2009-2012 longline surveys were included.
- Fishery catch and length composition data were updated through 2012.
- Haul-by-haul fishery length composition data were weighted proportionally to catch.

Several changes were made to the assessment model, all of which were either previewed in the preliminary assessment or recommended by the Team/SSC in September/October:

- The weight-at-length relationship was re-estimated.
- A new method was used to weight annual fishery length compositions.
- Several changes were made in the method for estimating recruitment in the early part of the time series.
- A new method for parameterizing sex-specific selectivity curves was used.
- The prior distributions for survey catchability were changed to be as diffuse as possible.

### *Spawning biomass and stock status trends*

The projected 2013 female spawning biomass is 23,500 t. This is a marked (51percent) decrease from the 2012 spawning biomass of 47,700 t due to major revisions in the stock assessment model Spawning biomass is projected to increase slightly in 2014 to 26,500 t. A strong 2008 year class and an especially strong 2009 year class were observed in both the survey and fisheries size composition data. These two year classes are expected to be larger than any other recruitment event since the 1970s and will begin to have an increasing influence on spawning stock biomass starting in 2014.

The changes in the weight at age and selectivity schedules had the net effect of reducing the current biomass estimate while increasing the biomass reference points and decreasing the fishing mortality reference points for this stock. In addition to changes to the assessment model and data, input errors in the 2009-2011 projection models were discovered this year, that resulted in large underestimates of all biomass reference points. The 2012 status of the stock is B21%, much lower than last year's projected status for 2012 of B88%.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC determined that reliable estimates of *B40%*, *F40%*, and *F35%* exist for this stock. Greenland turbot therefore qualifies for management under Tier 3

Updated point estimates of *B40%*, *F40%*, and *F35%* from the present assessment are 47,700 t, 0.25, and 0.31, respectively. Projected spawning biomass for 2013 is 23,500 t. Due to the aforementioned changes, the stock is now in Tier 3b and therefore the ABC and OFL recommendations are further reduced by the descending limb of the control rules. The maximum permissible value of $F_{ABC}$ under this Tier translates into a maximum permissible ABC of 2,060 t for 2013 and 2,660 t for 2014, and the OFLs for 2013 and 2014 under the Tier 3b formula are 2,540 t and 3,270 t, respectively. These are the authors' and Team's ABC and OFL recommendations.

*Status determination*

Greenland turbot is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## 6. Arrowtooth flounder

Status and catch specifications (t) of arrowtooth flounder in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year, except that the 2013 and 2014 values were held constant at the 2012 value. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team and are taken from the 2011 assessment. Catch data are current through November 3, 2012.

| Area | Year | Age 1+ Bio | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 1,120,000 | 186,000 | 153,000 | 25,900 | 20,612 |
| | 2012 | 1,130,000 | 181,000 | 150,000 | 25,000 | 22,227 |
| | 2013 | 1,130,000 | 186,000 | 152,000 | n/a | n/a |
| | 2014 | 1,130,000 | 186,000 | 152,000 | n/a | n/a |

*Changes from previous assessment*

New input data include:

- Biomass estimates and size compositions from the 2012 EBS shelf and slope surveys and the 2012 AI survey.
- Fishery size composition for 2010 and 2011.
- Updated 2011 catch and preliminary 2012.

The authors' assessment model changed from last year due to the use of a new maturity schedule. However, the Team opted not to accept the new model due to technical issues regarding the way that the new maturity parameters were estimated. Estimates from both last year's and this year's assessments are included in the following paragraphs.

*Spawning biomass and stock status trends*

The 2011 stock assessment model resulted in a 2013 age 1+ biomass projection of 1,130,000 t, compared to 1,020,000 t from this year's assessment. The corresponding values for 2013 spawning biomass are 812,000 t (last year's assessment) and 638,000 t (this year's assessment). Although the scales differ between the two assessments, they both show a long-term increasing trend in spawning biomass that is expected to peak in 2013. The 1997-2006 year classes are all above average in both last year's and this year's assessments.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

Because the SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, arrowtooth flounder was assessed for management under Tier 3. The point estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ from last year's assessment were 281,000 t, 0.22, and 0.27, respectively; from this year's assessment, they are 246,000 t, 0.17, and 0.21, respectively. The projected 2013 spawning biomass is far above $B_{40\%}$ in both last year's and this year's assessments, so ABC and OFL recommendations for 2013 were calculated under sub-tier "a" of Tier 3. The authors and Team recommend setting $F_{ABC}$ at the $F_{40\%}$ level, which is the maximum permissible level under Tier 3a. Projected harvesting at the $F_{40\%}$ level in this year's assessment gives 2013 and 2014 ABCs of 111,000 t and 112,000 t, respectively. However, because the Team did not accept the model in this year's assessment, the Team recommends rolling over the current 2013 ABC of 152,000 t (set last year) for 2013 and 2014. Similarly, the 2013 and 2014 OFLs from this year's assessment are 132,000 t and 134,000 t, respectively, but the Team recommends rolling over the current 2013 OFL of 186,000 t (set last year) for 2013 and 2014.

*Status determination*

Arrowtooth flounder is a largely unexploited stock in the BSAI. Arrowtooth flounder was managed separately from Kamchatka flounder for the first time in 2011. Under either last year's or this year's assessment, arrowtooth flounder is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

*Ecosystem Considerations summary*

In contrast to the Gulf of Alaska, arrowtooth flounder is not at the top of the food chain on the EBS shelf. Arrowtooth flounder in the EBS is an occasional prey in the diets of groundfish, being eaten by Pacific cod, walleye pollock, Alaska skates, and sleeper sharks. However, given the large biomass of these species in the EBS overall, these occasionally recorded events translate into considerable total mortality for the arrowtooth flounder population in the EBS ecosystem.

## 7. Kamchatka flounder

Status and catch specifications (t) of Kamchatka flounder in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 1+ Bio | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 129,000 | 23,600 | 17,700 | 17,700 | 9,934 |
| | 2012 | 125,000 | 24,800 | 18,600 | 17,700 | 9,558 |
| | 2013 | 125,000 | 16,300 | 12,200 | n/a | n/a |
| | 2014 | 125,000 | 16,300 | 12,200 | n/a | n/a |

Prior to 2011, this species was a component of the arrowtooth flounder/Kamchatka flounder complex. Due to the development of a targeted fishery on Kamchatka flounder in 2009 and 2010, it was assessed separately beginning in 2010 and split from the former arrowtooth/Kamchatka complex in the 2011 harvest specifications.

### *Changes from previous assessment*

New data include the 2012 AI, EBS shelf, and EBS slope survey biomass estimates. The natural mortality rate of Kamchatka flounder was evaluated from 4 separate methods for this assessment and was re-estimated at a lower value (0.13) than in 2011 (0.20).

### *Spawning biomass and stock status trends*

Because no age-structured model has been developed for Kamchatka flounder, estimates of spawning biomass *per se* are not available. Kamchatka flounder has a widespread distribution along the deeper waters of the BSAI region and is believed to be increasing in abundance, as evidenced by 7-year running averages of survey biomass estimates from the EBS shelf, EBS slope, and AI over the period 2001-2012. The 2013 combined estimate of total biomass from the three surveys is 125,000 t. Exploitation rates estimated for 2008-2010 steadily increased from 5% in 2008, 10% in 2009, to 16% in 2010, but have since declined to 9% in 2012. The estimate of biomass from the three surveys conducted in 2012 is 13% less than in 2011. The lower 2012 biomass combined with the revised natural mortality value, gives a recommended ABC and OFL that is 31% less than the 2011 value.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that the Kamchatka flounder stock qualifies for management under Tier 5. The Tier 5 formula for calculating maximum permissible ABC is: maxABC = 0.75 x $M$ x biomass. The natural mortality rate was estimated at a value of 0.13. Biomass was estimated at a value of 109,000 t by the same method used last year, which consisted of averaging the 7 most recent years of survey biomass estimates from the three survey areas (EBS shelf, EBS slope, and AI) after interpolating for missing values. The recommended 2013 and 2014 OFL is 16,300 t, and the recommended 2013-2014 ABC is 12,200 t.

### *Status Determination*

Kamchatka flounder was managed on its own (i.e., as something other than a constituent stock of the former arrowtooth/Kamchatka complex) for the first time in 2011. The 2011 OFL was 23,600 t and the 2011 catch was 9,934. Therefore, Kamchatka flounder is not being subjected to overfishing. As a Tier 5 stock, it is not possible to determine whether Kamchatka flounder is overfished or whether it is approaching an overfished condition.

### *Ecosystem Considerations*

Kamchatka flounder have rarely been found in the stomachs of other groundfish species in samples collected by the Alaska Fisheries Science Center. Pollock was the most important prey item for all sizes of Kamchatka flounder, ranging from 56 to 86 percent of the total stomach content weight. An examination of diet overlap with arrowtooth flounder indicated that these two congeneric species consume similar prey.

## 8. Northern Rock sole

Status and catch specifications (t) of northern rock sole in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 6+ Bio. | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 1,870,000 | 248,000 | 224,000 | 85,000 | 60,632 |
| | 2012 | 1,860,000 | 231,000 | 208,000 | 87,000 | 75,806 |
| | 2013 | 1,470,000 | 241,000 | 214,000 | n/a | n/a |
| | 2014 | 1,390,000 | 229,000 | 204,000 | n/a | n/a |

### *Changes from previous assessment*

Changes to input data in this analysis include:

- 2011 fishery age composition
- 2011 survey age composition
- 2012 trawl survey biomass estimate
- updated fishery catch and discards for 2011 and 2012

The assessment methodology was unchanged.

### *Spawning biomass and stock status trends*

The stock assessment model estimates a 2013 age 6+ biomass estimate of 1,470,000 t. This is 20% less than the 2013 value projected in last year's assessment. Spawning biomass has been increasing since 2009. If harvest rates remain close to the recent average, northern rock sole stock is expected to continue increasing for the next few years because of recruitment from the 2000-2005 year classes, all of which were stronger than any year class spawned between 1991 and 1999.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that northern rock sole qualifies for management under Tier 1. Spawning biomass for 2013 is projected to be 264% of *BMSY*, placing northern rock sole in sub-tier "a" of Tier 1. In some past years, one difficulty with applying the Tier 1 formulae to rock sole was that the harmonic and arithmetic means of the *FMSY* distribution were extremely close, resulting in little buffer between recommendations of ABC and OFL. This closeness resulted from estimates of *FMSY* that were highly certain. The use of time-varying fishery selectivity, first instituted in the 2010 assessment, increased the buffer between ABC and OFL from a little over 1 percent in the 2009 assessment to >10 percent in this year's assessment.

The Tier 1 2013 ABC harvest recommendation is 214,400 t ($F_{ABC}$ = 0.15) and the 2013 OFL is 240,600 t ($F_{OFL}$ = 0.16). The 2014 ABC and OFL values are 203,800 t and 240,600 t, respectively.

This is a stable fishery that lightly exploits the stock because it is constrained by PSC limits and the BSAI optimum yield limit. Usually the fishery only takes a small portion of the northern rock sole ABC (the average catch/biomass ratio is about 4 percent).

### *Status determination*

Northern rock sole is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## 9. Flathead sole

Status and catch specifications (t) of flathead sole in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 3+ Bio. | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 791,000 | 83,300 | 69,300 | 41,500 | 13,556 |
| | 2012 | 811,000 | 84,500 | 70,400 | 34,100 | 11,012 |
| | 2013 | 748,000 | 81,500 | 67,900 | n/a | n/a |
| | 2014 | 748,000 | 80,100 | 66,700 | n/a | n/a |

### *Changes from previous assessment*

New data in this year's assessment include the following:

- The 2011 fishery catch was updated and preliminary 2012 catch was included.
- Sex-specific size compositions from the 2012 fishery and EBS shelf survey were included, and fishery size compositions from 2011were updated.
- Sex-specific age compositions from the 2010 and 2011 fisheries and the 2011 EBS shelf survey were included.
- The biomass estimate from the 2012 EBS shelf survey was included.
- The mean bottom temperature from the 2012 EBS shelf survey was included.

The preferred model is identical to that selected in last year's assessment.

### *Spawning biomass and stock status trends*

Estimated age 3+ biomass increased from a low of 119,000 t in 1977 to a peak of 958,000 t in 1994, then declined to 780,000 t in 2003, rose briefly to 804,000 t in 2006, and subsequently declined again to 727,000 t in 2012. This was the lowest total biomass since 1987. Estimated female spawning biomass followed a similar trend, although the peak value (318,000 t) occurred in 1997 rather than 1994. Spawning biomass in 2009 (233,000 t) was the lowest since 1991, but has since rebounded somewhat (243,000 t in 2012). These changes in stock biomass are primarily a function of recruitment, as fishing pressure has been relatively light. The 2004-2008 have all been weak, but the 2009 year class may be strong.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, thereby qualifying flathead sole for management under Tier 3. The current values of these reference points are $B_{40\%}$=128,000 t, $F_{40\%}$=0.29, and $F_{35\%}$=0.35. Because projected spawning biomass for 2013 (245,000 t) is above $B_{40\%}$, flathead sole is in sub-tier "a" of Tier 3. The authors and Plan Team recommend setting ABCs for 2013 and 2014 at the maximum permissible values under Tier 3a, which are 67,900 t and 66,700 t, respectively. The 2013 and 2014 OFLs under Tier 3a are 81,500 t and 80,100 t, respectively.

### *Status determination*

Flathead sole is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## 10. Alaska plaice

Status and catch specifications (t) of Alaska plaice in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 3 + Bio | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 780,000 | 79,100 | 65,100 | 16,000 | 23,656 |
| | 2012 | 606,000 | 64,600 | 53,400 | 24,000 | 16,124 |
| | 2013 | 589,000 | 67,000 | 55,200 | n/a | n/a |
| | 2014 | 580,000 | 60,200 | 55,800 | n/a | n/a |

### *Changes from previous assessment*

Changes to the input data included:

- Preliminary 2012 fishery catch and updated 2011 fishery catch
- 2012 shelf survey biomass estimate
- 2012 shelf survey length composition
- 2011 shelf survey age composition
- 2008-2011 fishery length compositions

The assessment methodology was unchanged.

