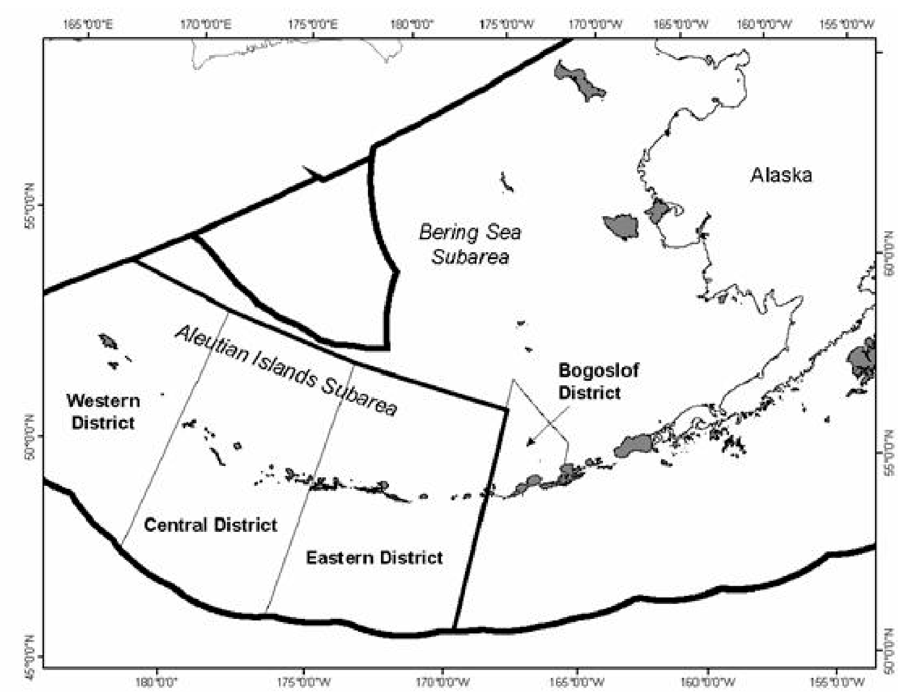
## APPENDIX A

# 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**




With Contributions by

K. Aydin, S. Barbeaux, D. Clausen, M.E. Conners, C. Conrath, M. Dalton, J. DiCosimo, K. Echave, S. Gaichas, K. Goldman, D. Hanselman, T. Honkalehto, P. Hulson, J. Ianelli, S. Kotwicki, R. Lauth, S. Lowe, C. Lunsford, B. Matta, D. Nichol, O.A. Ormseth, C.J. Rodgveller, C.N. Rooper, P. Spencer, I. Spies, W. Stockhausen, T. TenBrink, G. Thompson, C. Tribuzio, T. Wilderbuer, M. Wilkins, and N. Williamson

**November 2011**

**North Pacific Fishery Management Council**
**605 West 4th Ave., Suite 306**
**Anchorage, AK 99501**

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

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# Summary

by

**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 flatfish stocks every year. Rockfishes, sharks, skates, octopus, 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.

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, David Carlile, Henry Cheng, Lowell Fritz, Mary Furuness, Dana Hanselman, Alan Haynie, Brenda Norcross, 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.

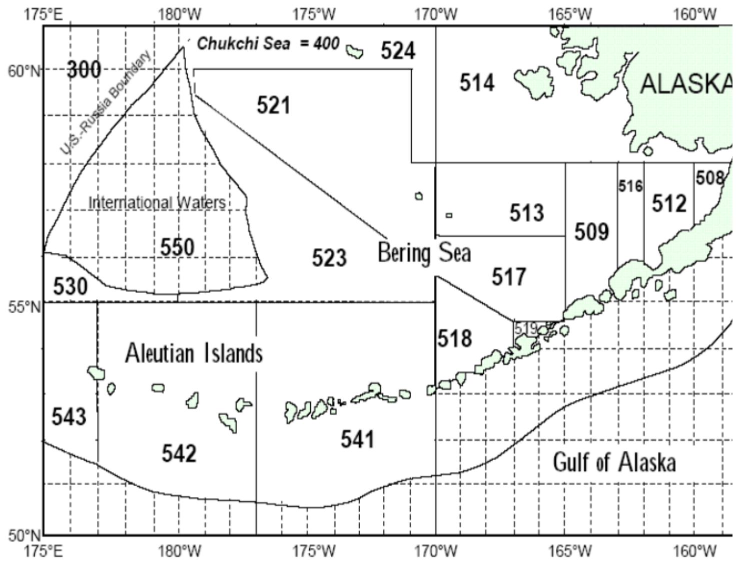



Figure 1. Bering Sea/Aleutian Islands statistical and reporting areas.

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.

1. In the Fishery:

   a. 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. This category includes walleye pollock, Pacific cod, sablefish, yellowfin sole, Greenland turbot, arrowtooth flounder, rock sole, flathead sole, Alaska plaice, "other flatfish," Pacific ocean perch, northern rockfish, shortraker rockfish, rougheye rockfish, "other rockfish," Atka mackerel, sharks, skates, sculpins, octopus, and squid.

2. Ecosystem Component:

   a. 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.

   b. 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.

**Species included in the BSAI Groundfish Fishery Management Plan by category**

| **In the Fishery** | |
|---|---|
| **Target Species**[2] | Walleye pollock<br>Pacific cod<br>Sablefish<br>Yellowfin sole<br>Greenland turbot<br>Arrowtooth flounder<br>Northern Rock sole<br>Flathead sole<br>Alaska plaice<br>Other flatfish assemblage<br>Pacific ocean perch<br>Northern rockfish<br>Shortraker rockfish<br>Blackspotted/Rougheye rockfish assemblage<br>Other rockfish assemblage<br>Atka mackerel<br>Squid assemblage<br>Shark assemblage<br>Skate assemblage<br>Sculpin assemblage<br>Octopus assemblage |
| **Ecosystem Component** | |
| **Prohibited Species**[1] | Pacific halibut<br>Pacific herring<br>Pacific salmon<br>Steelhead trout<br>King crab<br>Tanner crab |
| **Forage Fish Species**[3] | Osmeridae family (eulachon, capelin, and other smelts)<br>Myctophidae family (lanternfishes)<br>Bathylagidae family (deep-sea smelts)<br>Ammodytidae family (Pacific sand lance)<br>Trichodontidae family (Pacific sand fish)<br>Pholidae family (gunnels)<br>Stichaeidae family (pricklebacks, warbonnets, eelblennys, cockscombs, and shannys)<br>Gonostomatidae family (bristlemouths, lightfishes, and anglemouths)<br>Order Euphausiacea (krill) |

[1] Must be immediately returned to the sea, except when retention is required or authorized.
[2] TAC for each listing. Species and species groups may or may not be targets of directed fisheries.
[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 implemented by the Council. Catches generally total well below the 2 million t optimal yield (OY) cap. Catches in the EBS for 2010 totaled 1,206,680 t; catches through November 5, 2011 totaled 1,683,732 t.

Catches in the Aleutian Islands (AI) subarea have always 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 68,496 t in 2010; and 50,556 t through November 5, 2011. Pacific cod is the second largest fishery at 29,000 t in 2010 and 10,706 t through November 5, 2011. Total AI catches were 148,520 t in 2010 and 95,227 t through November 5, 2011. Recent total AI catches peaked at 190,750 t in 1996.

Total catches since 1954 for the BSAI, combined, are in Table 4. Total 2010 BSAI catches were 1,355,200 t (80 percent of total TACs and 67 percent of the OY); BSAI catches through November 5, 2011 totaled 1,778,959 t (89 percent of total TACs and OY). The relationship of the various biological reference points (biomass, OFL, ABC, TAC, and catch) is depicted in Figure 2.

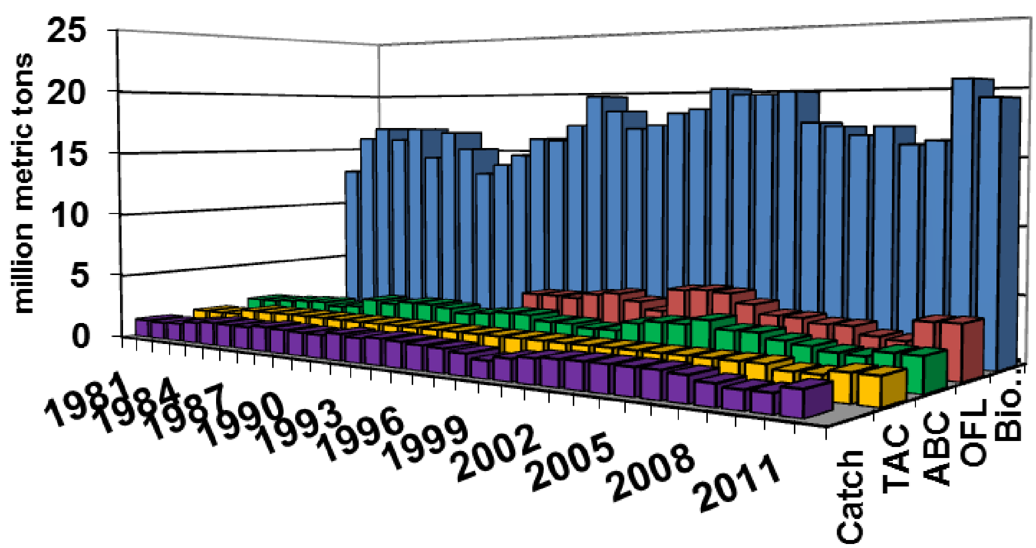



Figure 2. Biomass, Overfishing Level, Acceptable Biological Catch and Total Allowable Catch for 1981-2012* and Catch, 1981-2011 (*2012, as recommended by the Plan Team and assuming TAC = OY)

## 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. Due to recent declines in biomasses of walleye pollock and Pacific cod, for example, and prohibited species catch 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. The TAC in 2011 was set at 2,000,000 t, equal to OY.

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 prohibited species catch (PSC) limits.

The TAC specifications for the primary allocated species, and PSC limit specifications, are recommended by the Council at its December meeting. 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*
     - $F_{ABC} \le \mu_H$, *the harmonic mean of the pdf*
   - 1b) Stock status: $\alpha < B/B_{MSY} \le 1$
     - $F_{OFL} = \mu_A \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
     - $F_{ABC} \le \mu_H \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
   - 1c) Stock status: $B/B_{MSY} \le \alpha$
     - $F_{OFL} = 0$
     - $F_{ABC} = 0$
2) Information available: *Reliable point estimates of B, $B_{MSY}$, $F_{MSY}$, $F_{35\%}$, and $F_{40\%}$.*
   - 2a) Stock status: $B/B_{MSY} > 1$
     - $F_{OFL} = F_{MSY}$
     - $F_{ABC} \le F_{MSY} \times (F_{40\%}/F_{35\%})$
   - 2b) Stock status: $\alpha < B/B_{MSY} \le 1$
     - $F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
     - $F_{ABC} \le F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
   - 2c) Stock status: $B/B_{MSY} \le \alpha$
     - $F_{OFL} = 0$
     - $F_{ABC} = 0$
3) Information available: *Reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.*
   - *3a) Stock status:* $B/B_{40\%} > 1$
     - $F_{OFL} = F_{35\%}$
     - $F_{ABC} \le F_{40\%}$
   - *3b) Stock status:* $\alpha < B/B_{40\%} \le 1$
     - $F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
     - $F_{ABC} \le F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
   - *3c) Stock status:* $B/B_{40\%} \le \alpha$
     - $F_{OFL} = 0$
     - $F_{ABC} = 0$
4) Information available: *Reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.*
   - $F_{OFL} = F_{35\%}$
   - $F_{ABC} \le F_{40\%}$
5) Information available: *Reliable point estimates of B and natural mortality rate M.*
   - $F_{OFL} = M$
   - $F_{ABC} \le 0.75 \times M$
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*
   - $ABC \le 0.75 \times OFL$

## 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 2012 and 2013 ABCs and OFLs are summarized in Tables 1, 5, and 6.

