APPENDIX B

STOCK ASSESSMENT AND FISHERY EVALUATION REPORT

FOR THE GROUNDFISH RESOURCES OF THE GULF OF ALASKA

Compiled by

The Plan Team for the Groundfish Fisheries of the Gulf of Alaska

with contributions by

T. A'mar, K. Aydin, E. Conners, C. Conrath, M. Dalton, O. Davis, M. Dorn, K. Echave, N. Friday, K. Green, D. Hanselman, J. Heifetz, P. Hulson, J. Ianelli, D. Jones, M. Jaenicke, S. Lowe, C. Lunsford, S. Meyer, C. McGilliard, D. Nichol, O. Ormseth, W. Palsson, C. Rodgveller, J. Rumble, K. Shotwell, L. Slater, K. Spalinger, P. Spencer, I. Spies, I. Stewart, M. Stichart, W. Stockhausen, D. Stram, T. TenBrink, C. Tribuzio, J. Turnock.

November 2013

North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, AK 99501

Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Gulf of Alaska

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Summary

by

The Plan Team for the Groundfish Fisheries of the Gulf of Alaska

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 reports are intended to summarize the best available scientific information concerning the past, present, and possible future condition of the stocks and fisheries under federal management. The FMPs for the groundfish fisheries managed by the Council require that drafts of the SAFE reports be produced each year in time for the December North Pacific Fishery Management Council (Council) meetings.

The SAFE report for the Gulf of Alaska (GOA) groundfish fisheries is compiled by the Plan Team for the Gulf of Alaska Groundfish FMP from chapters contributed by scientists at NMFS Alaska Fisheries Science Center (AFSC) and the Alaska Department of Fish and Game (ADF&G). The stock assessment section includes recommended acceptable biological catch (ABC) levels for each stock and stock complex managed under the FMP. The ABC recommendations, together with social and economic factors, are considered by the Council in determining total allowable catches (TACs) and other management strategies for the fisheries.

The GOA Groundfish Plan Team met in Seattle on November 18-22nd, 2013 to review the status of stocks of twenty three species or species groups that are managed under the FMP. The Plan Team review was based on presentations by ADF&G and NMFS AFSC scientists with opportunity for public comment and input. Members of the Plan Team who compiled the SAFE report were James Ianelli and Diana Stram (co-chairs), Sandra Lowe, Chris Lunsford, Jon Heifetz, Kristen Green, Janet Rumble, Mark Stichart, Mike Dalton, Nancy Friday, Leslie Slater, Ian Stewart, Paul Spencer, and Obren Davis. Craig Faunce was unable to attend.

Background Information

Management Areas and Species

The Gulf of Alaska (GOA) management area lies within the 200-mile U.S. Exclusive Economic Zone (EEZ) of the United States (Figure 1). Formerly, five categories of finfishes and invertebrates were designated for management purposes: target species, other species, prohibited species, forage fish species and non-specified species. Effective for the 2011 fisheries, these categories have been revised in Amendments 96 and 87 to the FMPs for Groundfish of the Bering Sea/Aleutian Islands (BSAI) and Gulf of Alaska (GOA), respectively. This action was necessary to comply with requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to prevent overfishing, achieve optimum yield, and to comply with statutory requirements for annual catch limits (ACLs) and accountability measures (AMs). Species and species groups must be identified "in the fishery" for which ACLs and AMs are required. An ecosystem component (EC) is also be included in the FMPs for species and species groups that are not

1) targeted for harvest
2) likely to become overfished or subject to overfishing, and
3) generally retained for sale or personal use.

The effects of the action amended the GOA and BSAI groundfish FMPs to:

1) identify and manage target groundfish stocks "in the fishery"
2) eliminate the "other species" category and manage (GOA) squids, (BSAI and GOA) sculpins, (BSAI and GOA) sharks, and (BSAI and GOA) octopuses separately "in the fishery";

3) manage prohibited species and forage fish species in the ecosystem component category; and
4) remove the non-specified species outside of the FMPs.