### *Spawning biomass and stock status trends*

Female spawning biomass decreased from 1985 to 1998, and has been relatively stable since then. The shelf survey biomass has been fairly steady since the mid-1980s. The 2001-2002 year classes appear very strong, and the 2004-2005 year classes are estimated to be slightly above average. If recent average fishing mortality rates continue into the future, spawning biomass is projected to be fairly stable for the next few years.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

Reliable estimates of *B40%*, *F40%*, and *F35%* exist for this stock, therefore qualifying it for management under Tier 3a. The updated point estimates are *B40%* = 152,000 t, *F40%* = 0.16, and *F35%* = 0.19. Given that the projected 2012 spawning biomass of 261,000 t exceeds *B40%*, the ABC and OFL recommendations for 2013 were calculated under sub-tier "a" of Tier 3. Projected harvesting at the *F40%* level gives a 2013 ABC of 55,200 t and a 2014 ABC of 55,800 t. The OFL was determined from the Tier 3a formula, which gives a 2013 value of 67,000 t and a 2014 value of 60,200 t.

### *Status determination*

Alaska plaice is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition. There is no targeted fishery for this species as there is no market. The total exploitation rate is quite low, as this species is taken only as incidental catch, which is mostly discarded.

## 11. Other Flatfish complex

Status and catch specifications (t) of other flatfish in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Total Bio. | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 127,000 | 19,500 | 14,500 | 3,000 | 3,176 |
| | 2012 | 111,000 | 17,100 | 12,700 | 3,200 | 3,452 |
| | 2013 | 114,000 | 17,800 | 13,300 | n/a | n/a |
| | 2014 | 114,000 | 17,800 | 13,300 | n/a | n/a |

### *Changes from previous assessment*

Changes to the input data include:

- preliminary 2012 catch and updated 2011 catch
- 2012 EBS shelf and slope and AI trawl survey biomass estimates

The assessment methodology was unchanged.

### *Spawning biomass and stock status trends*

Because this complex is managed under Tier 5, no models are available from which to predict future trends. Starry flounder, rex sole, and butter sole comprise the majority of the fishery catch with a negligible amount of other species caught in recent years. Starry flounder continues to dominate the shelf survey biomass in the EBS and rex sole is the most abundant "other" flatfish in the AI. There is no consistent trend in the survey biomass of EBS butter sole over time. The 1982 butter sole estimate for the Eastern Bering Sea was 182 t compared to the 2012 estimate of 619 t, with values as high as 6,340 t in 1986 and as low as 37 t in 1983 (the median of the absolute value of the relative change from year to year is 59 percent). EBS starry flounder biomass increased from 7,780 t in 1982 to 98,600 t in 2007 and remains at a high level (62,800 t) in 2012. This estimate has fluctuated over time, though there has been an upward trend. Conversely, EBS longhead dab decreased from a one-time high of 104,000 t in 1982 to 9,000 t in 2012. This estimate has fluctuated over time, though less dramatically from 1985 through the present. Habitat and depth preference may affect the apparent changes in abundance. For example, longhead dab are found in inshore waters that are not normally sampled by the bottom trawl survey. Sakhalin sole biomass, which has no pattern in fluctuation, had a high of 1,410 t in 1997 and a low of 30 t in 2007. However, the northern BS survey in 2010 indicated that the primary distribution of this species is north of the standard survey area. Thus, distributional changes (e.g., onshore-offshore or north-south), might affect the survey biomass estimates of "other" flatfish (Table 11.5).

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has classified "other flatfish" as a Tier 5 stock complex with harvest recommendations calculated from estimates of biomass and natural mortality. Natural mortality rates for rex sole (0.17) and Dover sole (0.085) in the GOA SAFE document are used, along with a value of 0.15 for all other species in the complex. Projected harvesting at the 0.75 M level (average $F_{ABC}$ = 0.11), gives a 2013-2014 ABC of 13,300 t for the "other flatfish" complex. The corresponding 2013-2014 OFL (average $F_{OFL}$ = 0.15) is 17,800 t.

Before the implementation of Amendment 80, fishing for this complex was usually closed for trawl gear prior to attainment of TAC because of the bycatch of Pacific halibut, a prohibited species. With the implementation of Amendment 80, a higher TAC for "other" flatfish was assigned for 2008-2010, although it was subsequently decreased for 2011-2012, and catches have remained at a small fraction of ABC throughout these transitions. The 2012 fishery is still open as of this writing.

*Status determination*

This assemblage is not being subjected to overfishing. It is not possible to determine whether this assemblage is overfished or whether it is approaching an overfished condition because it is managed under Tier 5.

## 12. Pacific ocean perch

Status and catch specifications (t) of Pacific ocean perch in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 3+ Bio | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| EBS | 2011 | | | 5,710 | 5,710 | 5,600 |
| Eastern AI | 2011 | | | 5,660 | 5,660 | 5,453 |
| Central AI | 2011 | | | 4,960 | 4,960 | 4,767 |
| Western AI | 2011 | | | 8,370 | 8,370 | 8,182 |
| BSAI | 2011 | 601,000 | 36,300 | 24,700 | 24,700 | 24,002 |
| EBS | 2012 | | | 5,710 | 5,710 | 3,280 |
| Eastern AI | 2012 | | | 5,620 | 5,620 | 5,519 |
| Central AI | 2012 | | | 4,990 | 4,990 | 4,800 |
| Western AI | 2012 | | | 8,380 | 8,380 | 8,238 |
| BSAI | 2012 | 594,000 | 35,000 | 24,700 | 24,700 | 21,837 |
| EBS | 2013 | | | 8,130 | n/a | n/a |
| Eastern AI | 2013 | | | 9,790 | n/a | n/a |
| Central AI | 2013 | | | 6,980 | n/a | n/a |
| Western AI | 2013 | | | 10,200 | n/a | n/a |
| BSAI | 2013 | 663,000 | 41,900 | 35,100 | n/a | n/a |
| EBS | 2014 | | | 7,680 | n/a | n/a |
| Eastern AI | 2014 | | | 9,240 | n/a | n/a |
| Central AI | 2014 | | | 6,590 | n/a | n/a |
| Western AI | 2014 | | | 9,590 | n/a | n/a |
| BSAI | 2014 | 639,000 | 39,500 | 33,100 | n/a | n/a |

*Changes from previous assessment*

Pacific ocean perch (POP) assessments are conducted on a two-year cycle to coincide with planned Aleutian Islands surveys. The 2012 assessment is a full assessment because the Aleutian Islands survey was conducted this year.

New data in the 2012 assessment included:

- The harvest time series was updated.
- The 2012 AI survey biomass estimate and length composition.
- The 2009 and 2011 fishery age compositions.
- The 2010 fishery length composition.
- The maturity curve was estimated based on recent data from the Aleutian Islands.
- The biased fishery ages from 1977-1980 were removed from the model and replaced with fishery lengths. The original age-reading data required to recompute the biased age matrix with a different plus group was not readily available to the authors.

Several changes were made to the assessment methodology:

- A sensitivity analysis was conducted to evaluate how the age plus group affects the fit to various model components. Based on this analysis, the age plus group was increased from 25 years to 40 years
- The age error matrix was recomputed to better account for aging error within the plus group.

*Spawning biomass and stock status trends*

The survey biomass estimates in the Aleutian Islands and the Bering Sea Slope both were high in 2012. Estimated age 3+ biomass for 2013 is up substantially from the 2013 estimate projected a year ago. Spawning biomass is projected to be 274,000 t in 2013 and decline slightly to 258,000 t in 2014.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, thereby qualifying Pacific ocean perch for management under Tier 3. The current estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ are 184,000 t, 0.063, and 0.076 respectively. Spawning biomass for 2013 (274,000 t) is projected to exceed $B_{40\%}$, thereby placing POP in sub-tier "a" of Tier 3. The 2013 and 2014 catches associated with the $F_{40\%}$ level of 0.063 are 35,100 t and 33,100 t, respectively. In 2010, the Plan Team recommended an adjusted ABC approach until the next Aleutian Islands survey. The 2012 AI survey was nearly as large as the 2010 survey so now the Plan Team endorses using maximum permissible ABC. The 2013 and 2014 OFLs are 41,900 t and 39,500 t.

*Area apportionment*

The Team agrees with the author's recommendation that ABCs be set regionally based on the proportions in combined survey biomass as follows (values are for 2013): BS = 8,130 t, Eastern Aleutians (Area 541) = 9,790 t, Central Aleutians (Area 542) = 6,980 t, and Western Aleutians (Area 543) = 10,200 t. The recommended OFL is not regionally apportioned.

*Status determination*

Pacific ocean perch is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## 13. Northern rockfish

Status and catch specifications (t) of northern rockfish in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 3+ Bio. | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 201,000 | 10,600 | 8,670 | 4,000 | 2,764 |
| | 2012 | 202,000 | 10,500 | 8,610 | 4,700 | 2,474 |
| | 2013 | 195,000 | 12,200 | 9,850 | n/a | n/a |
| | 2014 | 196,000 | 12,000 | 9,320 | n/a | n/a |

*Changes from previous assessment*

Northern rockfish assessments are conducted on a two-year cycle to coincide with planned Aleutian Islands surveys. The 2012 assessment is a full assessment because the Aleutian Islands survey was conducted this year.

New data included in the 2012 assessment included:

- Catch updated through October 6, 2012.
- The biomass estimate and length composition from the 2012 AI survey.
- The 2008, 2009, and 2011 fishery age compositions and the 2010 fishery length composition.
- The maturity curve was estimated based on recent data from the Aleutian Islands.

Several changes were made to the assessment methodology:

- A sensitivity analysis was conducted to evaluate how the age and length plus groups affect the fit to various model components. Based on this analysis, the age and length plus groups were increased to 40 years and 38 cm (previous values were 23 years and 34 cm).
- The age error matrix was recomputed to better account for aging error within the plus group.

*Spawning biomass and stock status trends*

Age 3+ biomass has been on an upward trend since 2002. Spawning biomass has been increasing slowly and almost continuously since 1977. Female spawning biomass is projected to be 84,700 t in 2013.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has determined that this stock qualifies for management under Tier 3 due to the availability of reliable estimates for $B_{40\%}$ (59,200 t), $F_{40\%}$ (0.063), and $F_{35\%}$ (0.079). Because the female spawning biomass of 84,700 t is greater than $B_{40\%}$, sub-tier "a" is applicable, with maximum permissible $F_{ABC} = F_{40\%}$ and $F_{OFL} = F_{35\%}$. Under Tier 3a, the maximum permissible ABC for 2013 is 9,850 t, which is the authors' and Plan Team's recommendation for the 2013 ABC. Under Tier 3a, the 2013 OFL is 12,200 t for the Bering Sea/Aleutian Islands combined. The Team continues to recommend setting a combined BSAI OFL and ABC. The Plan Team recommendation for 2014 ABC is 9,320 t and the 2014 OFL is 12,000 t.

*Status determination*

Northern rockfish is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## 14. Blackspotted and rougheye rockfish

Status and catch specifications (t) blackspotted/rougheye rockfishes in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area/subarea | Year | Total Bio1. | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 24,200 | 549 | 454 | 454 | 170 |
| | 2012 | 24,900 | 576 | 475 | 475 | 204 |
| | 2013 | 28,000 | 691 | 569 | n/a | n/a |
| | 2014 | 29,000 | 704 | 604 | n/a | n/a |
| Western and Central AI | 2011 | | | 220 | 220 | 85 |
| | 2012 | | | 244 | 244 | 131 |
| | 2013 | | | 328 | n/a | n/a |
| | 2014 | | | 350 | n/a | n/a |
| Eastern AI and EBS | 2011 | | | 234 | 234 | 85 |
| | 2012 | | | 231 | 231 | 74 |
| | 2013 | | | 241 | n/a | n/a |
| | 2014 | | | 254 | n/a | n/a |

[1] Total biomass from AI age-structured projection model and survey biomass estimates from EBS.

*Changes from previous assessment*

Black spotted and rougheye rockfish assessments are conducted on a two-year cycle to coincide with planned Aleutian Islands surveys, so this was a full-assessment update from 2010 because a survey was conducted in 2012.

The following input data were updated:

- Catch updated through October 6, 2012.
- The biomass estimate from the 2012 AI survey.
- The 2009 and 2011 fishery age composition and 2010 fishery length composition.
- The 2010 survey age composition and 2012 survey length composition.

The age error matrix was recomputed to better account for aging error within the plus group.

*Spawning biomass and stock status trend*

Total biomass for 2013 was estimated at a value of 28,000 t. Female spawning biomass in the AI is increasing.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

For the Aleutian Islands, this stock qualifies for management under Tier 3 due to the availability of reliable estimates for $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$. Because the projected female spawning biomass of 6,836 t is greater than $B_{40\%}$, (5,196 t), $F_{40\%} = F_{ABC} = 0.035$ and $F_{35\%} = F_{OFL} = 0.043$. Under Tier 3a, the maximum permissible ABC is 569 t, which is the authors' and Plan Team's recommendation for the 2013 ABC. Under Tier 3a, the 2013 OFL is 691 t for the Bering Sea/Aleutian Islands combined. The apportionment of 2013 ABC to subareas is 328 t for the Western and Central Aleutian Islands and 241 t for the Eastern Aleutian Islands and Eastern Bering Sea. The Plan Team recommendation for 2014 ABC is 604 t and the 2014 OFL is 704 t.

*Status determination*

The blackspotted and rougheye rockfish complex is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

## 15. Shortraker rockfish

Status and catch specifications (t) of shortraker rockfish in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Survey Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 17,500 | 524 | 393 | 393 | 334 |
| | 2012 | 17,500 | 524 | 393 | 393 | 305 |
| | 2013 | 16,400 | 493 | 370 | n/a | n/a |
| | 2014 | 16,400 | 493 | 370 | n/a | n/a |

*Changes from previous assessment*

Shortraker rockfish assessments are conducted on a two-year cycle to coincide with planned Aleutian Islands surveys. The biomass estimate is updated with 2012 survey data.