The sum of the recommended ABCs for 2012 and 2013 are 2.51 million t and 2.64 million t, respectively. These are 20,000 t less than and 110,000 t more than the sum of the 2011 ABCs (2.53 million t), indicating relative stability in 2012, after a rebound in stock status in 2011 that followed 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 $B_{35\%}$. Many stocks are rebounding due to increased recent recruitments. The abundances of EBS pollock, Pacific cod, sablefish, all rockfishes managed under Tier 3, all flatfishes managed under Tiers 1 or 3, and Atka mackerel are projected to be above $B_{MSY}$ or the $B_{MSY}$ proxy of $B_{35\%}$ in 2012. The abundance of AI pollock is projected to be about 14 percent below $B_{35\%}$.

The sum of the biomasses for 2012 listed in Table 5 (19.4 million t) is down approximately six percent compared to 2011 (20.6 million t). Pollock and Pacific cod biomasses are increasing after a period of decline. Flatfishes generally are trending upwards. The 2011 bottom trawl survey biomass estimate for pollock was 3.11 million t, down 17 percent from the 2010 estimate, and still below average for the 1987-2011 time series. There was no new estimate from the acoustic-trawl survey in 2011, which was 2.32 million t in 2010; the 2010 estimate was up 151 percent from the 2009 estimate, but still below average for the 1979-2010 time series.

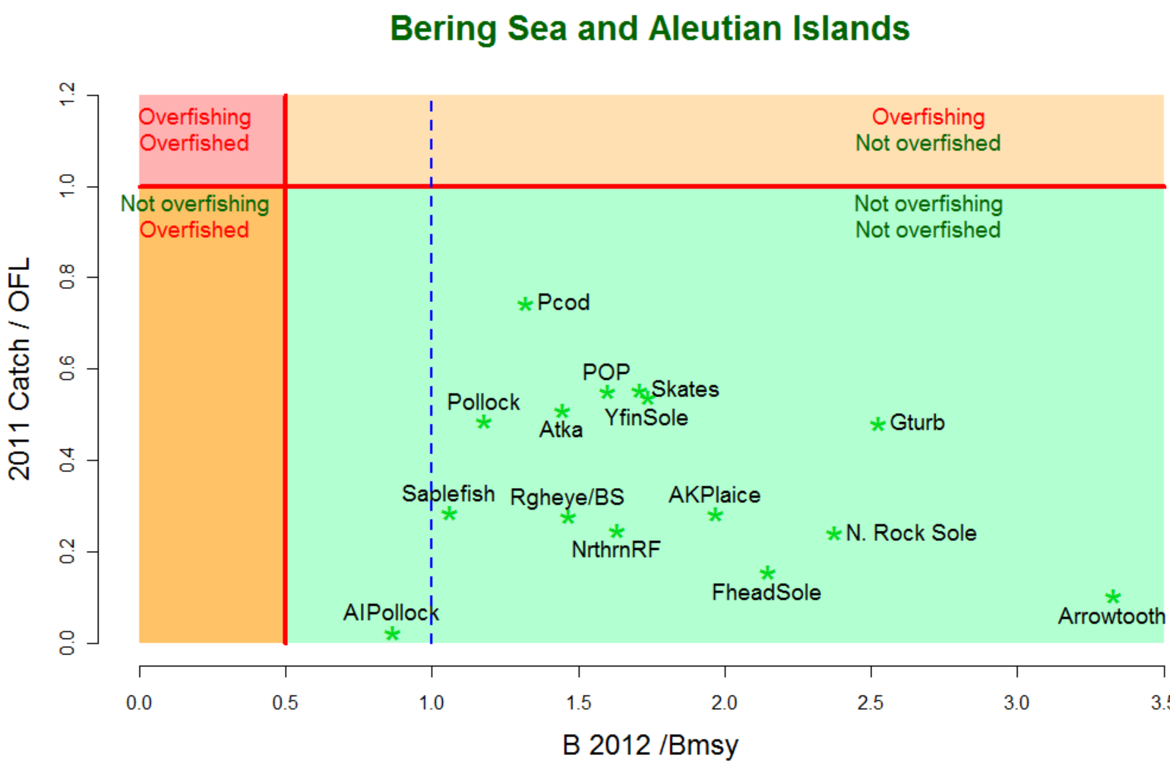



Figure 3. Summary status of age-structured BSAI species as measured by 2011 catch level relative to OFL (vertical axis) and projected 2012 spawning biomass relative to $B_{MSY}$.

The sum of the biomasses for 2012 listed in Table 5 (19.4 million t) is down approximately six percent compared to 2011 (20.6 million t). Pollock and Pacific cod biomasses are increasing after a period of decline. Flatfishes generally are trending upwards. The 2011 bottom trawl survey biomass estimate for pollock was 3.11 million t, down 17 percent from the 2010 estimate, and still below average for the 1987-2011 time series. There was no new estimate from the acoustic-trawl survey in 2011, which was 2.32 million t in 2010; the 2010 estimate was up 151 percent from the 2009 estimate, but still below average for the 1979-2010 time series.

Following the highest observation in 1994, the Pacific cod bottom trawl survey biomass estimate declined steadily through 1998 and remained around 600,000 t from 2002 through 2005. However, the survey biomass estimates were at all-time lows from 2006 through 2008. The 2009 biomass estimate was slightly higher than the 2008 estimate, and the 2010 biomass estimate was more than double the 2009 estimate. The 2011 biomass estimate was 4 percent higher, at 896,000 t. The 2006 and 2008 year classes appear to be strong, and stock abundance is expected to increase substantially in the near term; however, these follow a string of five consecutive sub-par year classes spawned from 2001-2005. The 2010 AI biomass estimate of 68,000 t was the lowest in the survey time series. No update is available since the AI trawl survey was not scheduled for 2011. The best estimate continues to be 91 percent in the EBS and 9 percent in the AI, replacing the previous proportions of 84 percent and 16 percent, respectively.

## 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. 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 5, 2011.

## Two-Year OFL and ABC Projections

Proposed and final 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 proposed 2012 and 2013 specifications will become effective when final rulemaking occurs in February or March 2012. The 2012 specifications (from Council recommendations in December 2010) will already be in place to start the fishery on January 1, 2012, but these will be replaced by final specifications recommended by the Council in December 2010. This process allows the Council to use the most current survey and fishery data in stock assessment models for setting the next two years’ quotas, while having no gap in specifications. The 2013 ABC and OFL values recommended in next year’s SAFE report are likely to differ from this year’s projections for 2013 because of new (e.g., survey) information that is incorporated into the assessments. In the case of stocks managed under Tier 3, 2012 and 2013 proposed ABC and OFL projections 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, 2013 projections are set equal to the Plan Team’s recommended values for 2012.

## Ecosystem Considerations

This year, the Ecosystem Considerations report included two synthesis sections: an update to last year's Bering Sea "Report Card" and ecosystem assessment, as well as a new Aleutian Islands "Report Card" and ecosystem assessment. The format and process for developing the Aleutian Islands synthesis was based on that of the Bering Sea synthesis developed in 2010. However, the end result differed due to the relatively few physical and ecological data sets available for the Aleutian Islands compared to the Bering Sea. In addition, the Aleutian Island ecosystem assessment team suggested that the significant ecological and physical variability along the island chain warranted dividing the assessment into three ecoregions: west, central, and east. A Gulf of Alaska assessment is planned for 2012 following the format and process of the Bering Sea and Aleutian Islands assessments. To the chapter as a whole, 44 indices were updated and 7 new ones were added. Additional important highlights follow.

*Eastern Bering Sea*

1. Despite neutral winter and spring temperatures and sea ice, the eastern Bering Sea remained in a cold pattern due to an unusually cold and stormy summer 2011. The cold pool was not as extensive as the previous few years, and the mean bottom temperature was nearly a degree warmer than in 2010. However, the mean surface temperature remained much colder than the long-term mean and was 0.1$^{o}$C lower than in 2010. Continued cold conditions may lead to early sea ice formation in fall 2011. A weak to moderate La Niña is predicted for the upcoming winter, which would be the second in a row.

2. Jellyfish abundance has increased dramatically in the past 2-3 years. Catch per unit effort (CPUE) during summer trawl surveys remained relatively stable from 200 through 2008. A notable increase in jellyfish CPUE occurred in 2009. CPUE in 2011 was nearly double that of the previous two years and nearly the same as the peak value in 2000 that occurred following a decade of steadily increasing catch rates. The fall BASIS surveys noted a substantial CPUE increase in 2010. The species composition in both surveys has been dominated by *Chrysaora melanaster.* Other species have declined since 2004, suggesting that the trend has shifted to a catch dominated by a single species. Increases in jellyfish biomass may redirect energy pathways in the food web through their predation on zooplankton and small fish. In contrast, CPUE of jellyfish in the Gulf of Alaska during 2011 surveys was low.

3. Thick-billed murres on St George experienced reproductive failure, suggesting that their piscivorous prey were not available during summer 2011.

4. Both *Calanus* copepod and euphausiid time series showed peak values in 2009, followed by small declines in 2010. Zooplankton were still considered abundant, indicating good conditions for planktivorous species through 2010.

5. There is an overall decreasing trend in Pacific cod biomass in the Aleutian Islands, whereas arrowtooth flounder, Kamchatka flounder, and skates are all increasing.

6. Index of human disturbance decreased in 2011 (using bottom trawl effort as an indicator).

*Aleutian Islands*

1. The winter North Pacific Index (NPI) may be negatively correlated with planktivorous seabirds' productivity. Values of the NPI this year were low and corresponded with increased auklet reproductive success in recent years.

2. Arrowtooth and Kamchatka flounders increased in the western Aleutian Islands; apex predators decreased in survey biomass in the central Aleutian Islands.

3. Fishery changes noted– no directed Atka mackerel or Pacific cod fisheries occurred in the western Aleutian Islands in 2011 due to implementation of management changes related to Steller sea lion reasonable and prudent alternatives (RPAs). The sea lion RPAs also included critical habitat closures for both fisheries and a TAC reduction for the Atka mackerel fishery in the central Aleutian Islands.

4. An oil spill and shipping traffic risk assessment was performed and is available.

5. Critical data gaps include an analysis of fishery exploitation rates by region (west, central, and east – to be worked on for next year). The role of myctophids and squids is extremely important in the AI and poorly understood (very limited data available).

## Uncertainty

Statistical uncertainty is addressed in the individual assessments, and to some degree, by the Tier system used to establish ABCs. In the past, statistical uncertainty or natural variability in the stock has led the Plan Team to recommend ABC values lower than the maximum permissible level for walleye pollock, Pacific cod, and Greenland turbot. For example, the Plan Team's recommended 2012 and 2013 ABCs for EBS pollock are reduced by 45 percent and 46 percent, respectively, from their potential maxima (Table 6).

## Effects of Cancelled Surveys

Except under Tier 1, current harvest rules do not automatically adjust for assessment uncertainty. Assessment uncertainty is increasing in Alaska groundfish assessments because some surveys have been cancelled due to decreased funding. Lacking an uncertainty adjustment, ABC recommendations may risk long-term fishery sustainability. To address this uncertainty, the Plan Team recommends: 1) increase funding so that surveys are not cancelled; and 2) modify harvest rules so that more tiers (especially 3 and 5) account for assessment uncertainty. The Plan Team specifically is concerned about species that rely on the Aleutian Islands trawl survey for biomass estimates, including Atka mackerel, walleye pollock, Pacific cod, and Pacific ocean perch and the Bering Sea slope survey for biomass estimates of Greenland turbot.