*Spawning biomass and stock status trends*

Estimated shortraker rockfish biomass is 16,400 t, which is a reduction of 1,100 t from the 2010 estimate. Overall, total biomass has trended slowly downward from 28,900 t in 1980.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has previously determined that reliable estimates only of biomass and natural mortality exist for shortraker rockfish, qualifying the species for management under Tier 5. The Tier 5 biomass estimate is based on a surplus production model. The Plan Team recommends setting $F_{ABC}$ at the maximum permissible level under Tier 5, which is 75 percent of $M$. The accepted value of $M$ for this stock is 0.03 for shortraker rockfish, resulting in a $maxF_{ABC}$ value of 0.025. The biomass estimate for 2013 is 16,400 t for shortraker rockfish, leading to 2013 and 2014 BSAI OFLs of 493 t and ABCs of 370 t.

*Status determination*

Shortraker rockfish is not being subjected to overfishing. It is not possible to determine whether this stock is overfished or whether it is approaching an overfished condition because it is managed under Tier 5.

## 16. Other Rockfish complex

Status and catch specifications (t) of other rockfish in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Survey Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 48,900 | 1,700 | 1,280 | 1,070 | 939 |
| | 2012 | 48,900 | 1,700 | 1,280 | 1,070 | 924 |
| | 2013 | 47,700 | 1,540 | 1,160 | n/a | n/a |
| | 2014 | 47,700 | 1,540 | 1,160 | n/a | n/a |
| EBS | 2011 | 28,600 | n/a | 710 | 500 | 323 |
| | 2012 | 28,600 | n/a | 710 | 500 | 191 |
| | 2013 | 29,800 | n/a | 686 | n/a | n/a |
| | 2014 | 29,800 | n/a | 686 | n/a | n/a |
| AI | 2011 | 20,300 | n/a | 570 | 570 | 616 |
| | 2012 | 20,300 | n/a | 570 | 570 | 733 |
| | 2013 | 17,900 | n/a | 473 | n/a | n/a |
| | 2014 | 17,900 | n/a | 473 | n/a | n/a |

### *Changes from previous assessment*

Other rockfish assessments are conducted on a two-year cycle to coincide with planned Aleutian Islands surveys. The 2012 assessment is a full assessment because the Aleutian Islands survey was conducted this year.

New data included in the 2012 assessment included:

- Updated catch and fishery lengths.
- Biomass estimates from the 2012 AI trawl survey, the 2012 EBS slope survey, as well as CPUE and lengths from the 2012 AI trawl survey.

There were no changes in the assessment methodology.

### *Spawning biomass and stock status trends*

Trends in spawning biomass are unknown. Stock biomass, as measured by trawl surveys of the Aleutian Islands and the EBS slope are similar to the 2010 assessment.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The Team agrees with the approach recommended by the author of setting $F_{ABC}$ at the maximum allowable under Tier 5 ($F_{ABC} = 0.75M$). Multiplying these rates by the best biomass estimates of shortspine thornyhead and other rockfish species in the "other rockfish" complex yields 2013 and 2014 ABCs of 686 t in the EBS and 473 t in the AI. The assessment uses a three survey weighted average to estimate biomass in similar fashion to the methodology used in the Gulf of Alaska rockfish assessments. The Plan Team recommends that OFL be set for the entire BSAI area, which under Tier 5 is calculated by multiplying the best estimates of total biomass for the area by the separate natural mortality values and adding the results, which yields an OFL of 1,540 t for 2013 and 2014.

### *Status determination*

The "other rockfish" complex is not being subjected to overfishing. It is not possible to determine whether this complex is overfished or whether it is approaching an overfished condition because it is managed under Tier 5.

## 17. Atka mackerel

Status and catch specifications (t) of Atka mackerel in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 3+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 438,000 | 101,000 | 85,300 | 53,100 | 51,807 |
| BSAI | 2012 | 405,000 | 96,500 | 81,400 | 50,763 | 47,755 |
| EAI/EBS | | | | 38,500 | 38,500 | 37,237 |
| CAI | | | | 22,900 | 10,763 | 10,323 |
| WAI | | | | 20,000 | 1,500 | 195 |
| BSAI | 2013 | 289,000 | 57,700 | 50,000 | n/a | n/a |
| EAI/EBS | | | | 16,900 | n/a | n/a |
| CAI | | | | 16,000 | n/a | n/a |
| WAI | | | | 17,100 | n/a | n/a |
| BSAI | 2014 | | 56,500 | 48,900 | n/a | n/a |
| EAI/EBS | | | | 16,500 | n/a | n/a |
| CAI | | | | 15,700 | n/a | n/a |
| WAI | | | | 16,700 | n/a | n/a |

### *Changes from previous assessment*

The following new data were included in this year's assessment:

- updated fishery catch data
- 2011 fishery catch- and weight-at-age values
- 2012 Aleutian Islands survey data were included (biomass is used in the model; length and age compositions are presented but were not available in time to include in the model)
- area apportionment of ABC was updated by adding the area biomass distribution from the 2012 survey and dropping the 2002 survey

As in last year's assessment, it was assumed that only 64% of the BSAI-wide ABC for the next two years would be taken under the Steller Sea Lion Interim Final Rule Reasonable and Prudent Alternatives (SSL RPAs). This percentage was applied to the 2013 maximum permissible ABC, and that amount was assumed to be caught in order to estimate the 2014 ABC and OFL.

There were two significant changes in assessment methodology:

- Standard deviation of log recruitment is now estimated as a free parameter; in past assessments, it was fixed at 0.6
- Prior penalty on degree of dome-shape in fishery selectivity is now fixed at 0.3; in recent past assessments it was fixed at 0.1

### *Spawning biomass and stock status trends*

The projected female spawning biomass for 2013 using the catch levels in the proposed SSL RPAs is 103,000 t, which is 37 percent of unfished spawning biomass and below $B_{40\%}$ (113,000 t). The population is projected to remain below $B_{40\%}$ through 2017, assuming the catch reductions contained in the proposed SSL RPAs occur and remain in place.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The projected female spawning biomass under the SSL RPA harvest strategy is estimated to be below $B_{40\%}$, thereby placing BSAI Atka mackerel in Tier 3b**.** The projected 2013 yield (ABC) at adjusted $F_{40\%}$= 0.32 is 50,000 t, down 38% from the 2012 ABC of 81,400 t. The projected 2013 overfishing level at adjusted $F_{35\%}$ = 0.39 is 57,700 t, down 40% from last year's estimate for 2012 (96,500 t).

*Status determination*

Atka mackerel is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

*Area apportionment*

Amendment 28 of the Bering Sea/Aleutian Islands Fishery Management Plan divided the Aleutian Islands subarea into 3 districts at 177° E and 177° W longitude, providing the mechanism to apportion the Aleutian Atka mackerel TACs. The Council uses a 4-survey weighted average to apportion the ABC, and the last 4 surveys were conducted in 2004, 2006, 2010, and 2012. The recommended ABC apportionment by subarea for 2013 are 16,900 t for Area 541 and the southern Bering Sea region, 16,000 t for Area 542, and 17,100 t for Area 543.

*Ecosystem Considerations*

Atka mackerel is the most common prey item of the endangered western Steller sea lion throughout the year in the Aleutian Islands. Analysis of historic fishery CPUE revealed that the fishery may create temporary localized depletions of Atka mackerel, and fishery harvest rates in localized areas may have been high enough to affect prey availability for Steller sea lions. The objectives of having areas closed to Atka mackerel fishing around Steller sea lion haulouts and rookeries, and time-area ABC allocations are to maintain sufficient prey for the recovery of Steller sea lions in the Aleutian Islands while also harvesting Atka mackerel. The stock assessment indicates that the abundance of Atka mackerel is decreasing, and peaked in 2005 due to four back-to-back strong year classes (1998-2001), including an extraordinarily strong 1999 year class which still persists in the population. Nevertheless, Steller sea lion surveys conducted in 2008-12 indicate that counts of adults, juveniles, and pups continue to decline in the Aleutian Islands west of Tanaga Pass. This contrasts with Steller sea lion counts in the eastern Aleutian Islands and southern Bering Sea (between Samalga and False Passes) which are increasing. The Steller sea lion RPAs prohibit any retention of Atka mackerel in area 543 (the western Aleutian Islands, where the Steller sea lion population is declining at ~7 percent per year); prohibit directed mackerel fishing in most of Steller sea lion critical habitat in area 542 (all except an area between 178-179°W (Tanaga Pass) which has catch and effort restrictions); set the area 542 Atka mackerel TAC to no more than 47 percent of the Area 542 ABC; retain the critical habitat closure in area 541; and close the entire eastern Bering Sea to directed fishing for Atka mackerel.

## 18. Skates

Status and catch specifications (t) of skates in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Age 0+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 612,000 | 37,800 | 37,500 | 16,500 | 23,135 |
| | 2012 | 645,000 | 39,100 | 32,600 | 24,700 | 22,338 |
| | 2013 | 745,000 | 45,800 | 38,800 | n/a | n/a |
| | 2014 | 725,000 | 44,100 | 37,300 | n/a | n/a |

*Changes from previous assessment*

The following new data were included in this year's assessment:

- Updated 2011 and preliminary 2012 catch
- 2012 EBS shelf, EBS slope, and AI survey data
- Updated fishery and survey length compositions, and new length at age data from the 2009 EBS shelf survey

Alaska skate assessment methodology was substantially revised using Stock Synthesis version 3.23, Schnute growth function, selectivity function for fisheries and survey are dome-shaped, "survivorship" function added to model the stock-recruit relationship, maximum age raised from 25 to 30 years, data length bins were changed, and the preferred model uses only the most recent length at age data and estimates the growth function parameters in the model.

*Spawning biomass and stock status trends*

In the case of Alaska skates, survey biomass estimates, though variable, are basically trendless since species identification began in 1999. Model estimates of spawning biomass are also basically trendless over the 1992-2011 period covered by the model, while total biomass has tended to increase fairly steadily at an average rate of about 0.7 percent per year over the same time period. Recruitment does not appear to vary much from year to year, with a CV for the time series of only 18 percent. The most recent above-average year class was spawned in 2004.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

2011 was the first time that the skate complex was managed outside the context of the former "other species" complex. The Alaska skate portions of the 2011 ABC and OFL were specified under Tier 3, while the "other skates" portions were specified under Tier 5 and this specification approach continued with this assessment.

The Team accepted the revised Alaska skate model recommended by the author. Four models were created and the preferred model used only the most recent, 2009, length-at-age data and estimates the growth function parameters in the model. The Team accepted this model because the Richards formulation of the growth curve improved the fit to the length-at-age data. The Team was concerned about dropping the earlier length-at-age data and asked the author to revisit whether this data should be excluded in the 2013 assessment update. Because projected spawning biomass for 2013 (194,000 t) exceeds $B_{40\%}$ (107,000 t), Alaska skates are in sub-tier "a" of Tier 3. Other reference points are $maxF_{ABC} = F_{40\%} = 0.098$ and $F_{OFL} = F_{35\%} = 0.113$. The Alaska skate portions of the 2013 and 2014 ABCs are 31,700 t and 30,200 t, and the Alaska skate portions of the 2013 and 2014 OFLs are 36,300 t and 34,600 t. The Plan Team agreed with the authors' recommendation to continue to assess the "other skates" component under Tier 5, based on a natural mortality rate of 0.10 and a biomass estimated as the average of the three most recent surveys. The "other skates" portion of the 2013-2014 ABC is 7,100 for both years, and the "other skates" portion of the 2013-2014 OFL is 9,470 t for both years.

For the skate complex as a whole, ABCs for 2013 and 2013 total 38,800 t and 37,300 t, respectively, and OFLs for 2013 and 2014 total 45,800 t and 44,100 t, respectively.

*Status determination*

Alaska skate, which may be viewed as an indicator stock for the complex, is not overfished and is not approaching an overfished condition. The skate complex was not subjected to overfishing. It is not possible to determine whether the other skates complex is overfished or approaching an overfished condition because it is managed under Tier 5.

## 19. Sculpins

Status and catch specifications (t) of sculpins in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | 208,000 | 58,300 | 43,700 | 5,200 | 5,358 |
| | 2012 | 208,000 | 58,300 | 43,700 | 5,200 | 5,469 |
| | 2013 | 216,000 | 56,400 | 42,300 | n/a | n/a |
| | 2014 | 216,000 | 56,400 | 42,300 | n/a | n/a |

*Changes from previous assessment*

This was a straightforward update from the 2011 assessment. Catch and retention data were updated with partial data for 2012; additionally, catch data from 2003-2012 was updated as a result of changes to the catch accounting system. Biomass estimates and length compositions from the 2011 and 2012 Bering Sea shelf survey, the 2012 Bering Sea slope survey, and the 2012 Aleutian Islands survey were added.

*Spawning biomass and stock status trends*

Total BSAI sculpin biomass dropped slightly from 2004 to 2010, but increased in 2012. In addition, the distribution decreased slightly on the EBS shelf but increased on the EBS slope and in the AI.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The authors have recommended the use of separate *M* estimates for 7 species, and different *M* estimates for the EBS and AI. No changes were noted for this year. The Team recommended ABCs based on species-specific ABCs summed to a total for the group. The total (Tier 5) sculpin recommended ABCs and OFLs for 2013 and 2014 are 42,300 t and 56,400 t, respectively.

*Status determination*

The sculpin complex is not being subjected to overfishing. It is not possible to determine whether the sculpin complex is overfished or whether it is approaching an overfished condition because it is managed under Tier 5.

## 20. Sharks

Status and catch specifications (t) of sharks in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BS/AI | 2011 | n/a | 1,360 | 1,020 | 50 | 172 |
| | 2012 | n/a | 1,360 | 1,020 | 200 | 81 |
| | 2013 | n/a | 1,360 | 1,020 | n/a | n/a |
| | 2014 | n/a | 1,360 | 1,020 | n/a | n/a |

*Changes from previous assessment*

Bycatch data through 2012 were added, as well as AFSC and IPHC survey results from 2012. The SSC had requested alternative specifications of OFL and ABC that incorporated estimates of unobserved shark bycatch in the halibut fishery (Halibut Fishery Incidental Catch Estimates, or HFICE)). These were included in the document but were not recommended by the authors or the Team.

*Spawning biomass and stock status trends*

The bulk of the shark catch in the BSAI is sleeper sharks, taken mainly in the pollock and Pacific cod fisheries. Small numbers of salmon sharks are taken in the pollock fishery, but they are pelagic and mostly invulnerable to groundfish fisheries. Few dogfish sharks appear this far north. In the period 1997-2010 the average annual catch of all sharks was 500 t. Catches have been below average in the last few years.

Trawl survey data do not provide reliable estimates of abundance of sharks in the BSAI. Sharks are seldom caught in BSAI trawl surveys except for the Bering Sea slope survey, where sleeper sharks occur in about 10 percent of hauls. They are also taken in the Bering Sea shelf and Aleutian Islands surveys, but rarely. Averaging the swept area estimates of sleeper sharks in all surveys over the last ten years produces a value of about 10,000 t, which is likely an underestimate.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

The SSC has placed sharks in Tier 6, where OFL is typically based on historical catches. Consistent with past policy, the Team recommends setting OFL at the maximum catch during the period 1997-2007 (1,363 t, taken in 2002), and ABC at 75 percent of OFL, which continues to be 1,020 t. The authors and the Team do not recommend specifying OFL and ABC on the basis of catch estimates that include HFICE because the extent of double counting is unknown and in the future, the actual bycatch in the halibut fishery will be known from the expanded observer program.

*Status determination*

The shark complex is not being subjected to overfishing. It is not possible to determine whether this species complex is overfished or whether it is approaching an overfished condition because it is managed under Tier 6.

The Plan Team is concerned about the steep decline of sleeper shark catch rates in the IPHC longline survey and all of the bycatch fisheries. However since all of the sleeper sharks taken in the survey and fisheries are juveniles, it is impossible to know what effect those catches have on spawning stock biomass.

## 21. Squid

Status and catch specifications (t) of squid in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | n/a | 2,620 | 1,970 | 1,970 | 336 |
| | 2012 | n/a | 2,620 | 1,970 | 425 | 678 |
| | 2013 | n/a | 2,620 | 1,970 | n/a | n/a |
| | 2014 | n/a | 2,620 | 1,970 | n/a | n/a |

*Changes from previous assessment*

The author included new information in the assessment that described the seasonal pattern of incidental squid catches, including length and geographical distribution of catch. The authors' and Plan Team's recommendation is to roll over last year's harvest specifications for 2013 and 2014.

*Tier determination/Plan Team discussion and resulting ABCs and OFLs*

Squids are managed under Tier 6 because the groundfish bottom trawl surveys do not provide reliable biomass estimates. The Team concurred with the author's ABC and OFL recommendations for 2013 and 2014, which are unchanged from last year. The recommended ABCs for 2013 and 2014 are the maximum permissible level, calculated as 0.75 times the average catch from the reference period of 1978-1995, or 1,970 t. The recommended OFLs in 2013 and 2014 are calculated as the average catch from 1978-1995, or 2,620 t.

*Status determination*

The squid complex is not being subjected to overfishing. It is not possible to determine whether this species complex is overfished or whether it is approaching an overfished condition because it is managed under Tier 6.

## 22. Octopus

Status and catch specifications (t) of octopus in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2013 and 2014 are those recommended by the Plan Team. Catch data are current through November 3, 2012.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2011 | n/a | 528 | 396 | 150 | 587 |
| | 2012 | n/a | 3,450 | 2,590 | 900 | 132 |
| | 2013 | n/a | 3,450 | 2,590 | n/a | n/a |
| | 2014 | n/a | 3,450 | 2,590 | n/a | n/a |

### *Changes from previous assessment*

The methodology for assessing octopus based on consumption of octopus by Pacific cod was accepted. The consumption estimate using Pacific cod predation of octopus as an estimator of biomass lost due to natural mortality first was accepted in 2011; the authors recommend that this calculation be revisited once every five years.

The following new data was included in this year's assessment:

- Updated 2011 and preliminary 2012 catch
- 2012 EBS shelf, EBS slope, and AI survey data

### *Spawning biomass and stock status trends*

Estimated survey biomass was lower in 2012 than in the most recent surveys of the Bering Sea shelf and the Aleutian Islands, but much higher for Bering Sea slope survey than in recent years. Species composition and size frequencies from the surveys were similar to previous years.

Giant Pacific octopus is the most abundant on the Bering Sea shelf and commercial catch of at least seven species found in the BSAI. Octopuses are commonly caught in pot and trawl fisheries, especially in the Pacific cod pot fishery. Trawl surveys sample octopus poorly, and biomass estimates from trawl surveys are not considered reliable.

### *Tier determination/Plan Team discussion and resulting ABCs and OFLs*

2011 was the first time that the octopus complex was managed outside the context of the former "other species" complex.

The ABC and OFL values were determined under Tier 6. Usually, Tier 6 specifications are based on average catch, but for 2012 and 2013 the authors recommended setting harvest specifications using an alternative mortality estimate based on species composition of Bering Sea Pacific cod diet from 1984-2008 survey data and weight-at-age data. This method is also recommended for 2013 and 2014. This consumption estimate results in 2013 and 2014 OFLs of 3,450 t and ABCs of 2,590 t. The Plan Team recommends adoption of these specifications.

### *Status determination*

The most recent year for which complete catch data are available is 2011. Because the 2011 octopus catch exceeded the 2011 octopus OFL, the 2012 assessment determined that the octopus complex was subjected to overfishing in 2011. However, the 2012 OFL increased and the 2012 catch decreased, so the octopus complex is not expected to be subject to overfishing in 2012.

The octopus complex is not being subjected to overfishing. It is not possible to determine whether the octopus complex is overfished or whether it is approaching an overfished condition because it is managed under Tier 6.

## Appendix 1: Grenadiers

A full assessment of the grenadier assemblage is provided in Appendix 1; while not required, it is provided to assist the Council in its pending decision of whether to include the assemblage in the groundfish FMPs. The Plan Teams have recommended that the Council should add grenadiers to both FMPs so that annual catch limits may be established.

Seven species of grenadiers are known to occur in Alaska. The giant grenadier is the most abundant and has the shallowest depth distribution on the continental slope. The assessment focused on the giant grenadier as it is the most common grenadier caught in both the commercial fishery and longline and trawl surveys. Pacific grenadiers and popeye grenadiers are occasionally caught.

The estimated annual catches of grenadiers in Alaska for the years 1997-2012 have ranged between 11,700-21,300 t, with an average for this period of 15,400 t. Highest catches have consistently been in the GOA. By region, annual catches have ranged between 5,400-14,700 t in the GOA, 1,600-5,000 t in the EBS, and 1,300-4,400 t in the AI. Most of the catch occurs in longline and pot fisheries.

### *Changes in assessment data*

New data for this assessment includes: 1) updated catch estimates for 2011-2012; 2) trawl survey results for the eastern Bering Sea (EBS) slope in 2012; 3) a time series of Aleutian Island (AI) biomass and variance estimates using a new estimation method for 1996-2012; 4) NMFS longline survey results for 2011 and 2012; and 5) observer data on giant grenadier length and sex in the commercial fishery for 2011 and 2012.

### *Changes in assessment methodology*

A new method for determining AI biomass and variance estimates was presented. This new method utilizes available biomass estimates from AFSC trawl surveys in the AI that only extend from 1-500 m. A ratio of "shallow" biomass estimates from the trawl survey (1-500 m) to "shallow" relative population weights (RPWs) from the AFSC longline survey (1-500 m) is used to extrapolate total biomass from longline survey RPWs for 1-1000 m.

### *Tier determination and resulting ABCs and OFLs*

If included in the fishery in the FMPs, Tier 5 determinations would result in the following OFLs and ABCs.

| Area | OFL | ABC |
|---|---|---|
| EBS | 46,200 | 32,400 |
| AI | 89,000 | 35,000 |
| GOA | 46,600 | 35,000 |

For the EBS and GOA these Tier 5 calculations are based on the average of the three most recent deep-water trawl surveys that sampled down to at least 1,000 and M = 0.078. In the EBS, these are now the 2008, 2010, and 2012 surveys. In the GOA, these are the 2005, 2007, and 2009 surveys. In the AI the new method combines the use of 2008, 2010, 2012 trawl survey data and longline survey data even when trawl surveys sampled only to 500 m.

For comparison, the authors also calculated a Tier 5 ABC for the GOA based on the Kalman filter model estimates of biomass. Since the depth sampled differed among the time series of the trawl surveys, the model was applied separately to three depth strata and then summed to give an estimate of biomass. This resulted in an OFL of 30,800 t and an ABC of 23,100 t for the GOA.

Table 1. BSAI Groundfish Plan Team Recommendations for Final OFLs and ABCs (t) for 2013 and 2014.

| | | 2012 | | | | 2013 | | 2014 | |
|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Area** | **OFL** | **ABC** | **TAC** | **Catch** | **OFL** | **ABC** | **OFL** | **ABC** |
| Pollock | EBS | 2,474,000 | 1,220,000 | 1,186,000 | 1,202,560 | *2,550,000* | *1,375,000* | *2,730,000* | *1,430,000* |
| | AI | 39,600 | 32,500 | 19,000 | 972 | 45,600 | 37,300 | 48,600 | 39,800 |
| | Bogoslof | 22,000 | 16,500 | 500 | 79 | 13,400 | 10,100 | 13,400 | 10,100 |
| Pacific cod | BSAI | 369,000 | 314,000 | 275,000 | 223,939 | 359,000 | 307,000 | 379,000 | 323,000 |
| Sablefish | BS | 2,640 | 2,230 | 2,230 | 717 | 1,870 | 1,580 | 1,760 | 1,480 |
| | AI | 2,430 | 2,050 | 2,050 | 1,180 | 2,530 | 2,140 | 2,370 | 2,010 |
| Yellowfin sole | BSAI | 222,000 | 203,000 | 202,000 | 137,716 | 220,000 | 206,000 | 219,000 | 206,000 |
| Greenland turbot | Total | 11,700 | 9,660 | 8,660 | 4,401 | 2,540 | 2,060 | 3,270 | 2,650 |
| | EBS | n/a | 7,230 | 6,230 | 2,744 | n/a | 1,610 | n/a | 2,070 |
| | AI | n/a | 2,430 | 2,430 | 1,657 | n/a | 450 | n/a | 580 |
| Arrowtooth flounder | BSAI | 181,000 | 150,000 | 25,000 | 22,227 | *186,000* | *152,000* | *186,000* | *152,000* |
| Kamchatka flounder | BSAI | 24,800 | 18,600 | 17,700 | 9,558 | 16,300 | 12,200 | 16,300 | 12,200 |
| Northern rock sole | BSAI | 231,000 | 208,000 | 87,000 | 75,806 | 241,000 | 214,000 | 229,000 | 204,000 |
| Flathead sole | BSAI | 84,500 | 70,400 | 34,134 | 11,011 | 81,500 | 67,900 | 80,100 | 66,700 |
| Alaska plaice | BSAI | 64,600 | 53,400 | 24,000 | 16,124 | 67,000 | 55,200 | 60,200 | 55,800 |
| Other flatfish | BSAI | 17,100 | 12,700 | 3,200 | 3,452 | 17,800 | 13,300 | 17,800 | 13,300 |
| Pacific ocean perch | Total | 35,000 | 24,700 | 24,700 | 21,837 | 41,900 | 35,100 | 39,500 | 33,100 |
| | EBS | n/a | 5,710 | 5,710 | 3,280 | n/a | 8,130 | n/a | 7,680 |
| | EAI | n/a | 5,620 | 5,620 | 5,519 | n/a | 9,790 | n/a | 9,240 |
| | CAI | n/a | 4,990 | 4,990 | 4,800 | n/a | 6,980 | n/a | 6,590 |
| | WAI | n/a | 8,380 | 8,380 | 8,238 | n/a | 10,200 | n/a | 9,590 |
| Northern rockfish | BSAI | 10,500 | 8,610 | 4,700 | 2,474 | 12,200 | 9,850 | 12,000 | 9,320 |
| Blackspotted/Rougheye | Total | 576 | 475 | 475 | 205 | 691 | 569 | 704 | 604 |
| | EBS/EAI | n/a | 231 | 231 | 74 | n/a | 241 | n/a | 254 |
| | CAI/WAI | n/a | 244 | 244 | 131 | n/a | 328 | n/a | 350 |
| Shortraker rockfish | BSAI | 524 | 393 | 393 | 273 | 493 | 370 | 493 | 370 |
| Other rockfish | Total | 1,700 | 1,280 | 1,070 | 924 | 1,540 | 1,160 | 1,540 | 1,160 |
| | EBS | n/a | 710 | 500 | 191 | n/a | 686 | n/a | 686 |
| | AI | n/a | 570 | 570 | 733 | n/a | 473 | n/a | 473 |
| Atka mackerel | Total | 96,500 | 81,400 | 50,763 | 47,755 | 57,700 | 50,000 | 56,500 | 48,900 |
| | EAI/BS | n/a | 38,500 | 38,500 | 37,237 | n/a | 16,900 | n/a | 16,500 |
| | CAI | n/a | 22,900 | 10,763 | 10,323 | n/a | 16,000 | n/a | 15,700 |
| | WAI | n/a | 20,000 | 1,500 | 195 | n/a | 17,100 | n/a | 16,700 |
| Skate | BSAI | 39,100 | 32,600 | 24,700 | 22,338 | 45,800 | 38,800 | 44,100 | 37,300 |
| Sculpin | BSAI | 58,300 | 43,700 | 5,200 | 5,469 | 56,400 | 42,300 | 56,400 | 42,300 |
| Shark | BSAI | 1,360 | 1,020 | 200 | 81 | 1,360 | 1,020 | 1,360 | 1,020 |
| Squid | BSAI | 2,620 | 1,970 | 425 | 677 | 2,620 | 1,970 | 2,620 | 1,970 |
| Octopus | BSAI | 3,450 | 2,590 | 900 | 132 | 3,450 | 2,590 | 3,450 | 2,590 |
| Total | BSAI | 3,996,000 | 2,511,778 | 2,000,000 | 1,811,907 | 4,028,694 | 2,639,508 | 4,205,467 | 2,697,673 |

Final 2012 OFLs, ABCs, and TACs from 2012-2013 final harvest specifications; total catch updated through November 3, 2012.
Italics indicate where the Team differed from the author's recommendation.