## Economic Summary of the BSAI Commercial Groundfish Fisheries in 2009-2010

The domestic groundfish fishery off Alaska is the largest fishery by volume in the U.S. 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.

More specifically, 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 presented in this report cover the years 2006 through 2010, 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 contains links to data on some of the external factors that, in part, determine 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 here in the last four years' 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.

A new section has been added to the Economic SAFE Report this year that analyzes economic performance using indices. Indices for different sectors of the North Pacific 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.

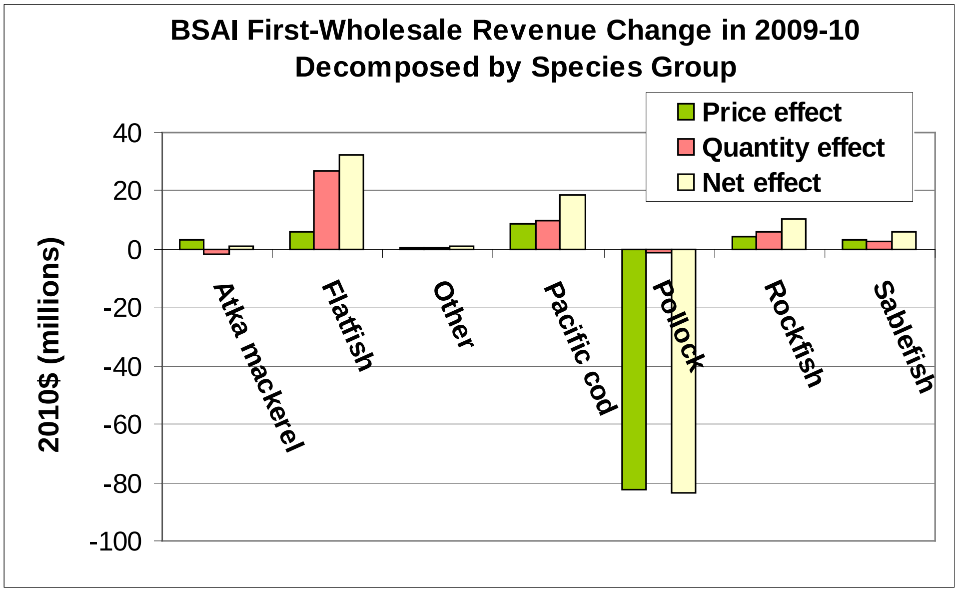
## A Decomposition of the Change in First-Wholesale Revenues from 2009-2010

The following brief analysis summarizes the overall changes that have occurred in the quantity produced, value, and revenue generated from Alaska groundfish. According to data reported in the 2011 Economic SAFE report, first-wholesale revenues from the processing and production of Alaska groundfish in the BSAI area were approximately $1.6 billion in 2009 and 2010. During that same time-period, the total quantity of groundfish products from the BSAI increased by 9.3 percent from 581,000 t to 625,000 t, an increase of 36,400 t. Overall, first wholesale revenues from Alaska groundfish fisheries increased by 2.4 percent in 2010 relative to 2009 levels.

By species, a negative price effect for pollock of -$82.6 million in 2009-10 was calculated in the first-wholesale revenue decomposition for the BSAI. This negative effect for pollock was almost completely offset by a combination of positive price and quantity effects for flatfish, Pacific cod, rockfish, and sablefish. The negative price effect for pollock translated into negative price effects for roe and fillets product groups for all species. These price effects for pollock were offset by a combination of positive price and quantity effects for surimi, whole head & gut and other product groups.

In summary, the BSAI had a relatively small change of -$14.3 million in first-wholesale revenues for 2009-10. In comparison, the corresponding change for the BSAI in 2008-09 was equal to -$519.8 million, which was caused by large negative price effects for cod and pollock, and a negative quantity effect for pollock. The decrease in BSAI first-wholesale revenues for 2009-2010 was due entirely to a negative price effect for pollock despite an overall quantity increase in processed groundfish products.

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 (2010 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.



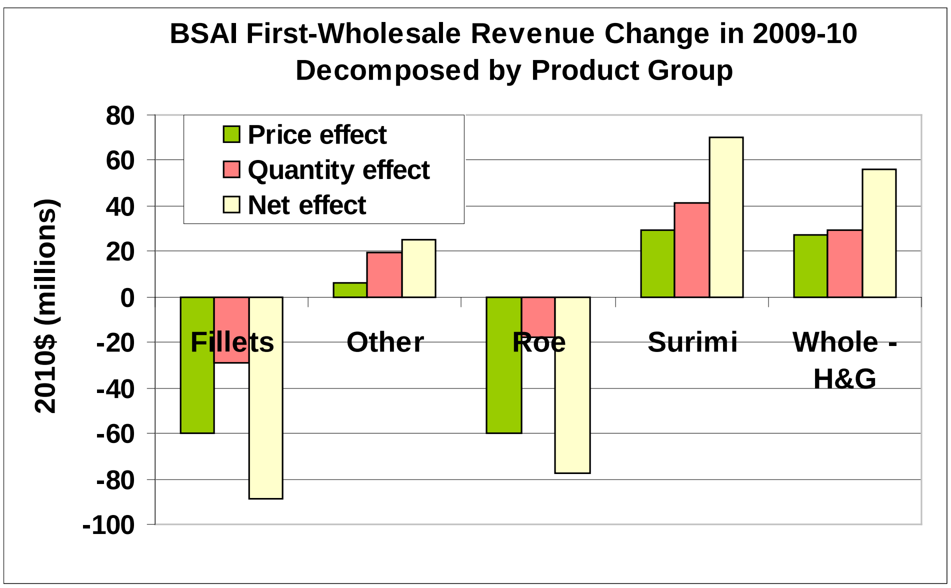




Figure 4. Decomposition of the change in first-wholesale revenues from 2009-10 in the BSAI area.

## 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 OFL and ABC for 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 3+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| Eastern Bering Sea | 2010 | 4,620,000 | 918,000 | 813,000 | 813,000 | 810,395 |
| | 2011 | 9,620,000 | 2,450,000 | 1,270,000 | 1,252,000 | 1,197,571 |
| | 2012 | 8,340,000 | 2,470,000 | 1,220,000 | n/a | n/a |
| | 2013 | 8,570,000 | 2,840,000 | 1,360,000 | n/a | n/a |
| Aleutian Islands | 2010 | 242,000 | 44,500 | 36,700 | 19,000 | 1,285 |
| | 2011 | 261,000 | 44,500 | 36,700 | 19,000 | 1,162 |
| | 2012 | n/a | 39,600 | 32,500 | n/a | n/a |
| | 2013 | n/a | 42,900 | 35,200 | n/a | n/a |
| Bogoslof | 2010 | 110,000 | 22,000 | 156 | 50 | 176 |
| | 2011 | 110,000 | 22,000 | 156 | 150 | 140 |
| | 2012 | 110,000 | 22,000 | 16,500 | n/a | n/a |
| | 2013 | 110,000 | 22,000 | 16,500 | n/a | n/a |

### *Eastern Bering Sea*

*Changes from previous assessment*

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

- 2011 NMFS summer bottom trawl survey abundance-at-age estimates
- 2010 age composition estimates were updated using acoustic-trawl survey age data (in last year's assessment, an age-length key from the 2010 bottom trawl survey was used)
- Observer data for age and average weight-at-age from the 2010 fishery
- Total catch as reported by NMFS Alaska Regional office were updated through 2011
- The acoustic index from the bottom trawl survey vessels was updated from 2006-2011

The only change in the assessment model was the use of the acoustic index from the bottom trawl survey vessels, which was reviewed last year by the Plan Team and SSC but not used in last year's assessment.

*Spawning biomass and stock status trends*

Estimates of age 3+ biomass from this year's assessment are higher than those from last year's assessment for every year from 1988-2008, but lower for every year since then. For example, the estimates/projections of 2011 and 2012 age 3+ biomass in this year's assessment are 19 percent and 26 percent lower than the respective projections in last year's assessment.

Spawning biomass in 2008 was at the lowest level since 1980, but has increased by 43 percent since then, with further increases projected for the next few years. 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. Spawning biomass is projected to be 17 percent and 26 percent above $B_{MSY}$ in 2012 and 2013, 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 2.03 million t. Projected spawning biomass for 2012 is 2.39 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 0.533, down 5 percent from last year’s value of 0.564. The harvest ratio of 0.533 is multiplied by the geometric mean of the projected fishable biomass for 2012 (4.13 million t) to obtain the maximum permissible ABC for 2012, which is 2.20 million t, up 2 percent and down 3 percent from the maximum permissible ABCs for 2011 and 2012 projected in last year’s assessment.

The authors recommend setting the ABCs for 2012 and 2013 below their respective maximum permissible levels; specifically, at values corresponding to the average harvest rate over the most recent five complete years (0.30), with the strength of the 2008 year class set equal to the long-term average. Projected harvesting under under this scenario results in ABCs for 2012 and 2013 equal to 1.09 million t and 1.14 million t, respectively. Last year, the Plan Team agreed with the authors that ABC should be set well below the maximum permissible level, the primary reason being the large hole in the age structure created by poor recruitments from the 2002-2005 year classes, which was expected to result in half of the 2011 catch coming from a single (2006) year class. As of this year, the 2008 year class has been observed by multiple surveys over three years and its above-average strength has been substantially confirmed, one result of which is that the 2012 catch is projected to be much less dependent upon a single year class, so the Plan Team’s concerns from last year are somewhat lessened. Nevertheless, the Plan Team agreed that the authors, who listed 14 reasons in support of their recommendation to set ABC well below the maximum permissible level, have made a compelling case. At the same time, the Plan Team disagreed with the authors’ recommendation to set the strength of the 2008 year class equal to the long-term average, concluding instead that the strength estimated by the model should be used in making projections. When the strength of the 2008 year class is set equal to the model estimate, harvesting at the recent average fishing mortality rate is projected to result in 2012 and 2013 catches of 1.22 million t and 1.36 million t, respectively, which are the Plan Team’s recommended ABCs.

The OFL harvest ratio under Tier 1a is 0.60, 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 2012 gives the OFL for 2012, which is 2.47 million t. The current projection for OFL in 2013 given a 2012 catch equal to the Plan Team’s recommended ABC is 2.84 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 consists of updated catch information from 1978 through 2011, and inclusion of the 1980, 1983, and 1986 Aleutian Islands bottom trawl surveys. In addition, a generalized additive model was applied to estimate weight-at-age data for years where those data were missing. This year’s model estimate of natural mortality was 0.19, down from 0.20 in previous years.

*Spawning biomass and stock status trends*

This year’s assessment estimates that spawning biomass reached a minimum level of about $B_{28\%}$ in 1999, increased steadily through 2006 to a level around $B_{37\%}$, and then decreased to about $B_{30\%}$ 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 2012 is projected to be 70,900 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 the reference model for evaluating stock status and recommending ABC. The reference model estimates $B_{40\%}$ at a value of 93,600 t, placing the AI pollock stock in sub-tier “b” of Tier 3. Under Tier 3b, with $F_{40\%}$=0.37, the maximum permissible ABC is 32,500 t for 2012. The Plan Team recommends setting 2012 ABC at this level. Following the Tier 3b formula with $F_{35\%}$=0.47, OFL for 2012 is 39,600 t. Given a 2012 catch of 19,000 t, the maximum permissible ABC would be 29,300 for 2013 and the projected OFL would be 35,900 t. If the 2012 catch is only 1,540 t (i.e., equal to the five year average), the 2013 maximum permissible ABC would be 35,200 t and the 2013 OFL would be 42,900 t. The Plan Team recommends setting 2013 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 2009 Bogoslof pollock acoustic-trawl survey resulted in the lowest estimate of biomass (110,000 t) in the region since the survey began in 1988. There was no survey in 2010 or 2011. The authors explored alternative methods for setting ABC (see below).