Table 2. Groundfish catches (metric tons) in the eastern Bering Sea, 1954-2012.

| Year | Pollock | Pacific Cod | Sable Fish | Yellowfin Sole | Greenland Turbot | Arrowtooth Flounder/a | Kamchatka Flounder/d | Rock Sole/c | Other Flatfish | Flathead sole | Alaska Plaice | Pacific Ocean Perch Complex/b | Pacific Ocean Perch | Northern Rockfish | Shortraker Rockfish | Rougheye Rockfish | Other Rockfish | Atka Mackerel | Squid | Other Species | Octopus | Sculpin | Shark | Skate | Total (All Species) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1954 | | | | 12,562 | | | | | | | | | | | | | | | | | | | | | 12,562 |
| 1955 | | | | 14,690 | | | | | | | | | | | | | | | | | | | | | 14,690 |
| 1956 | | | | 24,697 | | | | | | | | | | | | | | | | | | | | | 24,697 |
| 1957 | | | | 24,145 | | | | | | | | | | | | | | | | | | | | | 24,145 |
| 1958 | 6,924 | 171 | 6 | 44,153 | | | | | | | | | | | | | | | | 147 | | | | | 51,401 |
| 1959 | 32,793 | 2,864 | 289 | 185,321 | | | | | | | | | | | | | | | | 380 | | | | | 221,647 |
| 1960 | | | 1,861 | 456,103 | 36,843 | | | | | | | 6,100 | | | | | | | | | | | | | 500,907 |
| 1961 | | | 15,627 | 553,742 | 57,348 | | | | | | | 47,000 | | | | | | | | | | | | | 673,717 |
| 1962 | | | 25,989 | 420,703 | 58,226 | | | | | | | 19,900 | | | | | | | | | | | | | 524,818 |
| 1963 | | | 13,706 | 85,810 | 31,565 | | | | 35,643 | | | 24,500 | | | | | | | | | | | | | 191,224 |
| 1964 | 174,792 | 13,408 | 3,545 | 111,177 | 33,729 | | | | 30,604 | | | 25,900 | | | | | | | | 736 | | | | | 393,891 |
| 1965 | 230,551 | 14,719 | 4,838 | 53,810 | 9,747 | | | | 11,686 | | | 16,800 | | | | | | | | 2,218 | | | | | 344,369 |
| 1966 | 261,678 | 18,200 | 9,505 | 102,353 | 13,042 | | | | 24,864 | | | 20,200 | | | | | | | | 2,239 | | | | | 452,081 |
| 1967 | 550,362 | 32,064 | 11,698 | 162,228 | 23,869 | | | | 32,109 | | | 19,600 | | | | | | | | 4,378 | | | | | 836,308 |
| 1968 | 702,181 | 57,902 | 4,374 | 84,189 | 35,232 | | | | 29,647 | | | 31,500 | | | | | | | | 22,058 | | | | | 967,083 |
| 1969 | 862,789 | 50,351 | 16,009 | 167,134 | 36,029 | | | | 34,749 | | | 14,500 | | | | | | | | 10,459 | | | | | 1,192,020 |
| 1970 | 1,256,565 | 70,094 | 11,737 | 133,079 | 19,691 | 12,598 | | | 64,690 | | | 9,900 | | | | | | | | 15,295 | | | | | 1,593,649 |
| 1971 | 1,743,763 | 43,054 | 15,106 | 160,399 | 40,464 | 18,792 | | | 92,452 | | | 9,800 | | | | | | | | 13,496 | | | | | 2,137,326 |
| 1972 | 1,874,534 | 42,905 | 12,758 | 47,856 | 64,510 | 13,123 | | | 76,813 | | | 5,700 | | | | | | | | 10,893 | | | | | 2,149,092 |
| 1973 | 1,758,919 | 53,386 | 5,957 | 78,240 | 55,280 | 9,217 | | | 43,919 | | | 3,700 | | | | | | | | 55,826 | | | | | 2,064,444 |
| 1974 | 1,588,390 | 62,462 | 4,258 | 42,235 | 69,654 | 21,473 | | | 37,357 | | | 14,000 | | | | | | | | 60,263 | | | | | 1,900,092 |
| 1975 | 1,356,736 | 51,551 | 2,766 | 64,690 | 64,819 | 20,832 | | | 20,393 | | | 8,600 | | | | | | | | 54,845 | | | | | 1,645,232 |
| 1976 | 1,177,822 | 50,481 | 2,923 | 56,221 | 60,523 | 17,806 | | | 21,746 | | | 14,900 | | | | | | | | 26,143 | | | | | 1,428,565 |
| 1977 | 978,370 | 33,335 | 2,718 | 58,373 | 27,708 | 9,454 | | | 14,393 | | | 2,654 | | | | | 311 | | 4,926 | 35,902 | | | | | 1,168,144 |
| 1978 | 979,431 | 42,543 | 1,192 | 138,433 | 37,423 | 8,358 | | | 21,040 | | | 2,221 | | | | | 2,614 | 831 | 6,886 | 61,537 | | | | | 1,302,509 |
| 1979 | 913,881 | 33,761 | 1,376 | 99,017 | 34,998 | 7,921 | | | 19,724 | | | 1,723 | | | | | 2,108 | 1,985 | 4,286 | 38,767 | | | | | 1,159,547 |
| 1980 | 958,279 | 45,861 | 2,206 | 87,391 | 48,856 | 13,761 | | | 20,406 | | | 1,097 | | | | | 459 | 4,955 | 4,040 | 34,633 | | | | | 1,221,944 |
| 1981 | 973,505 | 51,996 | 2,604 | 97,301 | 52,921 | 13,473 | | | 23,428 | | | 1,222 | | | | | 356 | 3,027 | 4,182 | 35,651 | | | | | 1,259,666 |
| 1982 | 955,964 | 55,040 | 3,184 | 95,712 | 45,805 | 9,103 | | | 23,809 | | | 224 | | | | | 276 | 328 | 3,838 | 18,200 | | | | | 1,211,483 |
| 1983 | 982,363 | 83,212 | 2,695 | 108,385 | 43,443 | 10,216 | | | 30,454 | | | 221 | | | | | 220 | 141 | 3,470 | 15,465 | | | | | 1,280,285 |
| 1984 | 1,098,783 | 110,944 | 2,329 | 159,526 | 21,317 | 7,980 | | | 44,286 | | | 1,569 | | | | | 176 | 57 | 2,824 | 8,508 | | | | | 1,458,299 |
| 1985 | 1,179,759 | 132,736 | 2,348 | 227,107 | 14,698 | 7,288 | | | 71,179 | | | 784 | | | | | 92 | 4 | 1,611 | 11,503 | | | | | 1,649,109 |
| 1986 | 1,188,449 | 130,555 | 3,518 | 208,597 | 7,710 | 6,761 | | | 76,328 | | | 560 | | | | | 102 | 12 | 848 | 10,471 | | | | | 1,633,911 |
| 1987 | 1,237,597 | 144,539 | 4,178 | 181,429 | 6,533 | 4,380 | | | 50,372 | | | 930 | | | | | 474 | 12 | 108 | 8,569 | | | | | 1,639,121 |
| 1988 | 1,228,000 | 192,726 | 3,193 | 223,156 | 6,064 | 5,477 | | | 137,418 | | | 1,047 | | | | | 341 | 428 | 414 | 12,206 | | | | | 1,810,470 |
| 1989 | 1,230,000 | 164,800 | 1,252 | 153,165 | 4,061 | 3,024 | | | 63,452 | | | 2,017 | | | | | 192 | 3,126 | 300 | 4,993 | | | | | 1,630,382 |
| 1990 | 1,353,000 | 162,927 | 2,329 | 80,584 | 7,267 | 2,773 | | | 22,568 | | | 5,639 | | | | | 384 | 480 | 460 | 5,698 | | | | | 1,644,109 |
| 1991 | 1,268,360 | 165,444 | 1,128 | 94,755 | 3,704 | 12,748 | | 46,681 | 30,401 | | | 4,744 | | | | | 396 | 2,265 | 544 | 16,285 | | | | | 1,647,455 |
| 1992 | 1,384,376 | 163,240 | 558 | 146,942 | 1,875 | 11,080 | | 51,720 | 34,757 | | | 3,309 | | | | | 675 | 2,610 | 819 | 29,993 | | | | | 1,831,954 |
| 1993 | 1,301,574 | 133,156 | 669 | 105,809 | 6,330 | 7,950 | | 63,942 | 28,812 | | | 3,763 | | | | | 190 | 201 | 597 | 21,413 | | | | | 1,674,406 |
| 1994 | 1,362,694 | 174,151 | 699 | 144,544 | 7,211 | 13,043 | | 60,276 | 29,720 | | | 1,907 | | | | | 261 | 190 | 502 | 23,430 | | | | | 1,818,628 |
| 1995 | 1,264,578 | 228,496 | 929 | 124,746 | 5,855 | 8,282 | | 54,672 | 20,165 | 14,699 | | 1,210 | | | | | 629 | 340 | 364 | 20,928 | | | | | 1,745,893 |
| 1996 | 1,189,296 | 209,201 | 629 | 129,509 | 4,699 | 13,280 | | 46,775 | 18,529 | 17,334 | | 2,635 | | | | | 364 | 780 | 1,080 | 19,717 | | | | | 1,653,828 |
| 1997 | 1,115,268 | 209,475 | 547 | 166,681 | 6,589 | 8,580 | | 67,249 | 22,957 | 20,656 | | 1,060 | | | | | 161 | 171 | 1,438 | 20,997 | | | | | 1,641,829 |
| 1998 | 1,101,428 | 160,681 | 586 | 101,310 | 8,303 | 14,985 | | 33,221 | 15,355 | 24,550 | | 1,134 | | | | | 203 | 901 | 891 | 23,156 | | | | | 1,486,704 |
| 1999 | 988,703 | 146,738 | 678 | 69,275 | 5,401 | 10,585 | | 40,505 | 15,515 | 18,534 | | 654 | | | | | 141 | 2,267 | 392 | 18,916 | | | | | 1,318,304 |
| 2000 | 1,132,736 | 151,372 | 742 | 84,057 | 5,888 | 12,071 | | 49,186 | 16,453 | 20,342 | | 704 | | | | | 239 | 239 | 375 | 23,098 | | | | | 1,497,502 |
| 2001 | 1,387,452 | 142,452 | 863 | 63,563 | 4,252 | 12,836 | | 28,949 | 9,930 | 17,757 | | 1,148 | | | | | 296 | 264 | 1,761 | 23,148 | | | | | 1,694,671 |
| 2002 | 1,481,815 | 166,552 | 1,143 | 74,956 | 3,150 | 10,821 | | 40,700 | 2,588 | 15,464 | | 858 | | | | | 401 | 572 | 1,334 | 26,639 | | | | | 1,826,993 |
| 2003 | 1,492,039 | 174,687 | 1,039 | 81,050 | 2,565 | 13,667 | | 36,375 | 2,922 | 14,132 | 10,118 | 1,391 | | | | | 336 | 6,362 | 1,246 | 26,986 | | | | | 1,864,915 |
| 2004 | 1,480,543 | 183,283 | 1,038 | 75,501 | 1,825 | 17,333 | | 47,862 | 4,755 | 17,354 | 7,888 | | 731 | 116 | 119 | 24 | 318 | 7,159 | 1,000 | 27,496 | | | | | 1,874,344 |
| 2005 | 1,483,286 | 182,938 | 1,064 | 94,382 | 2,140 | 13,408 | | 36,814 | 4,566 | 16,074 | 11,194 | | 879 | 112 | 108 | 12 | 178 | 3,540 | 1,170 | 28,066 | | | | | 1,879,931 |
| 2006 | 1,486,648 | 168,265 | 1,036 | 99,134 | 1,452 | 11,911 | | 35,878 | 3,123 | 17,934 | 17,318 | | 1,042 | 247 | 48 | 7 | 157 | 3,175 | 1,403 | 24,865 | | | | | 1,873,644 |
| 2007 | 1,354,492 | 140,079 | 1,173 | 120,966 | 1,481 | 11,080 | | 36,364 | 5,764 | 19,086 | 19,522 | | 870 | 69 | 113 | 10 | 219 | 3,021 | 1,175 | 24,779 | | | | | 1,740,263 |
| 2008 | 990,576 | 139,604 | 1,125 | 148,894 | 1,925 | 19,357 | | 50,935 | 3,578 | 24,520 | 17,377 | | 513 | 22 | 58 | 29 | 209 | 398 | 1,493 | 27,063 | | | | | 1,427,676 |
| 2009 | 810,743 | 147,166 | 891 | 107,512 | 2,249 | 19,676 | | 48,145 | 2,131 | 19,535 | 13,944 | | 623 | 48 | 83 | 12 | 204 | 244 | 269 | 25,358 | | | | | 1,198,833 |
| 2010 | 810,395 | 142,859 | 754 | 118,624 | 2,272 | 15,265 | | 52,645 | 2,154 | 20,097 | 16,165 | | 3,547 | 299 | 181 | 34 | 263 | 151 | 305 | 20,670 | | | | | 1,206,680 |
| 2011 | 1,199,243 | 209,272 | 695 | 151,166 | 3,111 | 17,324 | 4,445 | 60,353 | 3,121 | 13,549 | 23,656 | | 5,600 | 198 | 103 | 39 | 323 | 1,207 | 237 | | 576 | 4,856 | 168 | 22,414 | 1,721,656 |
| 2012/e | 1,202,639 | 210,949 | 717 | 137,715 | 2,744 | 18,802 | 2,515 | 75,484 | 3,410 | 11,000 | 16,124 | | 3,280 | 87 | 77 | 22 | 191 | 894 | 550 | | 121 | 4,660 | 79 | 21,164 | 1,713,224 |

a/ Arrowtooth flounder included in Greenland turbot catch statistics, 1960-69.

b/ Includes POP shortraker, rougheye, northern, and sharpchin.

c/ Rock sole prior to 1991 and flathead sole prior to 1995 are included in other flatfish catch statistics.

d/ Kamchatka flounder included in Arrowtooth flounder prior to 2011.

e/ Data through November 3, 2012.

f/ Octopus, sculpin, sharks, skates included in Other species prior to 2011.

Note: Numbers don't include fish taken for research.