*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 110,000 t in 2009 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. Traditionally, the ABC for this stock has been set using a formula similar to the Tier 3 formula, but substituting a reference biomass level of 2 million t for $B_{40\%}$.

This year the authors’ presented three new strategies for setting ABC and OFL. The Plan Team concurs with the authors’ recommendation to revert to a more standard Tier 5 approach, using the most recent survey to provide the estimate of current biomass. The maximum permissible ABC value for 2012 would be 16,500 t (assuming M = 0.2 and $F_{ABC}$ = 0.75 x M = 0.15): ABC = $B_{2009}$ x M x 0.75 = 110,000 x 0.2 x 0.75 = 16,500 t. The projected ABC for 2013 is the same.

Following the Tier 5 formula with *M*=0.20, OFL for 2012 is 22,000 t. The OFL for 2013 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 3+ biomass | OFL | ABC | TAC* | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 1,140,000 | 205,000 | 174,000 | 168,780 | 159,012 |
| | 2011 | 1,560,000 | 272,000 | 235,000 | 227,950 | 202,697 |
| | 2012 | 1,620,000 | 369,000 | 314,000 | n/a | n/a |
| | 2013 | 1,620,000 | 374,000 | 319,000 | 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 2011 Eastern Bering Sea trawl survey biomass estimate was 4% above the 2010 value, which was about twice the 2007-2009 level.

*Change in assessment methods*

The cod assessments in the GOA and BSAI have been the object of a great deal of scrutiny and development over the last several years. The accuracy of age readings for this stock has been a continuing concern, mainly because the mean size at age from age readings did not match the first three clear modes of cod length frequencies in the Bering Sea trawl survey. Other issues have been the trawl survey catchability coefficient, the modeling of commercial selectivity (variable or not, asymptotic or not, fishery by fishery), and the modeling of growth (constant, cohort-specific, year-specific). In 2011 there was a CIE review and two rounds of model proposals, trials, and reviews by the Plan Teams and SSC (May/June and September/October) that produced the five candidate models (1, 2b, 3, 3b, and 4) for the 2012 OFL/ABC specifications. Model 1 was the 2010 preferred model, whose main features were:

(i) Natural mortality $M = 0.34$ fixed externally.

(ii) Commercial length compositions fitted, not commercial CPUE. Length-specific commercial selectivities, estimated in blocks of years, some forced to be asymptotic.

(iii) Trawl survey age composition and CPUE fitted. Age-specific trawl survey selectivity with annually varying left limb. Trawl survey catchability fixed at 0.77, which in the 2009 assessment had resulted in the average product of catchability and selectivity of 60-80 cm fish being 0.47, the value estimated from a small set of data from archival tag recoveries.

(iv) A single schedule for mean length at age estimated internally for all years. Standard deviation of length at age a linear function of mean length at age, estimated externally.

(v) Assumed age reading bias of +0.4 y at all ages.

(vi) Length composition data not used where age composition data were available.

The other models were as follows:

- Model 2b was the same as Model 1 except that the pre-1982 trawl survey data were left out and the author made a number of small but helpful housekeeping changes to the model configuration.
- Model 3 was the same as Model 2b except that aging error parameters were estimated internally.
- Model 3b was the same as Model 3 except that the standard deviation of length at age was estimated internally, the mean length-at-age data were left out of the likelihood, and all length frequency data were used.
- Model 4 was the same as Model 3b except that all age composition data were left out of the fit (to avoid the whole issue of aging error).

*Author and Team evaluation of alternative models*

All of the models produced similar fits to the survey abundance data and similar estimates of historical recruitment and present abundance. All models predicted mean length at age of younger fish in good agreement with the modes in the trawl survey length frequencies. Model 3b fitted the survey age data best in most years.

The author adopted a set of criteria for choosing a preferred model, including among others (i) that the age data should be used if possible, (ii) that aging error should be estimated internally if possible, and (iii) that the standard deviation of length at age should be estimated internally. By these criteria Model 3b was the clear choice. The Plan Team endorsed the author's criteria and the choice of Model 3b

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

$B_{40\%}$ for this stock is estimated to be 355,000 t and projected spawning biomass in 2012 according to Model 3b is 410,000 t, so this stock is assigned to Tier 3a. While there remains some concern about the fixed value of trawl survey catchability used in the assessment, 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 and 2008 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, presently 9 percent. The resulting ABC of Pacific cod is not apportioned between the EBS and AI. In 2010 (the last year in which a bottom trawl survey was conducted in both the EBS and AI), the ratio of catch to survey biomass in the Aleutian Islands was about twice that in the Bering Sea. The Team is in favor of implementing an area apportionment that would equalize the exploitation rates. The SSC has recommended that the stock be managed under a combined BSAI OFL and separate BS and AI ABCs sometime 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 4+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| Bering Sea | 2010 | 38,000 | 3,310 | 2,790 | 2,720 | 754 |
| | 2011 | 37,000 | 3,360 | 2,850 | 2,850 | 668 |
| | 2012 | 30,000 | 2,640 | 2,230 | n/a | n/a |
| | 2013 | 28,000 | 2,610 | 2,200 | n/a | n/a |
| Aleutian Islands | 2010 | 27,000 | 2,450 | 2,070 | 2,070 | 1,076 |
| | 2011 | 25,000 | 2,250 | 1,900 | 1,900 | 950 |
| | 2012 | 26,000 | 2,430 | 2,050 | n/a | n/a |
| | 2013 | 24,000 | 2,400 | 2,020 | 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 2011 longline and trawl surveys
- relative abundance from the 2010 longline fishery
- length data from the 2010 longline and trawl fisheries
- age data from the 2010 longline survey and longline fishery
- updated 2010 catch and estimated 2011 catch.

There were no model changes.

The 2011 survey abundance index increased 3 percent from 2010 and follows a 10 percent increase between 2009 and 2010. The fishery abundance index was down 9 percent from 2009 to 2010 (2011 data not yet available).

*Spawning biomass and stock status trends*

Spawning biomass is projected to decrease from 2011 to 2016, and then increase. The spawning biomass has increased from a low of 30 percent of unfished biomass in 2002 to 37 percent, projected for 2012. The 1997 year class has been an important contributor to the population but has been reduced and should comprise 10 percent of the 2012 spawning biomass. The 2000 year class appears to be larger than the 1997 year class, and is now mature; it is expected to comprise 23 percent of the spawning biomass in 2012. The 2002 year class shows signs of strength and is expected to comprise 10 percent of spawning biomass in 2012, when 92 percent of the individuals will be mature. The 2008 year class may also be above average.

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

Sablefish are managed under Tier 3. Reference points are calculated using age-2 recruitments from 1979-2009. The updated point estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ from this assessment are 109,000 t (combined across the EBS, AI, and GOA), 0.10, and 0.11, respectively. Projected female spawning biomass (combined areas) for 2012 is 101,000 t (93 percent of $B_{40\%}$), placing sablefish in sub-tier “b” of Tier 3. The maximum permissible value of $F_{ABC}$ under Tier 3b is 0.09, which translates into a 2012 ABC (combined areas) of 17,200 t. The OFL fishing mortality rate is 0.11 which translates into a 2012 OFL (combined areas) of 20,400 t.

*Area allocations*

Using established procedures for determining area apportionments, the OFL and ABC for Bering Sea sablefish are 2,640 t and 2,230 t in 2012, and 2,610 t and 2,200 t in 2013. The OFL and ABC for Aleutian Island sablefish are 2,430 t and 2,050 t in 2012, and 2,400 t and 2,020 t in 2013.

*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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 6+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 1,960,000 | 234,000 | 219,000 | 219,000 | 118,624 |
| | 2011 | 1,960,000 | 262,000 | 239,000 | 196,000 | 141,400 |
| | 2012 | 1,950,000 | 222,000 | 203,000 | NA | NA |
| | 2013 | 1,990,000 | 226,000 | 207,000 | NA | NA |

*Changes from previous assessment*

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

- 2010 fishery and survey age compositions
- 2011 trawl survey biomass point estimate and standard error
- estimates of the discarded and retained portions of the 2010 catch
- estimate of total catch through the end of 2011.

Time-varying growth by age, year and gender was implemented in the model. This year's EBS bottom trawl survey resulted in a biomass estimate of 2.40 million t, compared to last year's survey biomass of 2.37 million t (an increase of 1 percent).

*Spawning biomass and stock status trends*

The projected female spawning biomass estimate for 2012 is 593,000 t. Projected spawning biomass for 2012 and beyond suggests a reversal 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 341,000 t. Corresponding to the approach used in recent years, the 1978-2005 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 0.10. The current value of the OFL harvest ratio (the arithmetic mean of the $F_{MSY}$ ratio) is 0.11. The product of the maximum permissible ABC harvest ratio and the geometric mean of the 2012 biomass estimate produces the author- and Plan Team-recommended 2012 ABC of 203,000 t, and the corresponding product using the OFL harvest ratio produces the 2012 OFL of 222,000 t. For 2013, the corresponding quantities are 207,000 t and 226,000 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 1+ Bio. | OFL | Subarea | ABC | TAC | Catch |
|---|---|---|---|---|---|---|---|
| BSAI | 2010 | 61,100 | 7,460 | | 6,120 | 6,120 | 4,138 |
| | | | | EBS | 4,220 | 4,220 | 2,272 |
| | | | | AI | 1,900 | 1,900 | 1,866 |
| BSAI | 2011 | 74,000 | 7,220 | | 6,140 | 5,050 | 3,493 |
| | | | | EBS | 4,590 | 3,500 | 2,979 |
| | | | | AI | 1,550 | 1,550 | 514 |
| BSAI | 2012 | 76,900 | 11,700 | | 9,660 | n/a | n/a |
| | | | | EBS | 7,230 | n/a | n/a |
| | | | | AI | 2,430 | n/a | n/a |
| BSAI | 2013 | 73,900 | 9,700 | | 8,030 | n/a | n/a |
| | | | | EBS | 6,010 | n/a | n/a |
| | | | | AI | 2,020 | n/a | n/a |

*Changes from previous assessment*

This year's Greenland turbot assessment model included:

- updated 2010 and 2011 catch data
- 2011 EBS shelf survey biomass
- 2011 EBS shelf survey length composition estimates
- additional years of NMFS bottom-trawl shelf survey age data
- updated fishery catch-at-length data for longline and trawl gear from 2004-2011.

Refinements were made for estimating selectivities (additional parameters estimated), an alternative model was investigated in which male natural mortality was estimated (with female mortality fixed), and some adjustments were made to the length bin structure.

*Spawning biomass and stock status trends*

The projected 2012 female spawning biomass is 47,700 t. This is a slight (7 percent) decrease from the 2011 spawning biomass of 51,300 t. Spawning biomass is projected to decline further in 2013 to 41,400 t. While spawning biomass generally continues to decline, age 0 recruitment appears to have improved substantially in 2008, 2009, and particularly 2010. These year classes are all estimated to be stronger than any other year class spawned since 1989. Very high estimated biomass and numbers from the trawl survey are largely attributable to an increase in small (< 30 cm) fish.