Table 3. Groundfish catches (metric tons) in the Aleutian Islands, 1954-2012.

| Year | Pollock | Pacific Cod | Sable Fish | Yellowfin Sole | Greenland Turbot | Arrowtooth Flounder/a | Kamchatka Flounder | Rock Sole/c | Other Flatfish | Flathead Sole | Alaska Plaice | Pacific Ocean Perch Complex/b | Pacific Ocean Perch | Northern Rockfish | Shortraker Rockfish | ugheye ockfish | Other Rockfish | Atka Mackerel | Squid | Other Species | Octopus | Sculpin | Shark | Skate | Total (All Species) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1954 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1955 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1956 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1957 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1958 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1959 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1960 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1961 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 1962 | | | | | | | | | | | | 200 | | | | | | | | | | | | | 200 |
| 1963 | | | 664 | | 7 | | | | | | | 20,800 | | | | | | | | | | | | | 21,471 |
| 1964 | | 241 | 1,541 | | 504 | | | | | | | 90,300 | | | | | | | | 66 | | | | | 92,652 |
| 1965 | | 451 | 1,249 | | 300 | | | | | | | 109,100 | | | | | | | | 768 | | | | | 111,868 |
| 1966 | | 154 | 1,341 | | 63 | | | | | | | 85,900 | | | | | | | | 131 | | | | | 87,589 |
| 1967 | | 293 | 1,652 | | 394 | | | | | | | 55,900 | | | | | | | | 8,542 | | | | | 66,781 |
| 1968 | | 289 | 1,673 | | 213 | | | | | | | 44,900 | | | | | | | | 8,948 | | | | | 56,023 |
| 1969 | | 220 | 1,673 | | 228 | | | | | | | 38,800 | | | | | | | | 3,088 | | | | | 44,009 |
| 1970 | | 283 | 1,248 | | 285 | 274 | | | | | | 66,900 | | | | | | 949 | | 10,671 | | | | | 80,610 |
| 1971 | | 2,078 | 2,936 | | 1,750 | 581 | | | | | | 21,800 | | | | | | | | 2,973 | | | | | 32,118 |
| 1972 | | 435 | 3,531 | | 12,874 | 1,323 | | | | | | 33,200 | | | | | | 5,907 | | 22,447 | | | | | 79,717 |
| 1973 | | 977 | 2,902 | | 8,666 | 3,705 | | | | | | 11,800 | | | | | | 1,712 | | 4,244 | | | | | 34,006 |
| 1974 | | 1,379 | 2,477 | | 8,788 | 3,195 | | | | | | 22,400 | | | | | | 1,377 | | 9,724 | | | | | 49,340 |
| 1975 | | 2,838 | 1,747 | | 2,970 | 784 | | | | | | 16,600 | | | | | | 13,326 | | 8,288 | | | | | 46,553 |
| 1976 | | 4,190 | 1,659 | | 2,067 | 1,370 | | | | | | 14,000 | | | | | | 13,126 | | 7,053 | | | | | 43,465 |
| 1977 | 7,625 | 3,262 | 1,897 | | 2,453 | 2,035 | | | | | | 8,080 | | | | | 3,043 | 20,975 | 1,808 | 16,170 | | | | | 67,348 |
| 1978 | 6,282 | 3,295 | 821 | | 4,766 | 1,782 | | | | | | 5,286 | | | | | 921 | 23,418 | 2,085 | 12,436 | | | | | 61,092 |
| 1979 | 9,504 | 5,593 | 782 | | 6,411 | 6,436 | | | | | | 5,487 | | | | | 4,517 | 21,279 | 2,252 | 12,934 | | | | | 75,195 |
| 1980 | 58,156 | 5,788 | 274 | | 3,697 | 4,603 | | | | | | 4,700 | | | | | 420 | 15,533 | 2,332 | 13,028 | | | | | 108,531 |
| 1981 | 55,516 | 10,462 | 533 | | 4,400 | 3,640 | | | | | | 3,622 | | | | | 328 | 16,661 | 1,763 | 7,274 | | | | | 104,199 |
| 1982 | 57,978 | 1,526 | 955 | | 6,317 | 2,415 | | | | | | 1,014 | | | | | 2,114 | 19,546 | 1,201 | 5,167 | | | | | 98,233 |
| 1983 | 59,026 | 9,955 | 673 | | 4,115 | 3,753 | | | | | | 280 | | | | | 1,045 | 11,585 | 510 | 3,675 | | | | | 94,617 |
| 1984 | 81,834 | 22,216 | 999 | | 1,803 | 1,472 | | | | | | 631 | | | | | 56 | 35,998 | 343 | 1,670 | | | | | 147,022 |
| 1985 | 58,730 | 12,690 | 1,448 | | 33 | 87 | | | | | | 308 | | | | | 99 | 37,856 | 9 | 2,050 | | | | | 113,310 |
| 1986 | 46,641 | 10,332 | 3,028 | | 2,154 | 142 | | | | | | 286 | | | | | 169 | 31,978 | 20 | 1,509 | | | | | 96,259 |
| 1987 | 28,720 | 13,207 | 3,834 | | 3,066 | 159 | | | | | | 1,004 | | | | | 147 | 30,049 | 23 | 1,155 | | | | | 81,364 |
| 1988 | 43,000 | 5,165 | 3,415 | | 1,044 | 406 | | | | | | 1,979 | | | | | 278 | 21,656 | 3 | 437 | | | | | 77,383 |
| 1989 | 156,000 | 4,118 | 3,248 | | 4,761 | 198 | | | | | | 2,706 | | | | | 481 | 14,868 | 6 | 108 | | | | | 186,494 |
| 1990 | 73,000 | 8,081 | 2,116 | | 2,353 | 1,459 | | | | | | 14,650 | | | | | 864 | 21,725 | 11 | 627 | | | | | 124,886 |
| 1991 | 78,104 | 6,714 | 2,071 | 1,380 | 3,174 | 938 | | | 88 | | | 2,545 | | | | | 549 | 22,258 | 30 | 91 | | | | | 117,942 |
| 1992 | 54,036 | 42,889 | 1,546 | 4 | 895 | 900 | | 236 | 68 | | | 10,277 | | | | | 3,689 | 46,831 | 61 | 3,081 | | | | | 164,513 |
| 1993 | 57,184 | 34,234 | 2,078 | 0 | 2,138 | 1,348 | | 318 | 59 | | | 13,375 | | | | | 495 | 65,805 | 85 | 2,540 | | | | | 179,659 |
| 1994 | 58,708 | 22,421 | 1,771 | 0 | 3,168 | 1,334 | | 308 | 55 | | | 16,959 | | | | | 301 | 69,401 | 86 | 1,102 | | | | | 175,614 |
| 1995 | 64,925 | 16,534 | 1,119 | 6 | 2,338 | 1,001 | | 356 | 31 | 16 | | 14,734 | | | | | 220 | 81,214 | 95 | 1,273 | | | | | 183,862 |
| 1996 | 28,933 | 31,389 | 720 | 654 | 1,677 | 1,330 | | 371 | 51 | 10 | | 20,443 | | | | | 278 | 103,087 | 87 | 1,720 | | | | | 190,750 |
| 1997 | 26,872 | 25,166 | 779 | 234 | 1,077 | 1,071 | | 271 | 7 | 32 | | 15,687 | | | | | 307 | 65,668 | 323 | 1,555 | | | | | 139,049 |
| 1998 | 23,821 | 34,964 | 595 | 5 | 821 | 694 | | 446 | 35 | 19 | | 13,729 | | | | | 385 | 56,195 | 25 | 2,448 | | | | | 134,182 |
| 1999 | 981 | 28,117 | 671 | 13 | 460 | 774 | | 580 | 20 | 34 | | 18,501 | | | | | 657 | 53,966 | 9 | 1,670 | | | | | 106,453 |
| 2000 | 1,244 | 39,684 | 1,070 | 13 | 1,086 | 1,157 | | 480 | 32 | 80 | | 14,893 | | | | | 601 | 46,990 | 8 | 3,010 | | | | | 110,348 |
| 2001 | 824 | 34,207 | 1,074 | 15 | 1,060 | 1,220 | | 526 | 43 | 54 | | 15,587 | | | | | 610 | 61,296 | 5 | 4,029 | | | | | 120,550 |
| 2002 | 1,177 | 30,801 | 1,118 | 29 | 485 | 1,032 | | 1,165 | 39 | 111 | | 14,996 | | | | | 551 | 44,722 | 10 | 1,980 | | | | | 98,216 |
| 2003 | 1,653 | 32,459 | 1,009 | 0 | 965 | 913 | | 964 | 32 | 49 | | 18,765 | | | | | 401 | 52,988 | 36 | 1,326 | | | | | 111,560 |
| 2004 | 1,158 | 28,869 | 955 | 9 | 434 | 818 | | 818 | 33 | 38 | 0 | | 11,165 | 4,567 | 123 | 185 | 337 | 53,405 | 14 | 1,866 | | | | | 104,794 |
| 2005 | 1,621 | 22,694 | 1,481 | 2 | 468 | 834 | | 549 | 26 | 34 | 0 | | 9,548 | 3,852 | 62 | 78 | 286 | 58,474 | 17 | 1,417 | | | | | 101,442 |
| 2006 | 1,745 | 24,210 | 1,132 | 4 | 534 | 1,475 | | 578 | 36 | 39 | 0 | | 11,826 | 3,582 | 165 | 196 | 425 | 58,719 | 15 | 1,943 | | | | | 106,624 |
| 2007 | 2,519 | 34,045 | 1,149 | 2 | 522 | 834 | | 762 | 26 | 33 | 0 | | 17,581 | 3,946 | 210 | 157 | 433 | 55,742 | 13 | 2,049 | | | | | 120,023 |
| 2008 | 1,278 | 31,056 | 894 | 0 | 827 | 2,527 | | 342 | 46 | 18 | 0 | | 16,923 | 3,265 | 108 | 185 | 388 | 57,690 | 49 | 2,315 | | | | | 117,910 |
| 2009 | 1,779 | 28,580 | 1,096 | 1 | 2,263 | 10,743 | | 571 | 45 | 23 | 0 | | 14,724 | 3,064 | 122 | 197 | 405 | 72,563 | 91 | 2,496 | | | | | 138,763 |
| 2010 | 1,285 | 29,000 | 1,076 | 0 | 1,866 | 24,151 | | 577 | 40 | 29 | 0 | | 14,304 | 4,033 | 143 | 222 | 497 | 68,496 | 105 | 2,696 | | | | | 148,520 |
| 2011 | 1,208 | 10,862 | 1,019 | 1 | 531 | 3,288 | 5,489 | 279 | 55 | 7 | 0 | | 18,402 | 2,566 | 231 | 131 | 616 | 50,600 | 99 | | 11 | 502 | 4 | 721 | 96,622 |
| 2012/e | 972 | 12,991 | 1,180 | 1 | 1,657 | 3,425 | 7,043 | 322 | 42 | 12 | 0 | | 18,557 | 2,387 | 228 | 182 | 733 | 46,860 | 128 | | 11 | 809 | 2 | 1,174 | 98,716 |

a/ Arrowtooth flounder included in Greenland turbot catch statistics, 1964-69.

b/ Includes POP shortraker, rougheye, northern, and sharpchin rockfish until 2004.

c/ Rock sole prior to 1991 and flathead sole prior to 1995 are included in other flatfish catch statistics.

d/ Kamchatka flounder included in Arrowtooth flounder prior to 2011.

e/ Data through November 3, 2012.

f/ Octopus, sculpin, sharks, skates included in Other species prior to 2011.

Note: Numbers don't include fish taken for research.

Table 4. Groundfish catches (metric tons) in the Bering Sea and Aleutian Islands, 1954-2012.

| Year | Pollock | Pacific Cod | Sable Fish | Yellowfin Sole | Greenland Turbot | Arrowtooth Flounder/a | Kamchatka Flounder/d | Rock Sole/c | Other Flatfish | Flathead sole | Alaska Plaice | Pacific Ocean Perch Complex/b | Pacific Ocean Perch | Northern Rockfish | Shortraker Rockfish | Rougheye Rockfish | Other Rockfish | Atka Mackerel | Squid | Other Species | Octopus | Sculpin | Shark | Skate | Total (All Species) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1954 | 0 | 0 | 0 | 12,562 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 12,562 |
| 1955 | 0 | 0 | 0 | 14,690 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 14,690 |
| 1956 | 0 | 0 | 0 | 24,697 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 24,697 |
| 1957 | 0 | 0 | 0 | 24,145 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 24,145 |
| 1958 | 6,924 | 171 | 6 | 44,153 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 147 | | | | | 51,401 |
| 1959 | 32,793 | 2,864 | 289 | 185,321 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 380 | | | | | 221,647 |
| 1960 | 0 | 0 | 1,861 | 456,103 | 36,843 | 0 | 0 | 0 | 0 | | 0 | 6,100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 500,907 |
| 1961 | 0 | 0 | 15,627 | 553,742 | 57,348 | 0 | 0 | 0 | 0 | | 0 | 47,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 673,717 |
| 1962 | 0 | 0 | 25,989 | 420,703 | 58,226 | 0 | 0 | 0 | 0 | | 0 | 20,100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 525,018 |
| 1963 | 0 | 0 | 14,370 | 85,810 | 31,572 | 0 | 0 | 0 | 35,643 | | 0 | 45,300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 212,695 |
| 1964 | 174,792 | 13,649 | 5,086 | 111,177 | 34,233 | 0 | 0 | 0 | 30,604 | | 0 | 116,200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 802 | | | | | 486,543 |
| 1965 | 230,551 | 15,170 | 6,087 | 53,810 | 10,047 | 0 | 0 | 0 | 11,686 | | 0 | 125,900 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,986 | | | | | 456,237 |
| 1966 | 261,678 | 18,354 | 10,846 | 102,353 | 13,105 | 0 | 0 | 0 | 24,864 | | 0 | 106,100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,370 | | | | | 539,670 |
| 1967 | 550,362 | 32,357 | 13,350 | 162,228 | 24,263 | 0 | 0 | 0 | 32,109 | | 0 | 75,500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12,920 | | | | | 903,089 |
| 1968 | 702,181 | 58,191 | 6,047 | 84,189 | 35,445 | 0 | 0 | 0 | 29,647 | | 0 | 76,400 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31,006 | | | | | 1,023,106 |
| 1969 | 862,789 | 50,571 | 17,682 | 167,134 | 36,257 | 0 | 0 | 0 | 34,749 | | 0 | 53,300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13,547 | | | | | 1,236,029 |
| 1970 | 1,256,565 | 70,377 | 12,985 | 133,079 | 19,976 | 12,872 | 0 | 0 | 64,690 | | 0 | 76,800 | 0 | 0 | 0 | 0 | 0 | 949 | 0 | 25,966 | | | | | 1,674,259 |
| 1971 | 1,743,763 | 45,132 | 18,042 | 160,399 | 42,214 | 19,373 | 0 | 0 | 92,452 | | 0 | 31,600 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16,469 | | | | | 2,169,444 |
| 1972 | 1,874,534 | 43,340 | 16,289 | 47,856 | 77,384 | 14,446 | 0 | 0 | 76,813 | | 0 | 38,900 | 0 | 0 | 0 | 0 | 0 | 5,907 | 0 | 33,340 | | | | | 2,228,809 |
| 1973 | 1,758,919 | 54,363 | 8,859 | 78,240 | 63,946 | 12,922 | 0 | 0 | 43,919 | | 0 | 15,500 | 0 | 0 | 0 | 0 | 0 | 1,712 | 0 | 60,070 | | | | | 2,098,450 |
| 1974 | 1,588,390 | 63,841 | 6,735 | 42,235 | 78,442 | 24,668 | 0 | 0 | 37,357 | | 0 | 36,400 | 0 | 0 | 0 | 0 | 0 | 1,377 | 0 | 69,987 | | | | | 1,949,432 |
| 1975 | 1,356,736 | 54,389 | 4,513 | 64,690 | 67,789 | 21,616 | 0 | 0 | 20,393 | | 0 | 25,200 | 0 | 0 | 0 | 0 | 0 | 13,326 | 0 | 63,133 | | | | | 1,691,785 |
| 1976 | 1,177,822 | 54,671 | 4,582 | 56,221 | 62,590 | 19,176 | 0 | 0 | 21,746 | | 0 | 28,900 | 0 | 0 | 0 | 0 | 0 | 13,126 | 0 | 33,196 | | | | | 1,472,030 |
| 1977 | 985,995 | 36,597 | 4,615 | 58,373 | 30,161 | 11,489 | 0 | 0 | 14,393 | | 0 | 10,734 | 0 | 0 | 0 | 0 | 3,354 | 20,975 | 6,734 | 52,072 | | | | | 1,235,492 |
| 1978 | 985,713 | 45,838 | 2,013 | 138,433 | 42,189 | 10,140 | 0 | 0 | 21,040 | | 0 | 7,507 | 0 | 0 | 0 | 0 | 3,535 | 24,249 | 8,971 | 73,973 | | | | | 1,363,601 |
| 1979 | 923,385 | 39,354 | 2,158 | 99,017 | 41,409 | 14,357 | 0 | 0 | 19,724 | | 0 | 7,210 | 0 | 0 | 0 | 0 | 6,625 | 23,264 | 6,538 | 51,701 | | | | | 1,234,742 |
| 1980 | 1,016,435 | 51,649 | 2,480 | 87,391 | 52,553 | 18,364 | 0 | 0 | 20,406 | | 0 | 5,797 | 0 | 0 | 0 | 0 | 879 | 20,488 | 6,372 | 47,661 | | | | | 1,330,475 |
| 1981 | 1,029,021 | 62,458 | 3,137 | 97,301 | 57,321 | 17,113 | 0 | 0 | 23,428 | | 0 | 4,844 | 0 | 0 | 0 | 0 | 684 | 19,688 | 5,945 | 42,925 | | | | | 1,363,865 |
| 1982 | 1,013,942 | 56,566 | 4,139 | 95,712 | 52,122 | 11,518 | 0 | 0 | 23,809 | | 0 | 1,238 | 0 | 0 | 0 | 0 | 2,390 | 19,874 | 5,039 | 23,367 | | | | | 1,309,716 |
| 1983 | 1,041,389 | 93,167 | 3,368 | 108,385 | 47,558 | 13,969 | 0 | 0 | 30,454 | | 0 | 501 | 0 | 0 | 0 | 0 | 1,265 | 11,726 | 3,980 | 19,140 | | | | | 1,374,902 |
| 1984 | 1,180,617 | 133,160 | 3,328 | 159,526 | 23,120 | 9,452 | 0 | 0 | 44,286 | | 0 | 2,200 | 0 | 0 | 0 | 0 | 232 | 36,055 | 3,167 | 10,178 | | | | | 1,605,321 |
| 1985 | 1,238,489 | 145,426 | 3,796 | 227,107 | 14,731 | 7,375 | 0 | 0 | 71,179 | | 0 | 1,092 | 0 | 0 | 0 | 0 | 191 | 37,860 | 1,620 | 13,553 | | | | | 1,762,419 |
| 1986 | 1,235,090 | 140,887 | 6,546 | 208,597 | 9,864 | 6,903 | 0 | 0 | 76,328 | | 0 | 846 | 0 | 0 | 0 | 0 | 271 | 31,990 | 868 | 11,980 | | | | | 1,730,170 |
| 1987 | 1,266,317 | 157,746 | 8,012 | 181,429 | 9,599 | 4,539 | 0 | 0 | 50,372 | | 0 | 1,934 | 0 | 0 | 0 | 0 | 621 | 30,061 | 131 | 9,724 | | | | | 1,720,485 |
| 1988 | 1,271,000 | 197,891 | 6,608 | 223,156 | 7,108 | 5,883 | 0 | 0 | 137,418 | | 0 | 3,026 | 0 | 0 | 0 | 0 | 619 | 22,084 | 417 | 12,643 | | | | | 1,887,853 |
| 1989 | 1,386,000 | 168,918 | 4,500 | 153,165 | 8,822 | 3,222 | 0 | 0 | 63,452 | | 0 | 4,723 | 0 | 0 | 0 | 0 | 673 | 17,994 | 306 | 5,101 | | | | | 1,816,876 |
| 1990 | 1,426,000 | 171,008 | 4,445 | 80,584 | 9,620 | 4,232 | 0 | 0 | 22,568 | | 0 | 20,289 | 0 | 0 | 0 | 0 | 1,248 | 22,205 | 471 | 6,325 | | | | | 1,768,995 |
| 1991 | 1,346,464 | 172,158 | 3,199 | 96,135 | 6,878 | 13,686 | 0 | 46,681 | 30,489 | | 0 | 7,289 | 0 | 0 | 0 | 0 | 945 | 24,523 | 574 | 16,376 | | | | | 1,765,397 |
| 1992 | 1,438,412 | 206,129 | 2,104 | 146,946 | 2,770 | 11,980 | 0 | 51,956 | 34,825 | | 0 | 13,586 | 0 | 0 | 0 | 0 | 4,364 | 49,441 | 880 | 33,074 | | | | | 1,996,467 |
| 1993 | 1,358,758 | 167,390 | 2,747 | 105,809 | 8,468 | 9,298 | 0 | 64,260 | 28,871 | | 0 | 17,138 | 0 | 0 | 0 | 0 | 685 | 66,006 | 682 | 23,953 | | | | | 1,854,065 |
| 1994 | 1,421,402 | 196,572 | 2,470 | 144,544 | 10,379 | 14,377 | 0 | 60,584 | 29,775 | | 0 | 18,866 | 0 | 0 | 0 | 0 | 562 | 69,591 | 588 | 24,532 | | | | | 1,994,242 |
| 1995 | 1,329,503 | 245,030 | 2,048 | 124,752 | 8,193 | 9,283 | 0 | 55,028 | 20,196 | 14,715 | 0 | 15,944 | 0 | 0 | 0 | 0 | 849 | 81,554 | 459 | 22,201 | | | | | 1,929,755 |
| 1996 | 1,218,229 | 240,590 | 1,349 | 130,163 | 6,376 | 14,610 | 0 | 47,146 | 18,580 | 17,344 | 0 | 23,078 | 0 | 0 | 0 | 0 | 642 | 103,867 | 1,167 | 21,437 | | | | | 1,844,578 |
| 1997 | 1,142,140 | 234,641 | 1,326 | 166,915 | 7,666 | 9,651 | 0 | 67,520 | 22,964 | 20,688 | 0 | 16,747 | 0 | 0 | 0 | 0 | 468 | 65,839 | 1,761 | 22,552 | | | | | 1,780,878 |
| 1998 | 1,125,249 | 195,645 | 1,181 | 101,315 | 9,124 | 15,679 | 0 | 33,667 | 15,390 | 24,569 | 0 | 14,863 | 0 | 0 | 0 | 0 | 588 | 57,096 | 916 | 25,604 | | | | | 1,620,886 |
| 1999 | 989,684 | 174,855 | 1,349 | 69,288 | 5,861 | 11,359 | 0 | 41,085 | 15,535 | 18,568 | 0 | 19,155 | 0 | 0 | 0 | 0 | 798 | 56,233 | 401 | 20,586 | | | | | 1,424,757 |
| 2000 | 1,133,980 | 191,056 | 1,812 | 84,070 | 6,974 | 13,228 | 0 | 49,666 | 16,485 | 20,422 | 0 | 15,597 | 0 | 0 | 0 | 0 | 840 | 47,229 | 383 | 26,108 | | | | | 1,607,850 |
| 2001 | 1,388,276 | 176,659 | 1,937 | 63,578 | 5,312 | 14,056 | 0 | 29,475 | 9,973 | 17,811 | 0 | 16,735 | 0 | 0 | 0 | 0 | 906 | 61,560 | 1,766 | 27,177 | | | | | 1,815,221 |
| 2002 | 1,482,992 | 197,353 | 2,261 | 74,985 | 3,635 | 11,853 | 0 | 41,865 | 2,627 | 15,575 | 0 | 15,854 | 0 | 0 | 0 | 0 | 952 | 45,294 | 1,344 | 28,619 | | | | | 1,925,209 |
| 2003 | 1,493,692 | 207,146 | 2,048 | 81,050 | 3,530 | 14,580 | 0 | 37,339 | 2,954 | 14,181 | 10,118 | 20,156 | 0 | 0 | 0 | 0 | 737 | 59,350 | 1,282 | 28,312 | | | | | 1,976,475 |
| 2004 | 1,481,701 | 212,152 | 1,993 | 75,510 | 2,259 | 18,151 | 0 | 48,680 | 4,788 | 17,392 | 7,888 | | 11,896 | 4,684 | 242 | 209 | 655 | 60,564 | 1,014 | 29,362 | | | | | 1,979,138 |
| 2005 | 1,484,907 | 205,632 | 2,545 | 94,384 | 2,608 | 14,242 | 0 | 37,363 | 4,592 | 16,108 | 11,194 | | 10,426 | 3,964 | 170 | 90 | 464 | 62,014 | 1,187 | 29,483 | | | | | 1,981,372 |
| 2006 | 1,488,393 | 192,475 | 2,168 | 99,138 | 1,986 | 13,386 | 0 | 36,456 | 3,160 | 17,973 | 17,318 | | 12,868 | 3,829 | 213 | 203 | 582 | 61,894 | 1,418 | 26,808 | | | | | 1,980,268 |
| 2007 | 1,357,011 | 174,124 | 2,322 | 120,968 | 2,003 | 11,914 | 0 | 37,126 | 5,790 | 19,119 | 19,522 | | 18,451 | 4,015 | 323 | 167 | 652 | 58,763 | 1,188 | 26,828 | | | | | 1,860,286 |
| 2008 | 991,854 | 170,660 | 2,018 | 148,894 | 2,751 | 21,884 | 0 | 51,277 | 3,624 | 24,538 | 17,377 | | 17,436 | 3,287 | 166 | 214 | 597 | 58,088 | 1,542 | 29,378 | | | | | 1,545,586 |
| 2009 | 812,522 | 175,746 | 1,987 | 107,513 | 4,512 | 30,419 | 0 | 48,716 | 2,176 | 19,558 | 13,944 | | 15,347 | 3,112 | 205 | 209 | 609 | 72,807 | 360 | 27,854 | | | | | 1,337,596 |
| 2010 | 811,680 | 171,859 | 1,830 | 118,624 | 4,138 | 39,416 | 0 | 53,222 | 2,194 | 20,126 | 16,165 | | 17,851 | 4,332 | 324 | 256 | 760 | 68,647 | 410 | 23,366 | | | | | 1,355,200 |
| 2011 | 1,200,451 | 220,134 | 1,714 | 151,167 | 3,642 | 20,612 | 9,934 | 60,632 | 3,176 | 13,556 | 23,656 | | 24,002 | 2,764 | 334 | 170 | 939 | 51,807 | 336 | 0 | 587 | 5,358 | 172 | 23,135 | 1,818,278 |
| 2012/e | 1,203,611 | 223,940 | 1,897 | 137,716 | 4,401 | 22,227 | 9,558 | 75,806 | 3,452 | 11,012 | 16,124 | 0 | 21,837 | 2,474 | 305 | 204 | 924 | 47,754 | 678 | 0 | 132 | 5,469 | 81 | 22,338 | 1,811,940 |

a/ Arrowtooth flounder included in Greenland turbot catch statistics, 1960-69.

b/ Includes POP shortraker, rougheye, northern, and sharpchin.

c/ Rock sole prior to 1991 and flathead sole prior to 1995 are included in other flatfish catch statistics.

d/ Kamchatka flounder included in Arrowtooth flounder prior to 2011.

e/ Data through November 3, 2012.

f/ Octopus, sculpin, sharks, skates included in Other species prior to 2011.

Note: Numbers don't include fish taken for research.