*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. Greenland turbot therefore qualifies for management under Tier 3.

Updated point estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ from the present assessment are 21,600 t, 0.37, and 0.45, respectively. Projected spawning biomass for 2012 is 47,700 t. Relative to $B_{40\%}$, this places Greenland turbot in sub-tier “a” of Tier 3. The maximum permissible value of $F_{ABC}$ under this Tier translates into a maximum permissible ABC of 9,660 t for 2012 and 8,030 t for 2013, and the OFLs for 2012 and 2013 under the Tier 3a formula are 11,700 t and 9,700 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. The OFL and ABC for 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 1+ Bio | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 1,120,000 | 190,800 | 156,300 | 75,000 | 39,416 |
| | 2011 | 1,120,000 | 186,000 | 153,000 | 25,900 | 19,600 |
| | 2012 | 1,130,000 | 181,000 | 150,000 | n/a | n/a |
| | 2013 | 1,130,000 | 186,000 | 152,000 | n/a | n/a |

*Changes from previous assessment*

New input data include:

- fishery catch through 12 September 2011
- estimate of retained and discarded portion of the 2010 catch
- 2011 shelf survey size composition and biomass point estimates and standard errors.

The model is unchanged from last year.

*Spawning biomass and stock status trends*

The 2011 stock assessment model resulted in a 2012 age 1+ biomass projection of 1,130,000 t. This is identical to the value projected in last year’s assessment for 2012. There is a long-term trend of increasing arrowtooth flounder biomass in the EBS. If the harvest rate remains close to the recent average, this trend is expected to continue for the next couple of years due to the strong recruitment observed in the past decade.

*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 updated point estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ from the present assessment are 281,000 t, 0.22, and 0.27, respectively. Given that the projected 2012 spawning biomass of 818,000 t exceeds $B_{40\%}$, the Team’s ABC and OFL recommendations for 2012 were calculated under sub-tier “a” of Tier 3. The Team recommends setting $F_{ABC}$ at the $F_{40\%}$ (0.22) level, which is the maximum permissible level under Tier 3a. Projected harvesting at the $F_{40\%}$ level gives a 2012 ABC of 150,000 t and a 2013 ABC of 152,000 t. The OFL fishing mortality rate under Tier 3a is $F_{35\%}$ (0.27), which translates to a 2012 OFL of 181,000 t and a 2013 OFL of 186,000 t.

*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. 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 eastern Bering Sea shelf. Arrowtooth flounder in the Bering Sea is an occasional prey in the diets of groundfish in the Bering Sea, being eaten by Pacific cod, walleye pollock, Alaska skates, and sleeper sharks. However, given the large biomass of these species in the Bering Sea overall, these occasionally recorded events translate into considerable total mortality for the arrowtooth flounder population in the Bering Sea 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 2012 and 2013 is those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 1+ Bio | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| **BSAI** | 2011 | 129,000 | 23,600 | 17,700 | 17,700 | 9,242 |
| | 2012 | 125,000 | 24,800 | 18,600 | n/a | n/a |
| | 2013 | 125,000 | 24,800 | 18,600 | n/a | n/a |

Prior to 2011, this species was a constituent 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 2011 EBS bottom trawl survey biomass estimate. The assessment methodology was unchanged.

*Spawning biomass and stock status trends*

Because no age-structured model has been developed for Kamchatka flounder, spawning biomass estimates 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 survey biomass estimates from the EBS shelf, EBS slope, and AI over the period 2004-2011. The 2012 combined estimate of total biomass from the three surveys is 125,000 t. Recent exploitation rates (catch divided by survey biomass) increased from 5 percent in 2008 to 10 percent in 2009 and 16 percent in 2010 before declining to 7 percent in 2011.

*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 0.2. Biomass was estimated at a value of 125,000 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 2012 and 2013 OFL is 24,800 t, and the recommended 2012-2013 ABC is 18,600 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. Therefore, there is no 2010 OFL against which the 2010 catch can be compared and the overfishing status of Kamchatka flounder is undefined. 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 2+ Bio | OFL | ABC | TAC | Catch |
|---:|---:|---:|---:|---:|---:|---:|
| **BSAI** | 2010 | 1,570,000 | 243,000 | 240,000 | 90,000 | 53,222 |
| | 2011 | 1,870,000 | 248,000 | 224,000 | 85,000 | 60,292 |
| | 2012 | 1,860,000 | 231,000 | 208,000 | n/a | n/a |
| | 2013 | 1,840,000 | 217,000 | 196,000 | n/a | n/a |

*Changes from previous assessment*

Changes to input data in this analysis include:

- 2010 fishery age composition
- 2010 survey age composition
- 2011 trawl survey biomass point estimate and standard error
- updated fishery catch and discards for 2010 and 2011

The assessment methodology was unchanged.

*Spawning biomass and stock status trends*

The stock assessment model estimates a 2012 age-2+ biomass estimate of 1,860,000 t. This was equal to the 2011 value projected in last year's assessment. The northern rock sole stock is expected to increase 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 2012 is projected to be at 238 percent of $B_{MSY}$, 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 $F_{MSY}$ distribution were extremely close, resulting in little buffer between recommendations of ABC and OFL. This closeness resulted from estimates of $F_{MSY}$ 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 2009 to 10 percent in 2010 and 2011.

The Tier 1 2012 ABC harvest recommendation is 208,000 t ($F_{ABC}$ = 0.13) and the 2012 OFL is 231,000 t ($F_{OFL}$ = 0.15). The 2013 ABC and OFL values are 196,000 t and 217,000 t, respectively.

*Status determination*

This is a stable fishery that lightly exploits the stock because it is constrained by prohibited species catch limits and the BSAI optimum yield limit. Usually the fishery only takes a small portion of the northern rock sole ABC (the catch/biomass ratio is about 0.03). 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 3+ Bio. | OFL | ABC | TAC | Catch |
|---:|---:|---:|---:|---:|---:|---:|
| BSAI | 2010 | 785,000 | 83,100 | 69,200 | 60,000 | 20,126 |
| | 2011 | 791,000 | 83,300 | 69,300 | 41,500 | 13,080 |
| | 2012 | 811,000 | 84,500 | 70,400 | n/a | n/a |
| | 2013 | 815,000 | 83,100 | 69,200 | n/a | n/a |

*Changes from previous assessment*

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

- updated 2010 fishery catch and preliminary 2011 fishery catch
- updated 2010 fishery size compositions and preliminary 2011 fishery size compositions
- estimated survey biomass and standard error from the 2011 EBS trawl survey
- size compositions from the 2011 EBS trawl survey
- age compositions from the 2010 EBS trawl survey
- mean bottom temperature from the 2011 EBS trawl survey

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

*Spawning biomass and stock status trends*

Spawning biomass declined continuously from a high of 328,000 t in 1997 to a minimum of 243,000 t in 2009, increasing slightly 247,000 t in 2011. The projected 2012 and 2013 values are 250,000 t and 244,000 t, respectively. The 2001-2003 year classes are estimated to be above the 1994-2008 average, but recruitments from 1994-2008 on average have been much lower than recruitments from 1974-1989.

*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 $B_{40\%}$=133,000 t, $F_{40\%}$=0.28, and $F_{35\%}$=0.34. Because projected spawning biomass for 2012 (250,000 t) is above $B_{40\%}$, flathead sole is in sub-tier "a" of Tier 3. The authors and Plan Team recommend setting ABCs for 2012 and 2013 at the maximum permissible values under Tier 3a, which are 70,400 t and 69,200 t, respectively. The 2012 and 2013 OFLs under Tier 3a are 84,500 t and 83,100 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 3 + Bio | OFL | ABC | TAC | Catch |
|---:|---:|---:|---:|---:|---:|---:|
| **BSAI** | 2010 | 2,260,000 | 278,000 | 224,000 | 50,000 | 16,165 |
| | 2011 | 780,000 | 79,100 | 65,100 | 16,000 | 22,471 |
| | 2012 | 606,000 | 64,600 | 53,400 | n/a | n/a |
| | 2013 | 599,000 | 65,000 | 54,000 | n/a | n/a |

*Changes from previous assessment*

Input data included:

- preliminary 2011 fishery catch and updated 2010 fishery catch
- 2011 trawl survey biomass estimate and standard error
- 2011 length composition of survey catch
- 2010 survey age composition

No changes were made in the stock assessment model recommended by the assessment authors. However, the authors presented an alternative model in which the survey catchability coefficient (Q) was increased from 1.0 (the value used in last year's assessment and the authors' preferred model in this year's assessment) back to 1.2 (the value used in previous assessments). The Plan Team and senior author agreed that the model with Q=1.2 more accurately reflected the catchability of the EBS bottom trawl survey relative to the biomass of Alaska plaice present in the standard survey area. The purpose of lowering Q to 1.0 was to compensate for the biomass of Alaska plaice found in the 2010 survey of the northern Bering Sea (NBS). However, the Plan Team concluded that it was premature to adjust the model to account for a one-time survey of the NBS, and instead accepted the alternative model with Q=1.2.

*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. Age-3 recruitment has been increasing since the late 1990s, with exceptionally strong age-3 recruitment from the 2001 and 2002 year classes. If recent average fishing mortality rates continue into the future, this good recruitment should result in increased biomass.

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

Reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, therefore qualifying it for management under Tier 3a. The updated point estimates are $B_{40\%}$ = 151,000 t, $F_{40\%}$ = 0.15, and $F_{35\%}$ = 0.18. As a consequence of the reduced $M$ used in the model, these are values are now in the range expected for flatfishes. Given that the projected 2012 spawning biomass of 260,000 t exceeds $B_{40\%}$, the ABC and OFL recommendations for 2012 were calculated under sub-tier "a" of Tier 3. Projected harvesting at the $F_{40\%}$ level gives a 2012 ABC of 53,400 t and a 2013 ABC of 54,000 t. The OFL was determined from the Tier 3a formula, which gives a 2012 value of 64,600 t and a 2013 value of 65,000 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 and 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Total Bio. | OFL | ABC | TAC | Catch |
|---:|---:|---:|---:|---:|---:|---:|
| **BSAI** | 2010 | 121,000 | 23,000 | 17,300 | 17,300 | 2,194 |
| | 2011 | 127,000 | 19,500 | 14,500 | 3,000 | 3,116 |
| | 2012 | 111,000 | 17,100 | 12,700 | n/a | n/a |
| | 2013 | 111,000 | 17,100 | 12,700 | n/a | n/a |

*Changes from previous assessment*

The assessment incorporates:

- preliminary 2011 catch and updated 2010 catch
- 2011 EBS trawl survey biomass

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 Aleutian Islands. There is no consistent trend in the survey biomass of EBS butter sole over time. The 1982 estimate was 182 t compared to the 2011 estimate of 437 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 in 2007 and remains at a high level (64,000 t) in 2011. 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 10,300 t in 2011. 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. Thus distributional changes, onshore-offshore or north-south, might affect the survey biomass estimates (Table 11.5).

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

The SSC has classified "other flatfish" as a Tier 5 species complex with harvest recommendations calculated from estimates of biomass and natural mortality. Natural mortality rates for rex (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 2012-2013 ABC of 12,700 t for the "other flatfish" complex. The corresponding 2012-2013 OFL (average $F_{OFL}$ = 0.15) is 17,100 t.

*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.

Before the implementation of Amendment 80, this group of fisheries 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 flatfishes was assigned for 2008, although there was not a higher catch taken 2009 - 2011. The 2011 fishery is still open as of this writing.

## 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 3+ Bio | OFL | Subarea | ABC | TAC | Catch |
|---|---|---|---|---|---|---|---|
| BSAI | 2010 | 403,000 | 22,400 | | 18,860 | 18,860 | 17,852 |
| | | | | EBS | 3,830 | 3,830 | 3,547 |
| | | | | Eastern AI | 4,220 | 4,220 | 4,038 |
| | | | | Central AI | 4,270 | 4,270 | 4,033 |
| | | | | Western AI | 6,540 | 6,540 | 6,234 |
| BSAI | 2011 | 601,000 | 36,300 | | 24,700 | 24,700 | 17,981 |
| | | | | EBS | 5,710 | 5,710 | 2,053 |
| | | | | Eastern AI | 5,660 | 5,660 | 5,094 |
| | | | | Central AI | 4,960 | 4,960 | 4,768 |
| | | | | Western AI | 8,370 | 8,370 | 8,181 |
| BSAI | 2012 | 594,000 | 35,000 | | 24,700 | n/a | n/a |
| | | | | EBS | 5,710 | n/a | n/a |
| | | | | Eastern AI | 5,620 | n/a | n/a |
| | | | | Central AI | 4,990 | n/a | n/a |
| | | | | Western AI | 8,380 | n/a | n/a |
| BSAI | 2013 | 583,000 | 33,700 | | 28,300 | n/a | n/a |
| | | | | EBS | 6,540 | n/a | |
| | | | | Eastern AI | 6,440 | n/a | n/a |
| | | | | Central AI | 5,710 | n/a | n/a |
| | | | | Western AI | 9,610 | 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. A straightforward update of the assessment was presented in an executive summary because the Aleutian Islands survey was not conducted this year. Catch data were updated and the projection model was run using results from the starting point of the 2010 assessment model. The apportionment was updated and changed slightly.

*Spawning biomass and stock status trends*

Age 3+ biomass for 2012 is down slightly from the 2011 level projected a year ago. Spawning biomass is projected to be 221,000 t in 2012 and decline slightly to 214,000 t in 2013.

*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 158,000 t, 0.061, and 0.074 respectively. Spawning biomass for 2012 (221,000 t) is projected to exceed $B_{40\%}$ (158,000 t), thereby placing POP in sub-tier “a” of Tier 3. The 2012 and 2013 catches associated with the $F_{40\%}$ level of 0.061 are 29,400 t and 28,300 t, respectively. In 2010, the Plan Team recommended an adjusted ABC approach until the next Aleutian Islands survey, which would keep the recommendation steady at 24,700 t for 2012, followed by an increase to 28,300 t in 2013. The Plan Team continues to endorse this approach. The 2012 and 2013 OFLs are 35,000 t and 33,700 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 2012): BS = 5,710 t, Eastern Aleutians (Area 541) = 5,620 t, Central Aleutians (Area 542) = 4,990 t, and Western Aleutians (Area 543) = 8,380 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 3+ Bio. | OFL | ABC | TAC | Catch |
|---:|---:|---:|---:|---:|---:|---:|
| BSAI | 2010 | 202,000 | 8,640 | 7,240 | 7,240 | 4,332 |
| | 2011 | 201,000 | 10,600 | 8,670 | 4,000 | 2,644 |
| | 2012 | 202,000 | 10,500 | 8,610 | n/a | n/a |
| | 2013 | 203,000 | 10,400 | 8,490 | 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. A straightforward update of the assessment was presented in an executive summary because the Aleutian Islands survey was not conducted this year. Catch data were updated and the projection model was run using results from the starting point of the 2010 assessment model.

*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 1977. Female spawning biomass is projected to be 72,200 t in 2012.

*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 $B_{40\%}$ (50,600 t), $F_{40\%}$ (0.058), and $F_{35\%}$ (0.071). Because the female spawning biomass of 72,200 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 2012 is 8,610 t, which is the authors' and Plan Team's recommendation for the 2012 ABC. Under Tier 3a, the 2012 OFL is 10,500 t for the Bering Sea/Aleutian Islands combined. The Team continues to recommend setting a combined BSAI OFL and ABC. Because the catch has routinely been lower than the ABC, the 2011 catch was estimated at a value of 3,450 t to make projections to 2012. The recommended 2013 ABC and OFL are 8,490 t and 10,400 t, respectively.

*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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area/subarea | Year | Total Bio[1]. | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 21,200 | 669 | 547 | 547 | 256 |
| | 2011 | 24,200 | 549 | 454 | 454 | 153 |
| | 2012 | 24,900 | 576 | 475 | n/a | n/a |
| | 2013 | 25,700 | 605 | 499 | n/a | n/a |
| Western and Central AI | 2011 | | | 234 | 234 | 75 |
| | 2012 | | | 244 | n/a | n/a |
| | 2013 | | | 258 | n/a | n/a |
| Eastern AI and EBS | 2011 | | | 220 | 220 | 78 |
| | 2012 | | | 231 | n/a | n/a |
| | 2013 | | | 241 | n/a | n/a |

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

| **Derivation of area apportionment for the AI subareas** | **Area** | | |
|---|---|---|---|
| | **WAI** | **CAI** | **EAI** |
| **Weighted average biomass (2004, 2006, 2010)** | 1,172 | 4,220 | 4,275 |
| **Proportion of AI biomass** | 12.1% | 43.7% | 44.2% |

*Changes from previous assessment*

Black spotted and rougheye rockfish assessments are conducted on a two-year cycle to coincide with planned Aleutian Islands surveys. A straightforward update of the assessment was presented in an executive summary because the Aleutian Islands survey was not conducted this year. Catch data were updated and the projection model was run using results from the starting point of the 2010 assessment model.

*Spawning biomass and stock status trend*

Total biomass for 2012 was estimated at a value of 24,900 t, up slightly from the value for 2011 projected in last year's assessment. Female spawning biomass in the AI is projected to increase by about 5 percent per year through 2013.

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

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 female spawning biomass of 6,070 t is greater than $B_{40\%}$, (4,739 t), $F_{40\%} = F_{ABC} = 0.034$ and $F_{35\%} = F_{OFL} = 0.041$. Under Tier 3a, the maximum permissible ABC is 475 t, which is the authors' and Plan Team's recommendation for the 2012 ABC. Under Tier 3a, the 2012 OFL is 576 t for the Bering Sea/Aleutian Islands combined. The apportionment of 2012 ABC to subareas is 244 t for the Western and Central Aleutian Islands and 231 t for the Eastern Aleutian Islands and Eastern Bering Sea. Since the catch has routinely been lower than the ABC, the catch for 2011 was estimated by using an expansion for the last three months of the year based on the last three years' catch history in order to make projections to 2012.

*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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Survey Bio. | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 17,200 | 516 | 387 | 387 | 324 |
| | 2011 | 17,500 | 524 | 393 | 393 | 275 |
| | 2012 | 17,500 | 524 | 393 | n/a | n/a |
| | 2013 | 17,500 | 524 | 393 | 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. A straightforward update of the assessment was presented in an executive summary because the Aleutian Islands survey was not conducted this year. Catch data were updated.

*Spawning biomass and stock status trends*

Estimated shortraker rockfish biomass is 17,500 t, which is identical to the 2010 assessment biomass 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. Because neither the time series of survey biomass estimates nor the proxy values for $F_{ABC}$ and $F_{OFL}$ have changed since 2010, the OFL values for 2012 and 2013 in this update are the same as last year's values for 2011 and 2012. 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 0.023. The biomass estimate for 2012 is 17,500 t for shortraker rockfish, leading to 2012 and 2013 BSAI OFLs of 524 t and ABCs of 393 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Survey Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 39,200 | 1,380 | 1,040 | 1,040 | 760 |
| | 2011 | 48,900 | 1,700 | 1,280 | 1,000 | 884 |
| | 2012 | 48,900 | 1,700 | 1,280 | n/a | n/a |
| | 2013 | 48,900 | 1,700 | 1,280 | n/a | n/a |
| EBS | 2010 | 21,100 | n/a | 485 | 485 | 263 |
| | 2011 | 28,600 | n/a | 710 | 500 | 274 |
| | 2012 | 28,600 | n/a | 710 | n/a | n/a |
| | 2013 | 28,600 | n/a | 710 | n/a | n/a |
| AI | 2010 | 18,100 | n/a | 555 | 555 | 497 |
| | 2011 | 20,300 | n/a | 570 | 500 | 610 |
| | 2012 | 20,300 | n/a | 570 | n/a | n/a |
| | 2013 | 20,300 | n/a | 570 | 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. A straightforward update of the assessment was presented in an executive summary because the Aleutian Islands survey was not conducted this year. Catch data were updated.

*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 the same as 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 2012 and 2013 ABCs of 710 t in the EBS and 570 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 1,700 t for 2012 and 2013.

*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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 3+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 389,000 | 88,200 | 74,000 | 74,000 | 68,647 |
| BSAI | 2011 | 438,000 | 101,000 | 85,300 | 53,100 | 51,753 |
| BSAI | 2012 | 405,000 | 96,500 | 81,400 | n/a | n/a |
| EAI/EBS | | | | 38,500 | n/a | n/a |
| CAI | | | | 22,900 | n/a | n/a |
| WAI | | | | 20,000 | n/a | n/a |
| BSAI | 2013 | 376,000 | 78,300 | 67,100 | n/a | n/a |
| EAI/EBS | | | | 31,700 | n/a | n/a |
| CAI | | | | 18,900 | n/a | n/a |
| WAI | | | | 16,500 | n/a | n/a |

*Changes from previous assessment*

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

- updated fishery catch data
- 2010 fishery age composition data
- 2010 fishery catch- and weight-at-age values

There were no significant changes in assessment methodology. 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 Reasonable and Prudent Alternatives (SSL RPAs). This percentage was applied to the 2012 maximum permissible ABC, and that amount was assumed to be caught in order to estimate the 2013 ABC and OFL.

*Spawning biomass and stock status trends*

The projected female spawning biomass for 2012 using the catch levels in the proposed SSL RPAs is 129,000 t, which is 50 percent of unfished spawning biomass and above $B_{40\%}$ (102,000 t). The 2012 estimate of spawning biomass is down 12 percent from last year's estimate for 2011 (146,000 t). The projected age 3+ biomass at the beginning of 2012 is 405,000 t, down slightly (7 percent) from last year's estimate for 2011.

*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 above $B_{40\%}$, thereby placing BSAI Atka mackerel in Tier 3a**.** The projected 2012 yield (ABC) at $F_{40\%}$= 0.38 is 81,400 t, up slightly (4 percent) from last year's estimate for 2012. The projected 2012 overfishing level at $F_{35\%}$ = 0.47 is 96,500 t, also up slightly (5 percent) from last year's estimate for 2012.

Atka mackerel female spawning biomass in 2013 (104,000 t) is also projected to remain above $B_{40\%}$. The projected 2013 yield (ABC) under Tier 3a ($F_{40\%}$= 0.38) and the proposed SSL RPAs is 67,100 t; the projected 2013 overfishing level at $F_{35\%}$ = 0.47 and the proposed SSL RPAs is 78,300 t. The population is projected to go below $B_{40\%}$ beginning in 2014 and remain below $B_{40\%}$ through 2017, assuming the catch reductions contained in the proposed SSL RPAs occur and remain in place.