Table 5. Summary of stock abundance (biomass), overfishing level (OFL), acceptable biological catch (ABC), the fishing mortality rate corresponding to ABC (FABC), and the fishing mortality rate corresponding to OFL (FOFL) for the eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof district as projected for 2013 and 2014. "Biomass" corresponds to projected January abundance for the age+ range reported in the summary. Stock-specific biomass, OFL, and ABC are in metric tons, reported to three significant digits (four digits are used when a stock-specific ABC is apportioned among areas on a percentage basis). Fishing mortality rates are reported to two significant digits. Exceptions to significant digits rule are for totals.

| Species or Complex | Tier | Area | 2013 | | | | | 2014 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Biomass | OFL | ABC | FOFL | FABC | OFL | ABC | FOFL | FABC |
| Walleye pollock | 1a | EBS | 8,140,000 | 2,550,000 | 1,375,000 | 0.54 | 0.38 | 2,730,000 | 1,430,000 | 0.54 | 0.38 |
| | 3b | Aleutian Islands | 266,000 | 45,600 | 37,300 | 0.34 | 0.27 | 48,600 | 39,800 | 0.34 | 0.28 |
| | 5 | Bogoslof | 67,100 | 13,400 | 10,100 | 0.2 | 0.15 | 13,400 | 10,100 | 0.2 | 0.15 |
| Pacific cod | 3a | BSAI | 1,510,000 | 359,000 | 307,000 | 0.34 | 0.29 | 379,000 | 323,000 | 0.34 | 0.29 |
| Sablefish | 3b | BS | 19,000 | 1,870 | 1,580 | 0.1 | 0.086 | 1,760 | 1,480 | 0.1 | 0.086 |
| | 3b | AI | 26,000 | 2,530 | 2,140 | 0.1 | 0.086 | 2,370 | 2,010 | 0.1 | 0.086 |
| Yellowfin sole | 1a | BSAI | 1,960,000 | 220,000 | 206,000 | 0.12 | 0.11 | 219,000 | 206,000 | 0.12 | 0.11 |
| Greenland turbot | 3b | Total | 81,000 | 2,540 | 2,060 | 0.14 | 0.12 | 3,270 | 2,650 | 0.14 | 0.12 |
| Arrowtooth flounder | 3a | BSAI | 1,130,000 | 186,000 | 152,000 | 0.29 | 0.23 | 186,000 | 152,000 | 0.29 | 0.23 |
| Kamchatka flounder | 5 | BSAI | 125,000 | 16,300 | 12,200 | 0.13 | 0.098 | 16,300 | 12,200 | 0.13 | 0.098 |
| Northern rock sole | 1a | BSAI | 1,470,000 | 241,000 | 214,000 | 0.16 | 0.15 | 229,000 | 204,000 | 0.16 | 0.15 |
| Flathead sole | 3a | BSAI | 748,000 | 81,500 | 67,900 | 0.35 | 0.29 | 80,100 | 66,700 | 0.35 | 0.29 |
| Other flatfish | 5 | BSAI | 114,000 | 17,800 | 13,300 | .17/.085/.15 | .13/.064/.11 | 17,800 | 13,300 | .17/.085/.15 | .13/.064/.11 |
| Alaska plaice | 3a | BSAI | 589,000 | 67,000 | 55,200 | 0.19 | 0.16 | 60,200 | 55,800 | 0.19 | 0.16 |
| Pacific ocean perch | 3a | BSAI | 663,000 | 41,900 | 35,100 | 0.076 | 0.063 | 39,500 | 33,100 | 0.076 | 0.063 |
| Northern rockfish | 3a | BSAI | 195,000 | 12,200 | 9,850 | 0.079 | 0.063 | 12,000 | 9,320 | 0.079 | 0.063 |
| Shortraker | 5 | BSAI | 16,400 | 493 | 370 | 0.030 | 0.023 | 493 | 370 | 0.03 | 0.023 |
| Blackspotted/ Rougheye | 3a | BSAI | 29,800 | 691 | 569 | 0.043 | 0.035 | 704 | 604 | 0.043 | 0.035 |
| Other rockfish | 5 | BSAI | 47,700 | 1,540 | 1,160 | .03/.09 | .023/.068 | 1,540 | 1,160 | .03/.09 | .023/.068 |
| Atka mackerel | 3b | Total | 289,000 | 57,700 | 50,000 | 0.39 | 0.32 | 56,500 | 48,900 | 0.33 | 0.29 |
| Skate | 3a/5 | BSAI | 745,000 | 45,800 | 38,800 | 0.11/0.10 | 0.098/0.075 | 44,100 | 37,300 | 0.11/0.10 | 0.098/0.075 |
| Sculpin | 5 | BSAI | 216,000 | 56,400 | 42,300 | 0.28 | 0.21 | 56,400 | 42,300 | 0.28 | 0.21 |
| Shark | 6 | BSAI | n/a | 1,360 | 1,020 | n/a | n/a | 1,360 | 1,020 | n/a | n/a |
| Squid | 6 | BSAI | n/a | 2,620 | 1,970 | n/a | n/a | 2,620 | 1,970 | n/a | n/a |
| Octopus | 6 | BSAI | n/a | 3,450 | 2,590 | n/a | n/a | 3,450 | 2,590 | n/a | n/a |
| **Total** | | **BSAI** | **18,447,000** | **4,028,694** | **2,639,509** | | | **4,205,467** | **2,697,674** | | |

Table 6. Summary of groundfish tier designations under Amendment 56, maximum permissible ABC fishing mortality rate (max FABC), the Plan Team's recommended tier designation, ABC fishing mortality rate (FABC), the maximum permissible value of ABC (max ABC), the Plan Team's recommended ABC, and the percentage reduction (% Red.) between max ABC and the Plan Team's recommended ABC for 2013-2014. Stock-specific max ABC and ABC are in metric tons, reported to three significant digits (four significant digits are used EBS pollock and when a stock-specific ABC is apportioned among areas on a percentage basis). Fishing mortality rates are reported to two significant digits.

| Species or Complex | Area | 2013 Tier | max FABC | FABC | max ABC | ABC | % Red. | 2014 Tier | max FABC | FABC | max ABC | ABC | % Red. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pollock | EBS | 1a | 0.49 | 0.38 | 2,310,000 | 1,375,000 | 40% | 1a | 0.49 | 0.38 | 2,610,000 | 1,430,000 | 45% |

**Table 7. Species included in assessments for the 2012 BSAI SAFE Report.**

| Chapter | Common name | Scientific name | Count |
|---|---|---|---|
| 1 | **Walleye Pollock** | | 1 |
| 2 | **Pacific cod** | | 1 |
| 3 | **Sablefish** | | 1 |
| 4 | **Yellowfin sole** | Limanda aspera | 1 |
| 5 | **Greenland turbot** | Reinhardtius hippoglossoides | 1 |
| 6 | **Arrowtooth flounder** | Atherestes stomias | 2 |
| 7 | Kamchatka flounder | Atherestes evermanni | |
| 8 | **Northern rock sole** | Lepidopsetta polyxystra n. sp. | 2 |
| | Southern rock sole | Lepidopsetta bilineata | |
| 9 | **Flathead sole** | Hippoglossoides classodon | 2 |
| | Bering flounder | Hippoglossoides robustus | |
| 10 | **Alaska plaice** | Pleuronectes quadrituberculatus | 1 |
| 11 | **Other flatfish** | | 15 |
| | Arctic flounder | Liopsetta glacialis | |
| | butter sole | Isopsetta isolepis | |
| | curlfin sole | Pleuronectes decurrens | |
| | deepsea sole | Embassichths bathybius | |
| | Dover sole | Microstomus pacificus | |
| | English sole | Parophrys vetulus | |
| | longhead dab | Limanda proboscidea | |
| | Pacific sanddab | Citharichthys sordidus | |
| | petrale sole | Eopsetta jordani | |
| | rex sole | Glyptocephalus zachirus | |
| | roughscale sole | Clidodoerma asperrimum | |
| | sand sole | Psettichthys melanostictus | |
| | slender sole | Lyopsetta exilis | |
| | starry flounder | Platichthys stellatus | |
| | Sakhalin sole | Pleuronectes sakhalinensis | |
| 12 | **Pacific Ocean perch** | Sebastes alutus | 1 |
| 13 | **Northern rockfish** | Sebastes polyspinus | 1 |
| 14 | Blackspotted/Rougheye | | 2 |
| | Blackspotted rockfish | | |
| | Rougheye rockfish | Sebastes aleutianus | |
| 15 | Shortraker rockfish | Sebastes borealis | 1 |
| 16 | **Other rockfish*** | | |
| | Shortspine thornyhead | Sebastolobus alascanus | 7 |
| | Dusky rockfish | Sebastes variabilis | |
| | Red banded rockfish | Sebastes babcocki | |
| | Redstripe rockfish | Sebastes proriger | |
| | Harlequin rockfish | Sebastes variegatus | |
| | Sharpchin rockfish | Sebastes zacentrus | |
| | Yelloweye rockfish | Sebastes ruberrimus | |
| 17 | **Atka mackerel** | Pleurogrammus monopterygius | 1 |

| Chapter | Common name | Scientific name | Count |
|---|---|---|---|
| 18 | **Skates** | | 15 |
| | deepsea skate | Bathyraja abyssicola | |
| | Aleutian skate | Bathyraja aleutica | |
| | Bering skate (complex?) | Bathyraja interrupta | |
| | Commander skate | Bathyraja lindbergi | |
| | whiteblotched skate | Bathyraja maculata | |
| | butterfly skate | Bathyraja mariposa | |
| | whitebrow skate | Bathyraja minispinosa | |
| | Alaska skate | Bathyraja parmifera | |
| | “Leopard” parmifera | Bathyraja sp. cf. parmifera | |
| | mud skate | Bathyraja taranetzi | |
| | roughtail skate | Bathyraja trachura | |
| | Okhotsk skate | Bathyraja violacea | |
| | big skate | Raja binoculata | |
| | roughshoulder skate | Amblyraja badia | |
| | longnose skate | Raja rhina | |
| 20 | **Sharks** | | 8 |
| | brown cat shark | Apristurus brunneus | |
| | White shark | Carcharodon carcharias | |
| | basking shark | Cetorhinus maximus | |
| | sixgill shark | Hexanchus griseus | |
| | salmon shark | Lamna ditropis | |
| | blue shark | Prionace glauca | |
| | Pacific sleeper shark | Somniosus pacificus | |
| | Spiny dogfish | Squalus acanthias | |
| 21 | **Squids** | | 14 |
| | | Chiroteuthis calyx | |
| | "glass squids" | Belonella borealis | |
| | | Galiteuthis phyllura | |
| | minimal armhook squid | Berryteuthis anonychus | |
| | magistrate armhook squid | Berryteuthis magister | |
| | | Eogonatus tinro | |
| | boreopacific armhook squid | Gonatopsis borealis | |
| | Berry armhook squid | Gonatus berryi | |
| | | Gonatus madokai | |
| | | Gonatus middendorffi | |
| | clawed armhook squid | Gonatus onyx | |
| | robust clubhook squid | Moroteuthis robusta | |
| | boreal clubhook squid | Onychoteuthis borealijaponicus | |
| | North Pacific bobtail squid | Rossia pacifica | |
| 22 | **Octopuses** | | 8 |
| | flapjack devilfish | Opisthoteuthis cf californiana | |
| | pelagic octopus | Japetella diaphana | |
| | smooth octopus | Benthoctopus leioderma | |
| | | Benthoctopus oregonensis | |
| | | Benthoctopus salebrosus | |
| | giant octopus | Enteroctopus dofleini | |
| | | Granelodone boreopacifica | |
| | stubby octopus | Sasakiopus salebrosus | |

| Chapter | Common name | Scientific name | Count |
|---|---|---|---|
| 19 | **Sculpins** | | 48 |
| | Scaled sculpin | Archistes biseriatus | |
| | Bride sculpin | Artediellus miacanthus | |
| | Pacific hookear sculpin | Artediellus pacificus | |
| | Broadfin sculpin | Bolinia euryptera | |
| | Antlered sculpin | Enophrys diceraus | |
| | Leister sculpin | Enophrys lucasi | |
| | Purplegray sculpin | Gymnocanthus detrisus | |
| | Armorhead sculpin | Gymnocanthus galeatus | |
| | threaded sculpin | Gymnocanthus pistilliger | |
| | Arctic staghorn sculpin | Gymnocanthus tricuspis | |
| | Banded Irish lord | Hemilepidotus gilberti | |
| | Red Irish Lord | Hemilepidotus hemilepidotus | |
| | Yellow Irish Lord | Hemilepidotus jordani | |
| | Butterfly sculpin | Hemilepidotus papilio | |
| | Longfin Irish lord | Hemilepidotus zapus | |
| | Northern sculpin | Icelinus borealis | |
| | Blacknose sculpin | Icelus canaliculatus | |
| | Wide-eye sculpin | Icelus euryops | |
| | Spatulate sculpin | Icelus spatula | |
| | thorny sculpin | Icelus spiniger | |
| | Uncinate sculpin | Icelus uncinalis | |
| | Longfin sculpin | Jordania zonope | |
| | Pacific staghorn sculpin | Leptocottus armatus | |
| | Plain sculpin | Myoxocephalus jaok | |
| | Great sculpin | Myoxocephalus polyacanthocephalus | |
| | Fourhorn sculpin | Myoxocephalus quadricornis | |
| | Warty sculpin | Myoxocephalus verrucocus | |
| | Slim sculpin | Radulinus asprellus | |
| | Roughskin sculpin | Rastrinus scutiger | |
| | Sponge sculpin | thyriscus anoplus | |
| | Scissortail sculpin | Triglops forficatus | |
| | Roughspine sculpin | Triglops macellus | |
| | Crescent-tail sculpin | Triglops metopias | |
| | Ribbed sculpin | Triglops pingelii | |
| | Spectacled sculpin | Triglops septicus | |
| | Scalybreasted sculpin | Triglops xenostethus | |
| | Flabby sculpin | Zesticelus profundorum | |
| | Crested sculpin | Blepsias bilobus | |
| | Bigmouth sculpin | Hemitripterus bolini | |
| | Sailfin sculpin | Nautichthys oculofasciatus | |
| | Eyeshade sculpin | Nautichthys pribilovius | |
| | Spinyhead sculpin | Dasycottus setiger | |
| | Smoothcheek sculpin | Eurymen gyrinus | |
| | Darkfin sculpin | Malacoccottus zonurus | |
| | Blackfin sculpin | Malacocottus kincaidi | |
| | Tadpole sculpin | Psychrolutes paradoxus | |
| | Blob sculpin | Psychrolutes phrictus | |
| | Grunt sculpin | Rhamphocottus richardsoni | |
| | **Total Species** | | **133** |

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