*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 authors recommend using the same method used in 2011 to apportion the 2012 and 2012 ABCs. The recommended ABC apportionment by subarea for both 2011 and 2012 is 47.3 percent for Area 541 and the southern Bering Sea region, 28.1 percent for Area 542, and 24.6 percent 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. Analyses 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 high, but decreasing, and recently peaked due to four back-to-back strong year classes and an extraordinarily strong 1999 year class which still persists in the population. Nevertheless, Steller sea lion surveys conducted in 2008-11 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 (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 will have catch and effort restrictions); set the area 542 Atka mackerel TAC to no more than 47 percent of the 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Age 0+ Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 608,000 | n/a | n/a | n/a | n/a |
| | 2011 | 612,000 | 37,800 | 31,500 | 16,500 | 21,034 |
| | 2012 | 645,000 | 39,100 | 32,600 | n/a | n/a |
| | 2013 | 629,000 | 38,300 | 32,000 | n/a | n/a |

*Changes from previous assessment*

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

- Updated 2010 and preliminary 2011 catch
- 2011 EBS shelf survey data
- updated fishery and survey length compositions

No changes were made to the assessment methodology.

*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*

This year marked 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.

The Team again accepted the Alaska skate model. Because projected spawning biomass for 2012 (55,100 t) exceeds $B_{40\%}$ (36,800 t), Alaska skates are in sub-tier "a" of Tier 3. Other reference points are $maxF_{ABC} = F_{40\%} = 0.075$ and $F_{OFL} = F_{35\%} = 0.087$. The Alaska skate portions of the 2012 and 2013 ABCs are 25,600 t and 24,900 t, and the Alaska skate portions of the 2012 and 2013 OFLs are 29,700 t and 28,900 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 2012-2013 ABC is 7,100 for both years, and the "other skates" portion of the 2012-2013 OFL is 9,400 t for both years.

For the skate complex as a whole, ABCs for 2012 and 2013 total 32,600 t and 32,000 t respectively, and OFLs for 2012 and 2013 total 39,100 t and 38,300 t respectively.

*Status determination*

The most recent year for which complete catch data are available is 2010. Because the skate complex was still managed in the context of the former "other species" complex in 2010, no OFL was specified for the skate complex *per se*, so an overfishing determination for the skate complex cannot be made. However, the "other species" complex was not subjected to overfishing in 2010.

Alaska skate, which may be viewed as an indicator stock for the complex, is not overfished and is not approaching an overfished condition. 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | 226,000 | n/a | n/a | n/a | n/a |
| | 2011 | 208,000 | 58,300 | 43,700 | 5,200 | 5,094 |
| | 2012 | 208,000 | 58,300 | 43,700 | n/a | n/a |
| | 2013 | 208,000 | 58,300 | 43,700 | n/a | n/a |

*Changes from previous assessment*

This is an off-year for the BSAI sculpins assessment and therefore only an executive summary was prepared. The only change in this year's assessment was the addition of 2010 catch. Although an EBS shelf survey occurred in 2011, the data were not included in the executive summary. The authors' and Plan Team's recommendation is to rollover last year's harvest specifications for 2012 and 2013.

*Spawning biomass and stock status trends*

Most of the survey biomass of sculpins occurs on the EBS shelf. The time series of EBS shelf survey biomass estimates is essentially trendless. The catch/biomass ratio for the complex is small, on the order of 2-4 percent.

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

This year marked the first time that the sculpin complex was managed outside the context of the former "other species" complex.

The authors have recommended the use of separate *M* estimates for 7 species, and different *M* estimates for the EBS and AI. The individual *M* estimates were evaluated last year and no changes were noted for this year. The Plan 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 2012 and 2013 are 43,700 t and 58,300 t, respectively.

*Status determination*

The most recent year for which complete catch data are available is 2010. Because the sculpin complex was still managed in the context of the former "other species" complex in 2010, no OFL was specified for the sculpin complex *per se*, so an overfishing determination for the sculpin complex cannot be made. However, the "other species" complex was not subjected to overfishing in 2010.

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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---:|:---:|---:|---:|---:|---:|---:|
| BSAI | 2010 | n/a | n/a | n/a | n/a | n/a |
| | 2011 | n/a | 1,360 | 1,020 | n/a | 162 |
| | 2012 | n/a | 1,360 | 1,020 | n/a | n/a |
| | 2013 | n/a | 1,360 | 1,020 | n/a | n/a |

*Changes from previous assessment*

This is an off-year for the BSAI shark assessment and therefore only an executive summary was prepared. The only change in this year's assessment was the addition of 2010 catch. Although an EBS shelf survey occurred in 2011, the data were not included in the executive summary. The authors' and Plan Team's recommendation is to rollover last year's harvest specifications for 2012 and 2013.

*Spawning biomass and stock status trends*

The bulk of the shark catch (>70 t) 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 not very vulnerable to any of the 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. 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 Aleutians 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*

This year marked the first time that the skate complex was managed outside the context of the former "other species" complex.

The SSC has placed sharks in Tier 6, where OFL is typically based on historical catches. The Team recommends setting OFL at the maximum catch during the period 1997-2007 (1,360 t, taken in 2002), and ABC at 75 percent of OFL, which is 1,020 t.

*Status determination*

The most recent year for which complete catch data are available is 2010. Because the shark complex was still managed in the context of the former "other species" complex in 2010, no OFL was specified for the shark complex *per se*, so an overfishing determination for the shark complex cannot be made. However, the "other species" complex was not subjected to overfishing in 2010.

It is not possible to determine whether the shark complex is overfished or whether it is approaching an overfished condition because it is managed under Tier 6.

## 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | n/a | 2,620 | 1,970 | 1,970 | 410 |
| | 2011 | n/a | 2,620 | 1,970 | 425 | 325 |
| | 2012 | n/a | 2,620 | 1,970 | n/a | n/a |
| | 2013 | n/a | 2,620 | 1,970 | n/a | n/a |

*Changes from previous assessment*

This is an off-year for the squid assessment and therefore only an executive summary was prepared. The author included new information in the assessment that described the seasonal pattern of incidental squid catches. The authors' and Plan Team's recommendation is to rollover last year's harvest specifications for 2012 and 2013.

*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 2012 and 2013, which are unchanged from last year. The recommended ABCs for 2012 and 2013 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 2012 and 2013 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 2012 and 2013 are those recommended by the Plan Team. Catch data are current through November 5, 2011.

| Area | Year | Biomass | OFL | ABC | TAC | Catch |
|---|---|---|---|---|---|---|
| BSAI | 2010 | n/a | n/a | n/a | n/a | n/a |
| | 2011 | n/a | 528 | 396 | 150 | 563 |
| | 2012 | n/a | 3,450 | 2,590 | n/a | n/a |
| | 2013 | n/a | 3,450 | 2,590 | n/a | n/a |

*Changes from previous assessment*

In this assessment, the authors proposed a new approach for setting harvest specifications for 2012 and 2013, using Pacific cod predation of octopus as an estimator of biomass lost due to natural mortality.

*Spawning biomass and stock status trends*

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 tend to sample octopus poorly, and biomass estimates from trawl surveys are not considered reliable. The 2011 catch was the highest ever recorded and has exceeded the OFL.

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

This year marked 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 consumption estimate results in an OFL of 3,450 t and ABC of 2,590 t. The Plan Team recommends adoption of these specifications, which are conservative and similar to estimates that would result from application of the Tier 5 formulae to estimates of average survey biomass.

*Status determination*

The most recent year for which complete catch data are available is 2010. Because the octopus complex was still managed in the context of the former “other species” complex in 2010, no OFL was specified for the octopus complex *per se*, so an overfishing determination for the octopus complex in 2010 cannot be made. However, the “other species” complex was not subjected to overfishing in 2010. Because the 2011 octopus catch has already exceeded the 2011 octopus OFL, next year’s assessment will determine that the octopus complex was subjected to overfishing in 2011.

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**

An updated executive summary of the grenadier assemblage stock assessment 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 Team has recommended that the Council consider adding grenadiers to both FMPs.

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. Grenadier species are not included in the BSAI and GOA Groundfish FMPs; however, the Teams recommend that the grenadier assemblage be moved into a managed category so that annual catch limits can be established.

Because grenadiers are outside the FMPs and reporting for this assemblage is not required, no catch statistics exist. Catches have been estimated, however, based on observer data or the NMFS Alaska Region Catch Accounting System. The estimated annual catches of grenadiers in Alaska for the years 1997-2010 have ranged between ~11,000-21,000 t, with an average for this period of ~16,000 t. Highest catches have consistently been in the GOA, followed generally by the EBS and then the AI. By region, annual catches have ranged between ~6,000-15,000 t in the GOA, ~2,000-5,000 t in the EBS, and ~1,000-4,000 t in the AI. Most of the catch occurs in longline and pot fisheries.

If included in the fishery in the FMPs, Tier 5 determinations would result in the following OFLs and ABCs. The BSAI grenadier TAC would count against the 2 million t OY.

| Area | OFL | ABC |
|---|---|---|
| EBS | 46,200 | 34,600 |
| AI | 89,000 | 66,800 |
| GOA | 46,600 | 35,000 |

Table 1. BSAI Groundfish Plan Team Recommendations for Final OFLs and ABCs (mt) for 2012 and 2013.

| | | 2011 | | | 11/5/2011 | 2012 | | 2013 | |
|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Area** | **OFL** | **ABC** | **TAC** | **Catch** | **OFL** | **ABC** | **OFL** | **ABC** |
| Pollock | EBS | 2,450,000 | 1,270,000 | 1,252,000 | 1,197,578 | 2,474,000 | 1,220,000 | 2,840,000 | 1,360,000 |
| | AI | 44,500 | 36,700 | 19,000 | 1,162 | 39,600 | 32,500 | 42,900 | 35,200 |
| | Bogoslof | 22,000 | 156 | 150 | 140 | 22,000 | 16,500 | 22,000 | 16,500 |
| Pacific cod | BSAI | 272,000 | 235,000 | 227,950 | 202,785 | 369,000 | 314,000 | 374,000 | 319,000 |
| Sablefish | BS | 3,360 | 2,850 | 2,850 | 668 | 2,640 | 2,230 | 2,610 | 2,200 |
| | AI | 2,250 | 1,900 | 1,900 | 950 | 2,430 | 2,050 | 2,400 | 2,020 |
| | Total | 5,610 | 4,750 | 4,750 | 1,618 | 5,070 | 4,280 | 5,010 | 4,220 |
| Atka mackerel | EAI/BS | n/a | 40,300 | 40,300 | 40,833 | n/a | 38,500 | n/a | 31,700 |
| | CAI | n/a | 24,000 | 11,280 | 10,714 | n/a | 22,900 | n/a | 18,900 |
| | WAI | n/a | 21,000 | 1,500 | 205 | n/a | 20,000 | n/a | 16,500 |
| | Total | 101,000 | 85,300 | 53,080 | 51,752 | 96,500 | 81,400 | 78,300 | 67,100 |
| Yellowfin sole | BSAI | 262,000 | 239,000 | 196,000 | 141,399 | 222,000 | 203,000 | 226,000 | 207,000 |
| Rock sole | BSAI | 248,000 | 224,000 | 85,000 | 60,292 | 231,000 | 208,000 | 217,000 | 196,000 |
| Greenland turbot | EBS | n/a | 4,590 | 3,500 | 2,979 | n/a | 7,230 | n/a | 6,010 |
| | AI | n/a | 1,550 | 1,550 | 514 | n/a | 2,430 | n/a | 2,020 |
| | Total | 7,220 | 6,140 | 5,050 | 3,493 | 11,700 | 9,660 | 9,700 | 8,030 |
| Arrowtooth flounder | BSAI | 186,000 | 153,000 | 25,900 | 19,600 | 181,000 | 150,000 | 186,000 | 152,000 |
| Kamchatka flounder | BSAI | 23,600 | 17,700 | 17,700 | 9,242 | 24,800 | 18,600 | 24,800 | 18,600 |
| Flathead sole | BSAI | 83,300 | 69,300 | 41,548 | 13,080 | 84,500 | 70,400 | 83,100 | 69,200 |
| Other flatfish | BSAI | 19,500 | 14,500 | 3,000 | 3,116 | 17,100 | 12,700 | 17,100 | 12,700 |
| Alaska plaice | BSAI | 79,100 | 65,100 | 16,000 | 22,471 | 64,600 | 53,400 | 65,000 | 54,000 |
| Pacific Ocean perch | EBS | n/a | 5,710 | 5,710 | 2,053 | n/a | 5,710 | n/a | 6,540 |
| | EAI | n/a | 5,660 | 5,660 | 5,094 | n/a | 5,620 | n/a | 6,440 |
| | CAI | n/a | 4,960 | 4,960 | 4,768 | n/a | 4,990 | n/a | 5,710 |
| | WAI | n/a | 8,370 | 8,370 | 8,181 | n/a | 8,380 | n/a | 9,610 |
| | Total | 36,300 | 24,700 | 24,700 | 20,096 | 35,000 | 24,700 | 33,700 | 28,300 |
| Northern rockfish | BSAI | 10,600 | 8,670 | 4,000 | 2,644 | 10,500 | 8,610 | 10,400 | 8,490 |
| Shortraker rockfish | BSAI | 524 | 393 | 393 | 275 | 524 | 393 | 524 | 393 |
| Blackspotted/Rougheye | EBS/EAI | n/a | 234 | 234 | 75 | n/a | 231 | n/a | 241 |
| Rockfishes | CAI/WAI | n/a | 220 | 220 | 78 | n/a | 244 | n/a | 258 |
| | Total | 549 | 454 | 454 | 153 | 576 | 475 | 605 | 499 |
| Other rockfish | EBS | n/a | 710 | 500 | 274 | n/a | 710 | n/a | 710 |
| | AI | n/a | 570 | 500 | 610 | n/a | 570 | n/a | 570 |
| | Total | 1,700 | 1,280 | 1,000 | 884 | 1,700 | 1,280 | 1,700 | 1,280 |
| Squids | BSAI | 2,620 | 1,970 | 425 | 325 | 2,620 | 1,970 | 2,620 | 1,970 |
| Skates | BSAI | 37,800 | 31,500 | 16,500 | 21,034 | 39,100 | 32,600 | 38,300 | 32,000 |
| Sharks | BSAI | 1,360 | 1,020 | 50 | 162 | 1,360 | 1,020 | 1,360 | 1,020 |
| Octopuses | BSAI | 528 | 396 | 150 | 563 | 3,450 | 2,590 | 3,450 | 2,590 |
| Sculpins | BSAI | 58,300 | 43,700 | 5,200 | 5,095 | 58,300 | 43,700 | 58,300 | 43,700 |
| **Total** | **BSAI** | **3,954,111** | **2,534,729** | **2,000,000** | **1,778,959** | **3,996,000** | **2,511,778** | **4,341,869** | **2,639,792** |

Final 2011 OFLs, ABCs, and TACs from 2011-2012 final harvest specifications

The "other species" category was removed in 2011 and replaced with separate categories for skates, sharks, octopuses, and sculpins

Table 2. Groundfish catches (metric tons) in the eastern Bering Sea, 1954-2011.

| 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/e | 1,197,718 | 192,079 | 668 | 141,398 | 2,979 | 16,387 | 4,332 | 60,013 | 3,064 | 13,073 | 22,471 | | 2,053 | 83 | 48 | 24 | 274 | 1,197 | 227 | | 552 | 4,592 | 158 | 20,342 | 1,683,732 |

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 5, 2011.
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, 1954-2011.

| Year | ollock/g | 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/e | 1,162 | 10,706 | 950 | 1 | 514 | 3,213 | 4,910 | 279 | 52 | 7 | 0 | | 18,043 | 2,561 | 227 | 129 | 610 | 50,556 | 98 | | 11 | 502 | 4 | 692 | 95,227 |

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 5, 2011.
f/ Octopus, sculpin, sharks, skates included in other species category prior to 2011.
g/includes the catch from the State's GHL fishery
Note: Numbers don't include fish taken for research.

Table 4. Groundfish catches (metric tons) in the Bering Sea and Aleutian Islands, 1954-2011.

| 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/e | 1,198,880 | 202,785 | 1,618 | 141,399 | 3,493 | 19,600 | 9,242 | 60,292 | 3,116 | 13,080 | 22,471 | | 20,096 | 2,644 | 275 | 153 | 884 | 51,753 | 325 | 0 | 563 | 5,094 | 162 | 21,034 | 1,778,959 |

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 5, 2011.

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 ($F_{ABC}$), and the fishing mortality rate corresponding to OFL ($F_{OFL}$) for the eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof district as projected for 2012 and 2013. "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.

| | | | 2012 | | | | | 2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species or Complex** | **Tier** | **Area** | **Biomass** | **OFL** | **ABC** | **$F_{OFL}$** | **$F_{ABC}$** | **OFL** | **ABC** | **$F_{OFL}$** | **$F_{ABC}$** |
| **Pollock** | 1a | EBS | 8,340,000 | 2,474,000 | 1,220,000 | 0.64 | 0.30 | 2,840,000 | 1,360,000 | 0.64 | 0.30 |
| | 3b | Aleutian Islands | 251,000 | 39,600 | 32,500 | 0.31 | 0.26 | 42,900 | 35,200 | 0.31 | 0.26 |
| | 5 | Bogoslof District | 110,000 | 22,000 | 16,500 | 0.2 | 0.17 | 22,000 | 16,500 | 0.2 | 0.17 |
| **Pacific cod** | 3a | BSAI | 1,690,000 | 369,000 | 314,000 | 0.29 | 0.25 | 374,000 | 319,000 | 0.29 | 0.25 |
| **Sablefish** | 3b | BS | 30,000 | 2,640 | 2,230 | 0.11 | 0.09 | 2,610 | 2,200 | 0.11 | 0.09 |
| | 3b | AI | 26,000 | 2,430 | 2,050 | 0.11 | 0.09 | 2,400 | 2,020 | 0.11 | 0.09 |
| **Atka mackerel** | 3a | Total | 405,000 | 96,500 | 81,400 | 0.47 | 0.38 | 78,300 | 67,100 | 0.47 | 0.38 |
| **Yellowfin sole** | 1a | BSAI | 1,950,000 | 222,000 | 203,000 | 0.11 | 0.1 | 226,000 | 207,000 | 0.11 | 0.1 |
| **Northern rock sole** | 1a | BSAI | 1,860,000 | 231,000 | 208,000 | 0.15 | 0.13 | 217,000 | 196,000 | 0.15 | 0.13 |
| **Greenland turbot** | 3a | Total | 76,900 | 11,700 | 9,660 | 0.3 | 0.25 | 9,700 | 8,030 | 0.3 | 0.25 |
| **Arrowtooth flounder** | 3a | BSAI | 1,130,000 | 181,000 | 150,000 | 0.29 | 0.23 | 186,000 | 152,000 | 0.29 | 0.23 |
| **Kamchatka flounder** | 5 | BSAI | 125,000 | 24,800 | 18,600 | 0.2 | 0.17 | 24,800 | 18,600 | 0.2 | 0.17 |
| **Flathead sole** | 3a | BSAI | 811,000 | 84,500 | 70,400 | 0.34 | 0.28 | 83,100 | 69,200 | 0.34 | 0.28 |
| **Other flatfish** | 5 | BSAI | 111,000 | 17,100 | 12,700 | .17/.085/.15 | .13/.06/.11 | 17,100 | 12,700 | .17/.085/.15 | .13/.06/.11 |
| **Alaska plaice** | 3a | BSAI | 606,000 | 64,600 | 53,400 | 0.18 | 0.15 | 65,000 | 54,000 | 0.18 | 0.15 |
| **Pacific Ocean perch** | 3a | BSAI | 594,000 | 35,000 | 24,700 | 0.074 | 0.061 | 33,700 | 28,300 | 0.074 | 0.061 |
| **Northern rockfish** | 3a | BSAI | 202,000 | 10,500 | 8,610 | 0.071 | 0.058 | 10,400 | 8,490 | 0.071 | 0.058 |
| **Shortraker** | 5 | BSAI | 17,500 | 524 | 393 | 0.030 | 0.025 | 524 | 393 | 0.03 | 0.025 |
| **Blackspotted/Rougheye** | 3a | BSAI | 23,400 | 576 | 475 | 0.041 | 0.035 | 605 | 499 | 0.041 | 0.035 |
| **Other rockfish** | 5 | BSAI | 48,900 | 1,700 | 1,280 | .03/.09 | .023/.068 | 1,700 | 1,280 | .03/.09 | .023/.068 |
| **Squid** | 6 | BSAI | n/a | 2,620 | 1,970 | n/a | n/a | 2,620 | 1,970 | n/a | n/a |
| **Skate** | 3a/5 | BSAI | 645,000 | 39,100 | 32,600 | .087/.1 | .075/.075 | 38,300 | 32,000 | .087/.1 | .075/.075 |
| **Shark** | 6 | BSAI | n/a | 1,360 | 1,020 | n/a | n/a | 1,360 | 1,020 | 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 |
| **Sculpin** | 5 | BSAI | 208,000 | 58,300 | 43,700 | 0.28 | 0.21 | 58,300 | 43,700 | 0.28 | 0.21 |
| **Total** | | **BSAI** | **19,260,700** | **3,996,000** | **2,511,778** | | | **4,341,869** | **2,639,792** | | |

Table 6. Summary of groundfish tier designations under Amendment 56, maximum permissible ABC fishing mortality rate (max $F_{ABC}$), the Plan Team's recommended tier designation, ABC fishing mortality rate ($F_{ABC}$), 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 2012-2013. Stock-specific max ABC and ABC are in metric tons, reported to three significant digits (four significant 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.

| | | 2012 | | | | | | 2013 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species or Complex** | **Area** | **Tier** | **max $F_{ABC}$** | **$F_{ABC}$** | **max ABC** | **ABC** | **% Red.** | **Tier** | **max $F_{ABC}$** | **$F_{ABC}$** | **max ABC** | **ABC** | **% Red.** |
| **Pollock** | EBS | 1a | 0.53 | 0.30 | 2,200,000 | 1,220,000 | 45% | 1a | 0.53 | 0.30 | 2,530,000 | 1,360,000 | 46% |

Table 7. Species included in assessments for the 2011 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 |
| 6b | Kamchatka flounder | Atherestes evermanni | |
| 7 | **Northern rock sole** | Lepidopsetta polyxystra n. sp. | 2 |
| | Southern rock sole | Lepidopsetta bilineata | |
| 8 | **Flathead sole** | Hippoglossoides classodon | 2 |
| | Bering flounder | Hippoglossoides robustus | |
| 9 | **Alaska plaice** | Pleuronectes quadrituberculatus | 1 |
| 10 | **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 | |
| 11 | **Pacific Ocean perch** | Sebastes alutus | 1 |
| 12 | **Northern rockfish** | Sebastes polyspinus | 1 |
| 13 | Blackspotted/Rougheye | | 2 |
| | Blackspotted rockfish | | |
| | Rougheye rockfish | Sebastes aleutianus | |
| 14 | Shortraker rockfish | Sebastes borealis | 1 |
| 15 | **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 | |
| 16 | **Atka mackerel** | Pleurogrammus monopterygius | 1 |

| Chapter | Common name | Scientific name | Count |
|---|---|---|---|
| 17 | **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 | |
| 18a | **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 | |
| 18b | **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 | |
| 18c | **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 |
|---|---|---|---|
| 18d | **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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