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 are listed below.

In the Fishery:

1) Target species – are those species that support 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 total allowable catch (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, shallow and deep water flatfish, northern and southern rock sole, rex sole, flathead sole, arrowtooth flounder, Pacific ocean perch, shortraker rockfish, rougheye/blackspotted rockfish, northern rockfish, "other " rockfish (formerly "other slope" rockfish), dusky rockfish (formerly "pelagic shelf" rockfish), demersal shelf rockfish, thornyhead rockfish, Atka mackerel, squid, sculpin, sharks, octopus, big skates, longnose skates, and other skates.

Ecosystem Component:

2) 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.
3) Forage fish species – are those species listed in the table 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.

The following lists the GOA stocks within these FMP species categories:

In the Fishery	
Target Species[2]	Walleye pollock, Pacific cod, Sablefish, Flatfish (shallow-water flatfish, deep-water flatfish, northern and southern rock sole, rex sole, flathead sole, arrowtooth flounder), Rockfish (Pacific ocean perch, northern rockfish, shortraker rockfish, rougheye/blackspotted rockfish, other rockfish [formerly "other slope" rockfish], dusky rockfish [formerly in the "pelagic shelf" rockfish], demersal shelf rockfish[3], thornyhead rockfish), Atka mackerel, Skates (big skates, longnose skates, and other skates), Squids, Sculpins, Sharks, Octopus
Ecosystem Component	
Prohibited Species[1]	Pacific halibut, Pacific herring, Pacific salmon, Steelhead trout, King crab, Tanner crab
Forage Fish Species[4]	Osmeridae family (eulachon, capelin, and other smelts), Myctophidae family (lanternfishes), Bathylagidae family (deep-sea smelts), Ammodytidae family (Pacific sand lance), Trichodontidae family (Pacific sand fish), Pholidae family (gunnels), Stichaeidae family (pricklebacks, warbonnets, eelblennys, cockscombs, and shannys), Gonostomatidae family (bristlemouths, lightfishes, and anglemouths), Order Euphausiacea (krill)

[1]Must be immediately returned to the sea
[2]TAC for each listing. Species and species groups may or may not be targets of directed fisheries.
[3]Management delegated to the State of Alaska
[4]Management measures for forage fish are established in regulations implementing the FMP

This SAFE report describes stock status of target and non-target species in the fishery. Although grenadiers are no longer in the GOA FMP, a summary is provided in Appendix 1 if in the future grenadiers are moved back into the FMP. The Council took initial action in June, 2012 to go forward with an EA/RIR/ERFA to consider grenadiers for inclusion in the groundfish FMPs.

A species or species group from within the fishery category may be split out and assigned an appropriate harvest level. Similarly, species in the fishery category may be combined and a single harvest level assigned to the new aggregate species group. The harvest level for demersal shelf rockfish in the Eastern Regulatory Area is specified by the Council each year. However, management of this fishery is deferred to the State of Alaska with Council oversight.

The GOA FMP recognizes single species and species complex management strategies. Single species specifications are set for stocks individually, recognizing that different harvesting sectors catch an array of species. In the Gulf of Alaska these species include Pacific cod, pollock, sablefish, Pacific ocean perch, flathead sole, rex sole, arrowtooth flounder, northern rockfish, shortraker rockfish, dusky rockfish (formerly in the "pelagic shelf" rockfish category), Atka mackerel, big skates, and longnose skates. Other groundfish species that are usually caught in groups have been managed as complexes (also called assemblages). For example, other rockfish (formerly "other slope" rockfish), rougheye and blackspotted rockfish, demersal shelf rockfish, thornyhead rockfish, deep water flatfish, shallow water flatfish, and other skates have been managed as complexes.

Beginning in 2011, squids, sculpins, octopus, and sharks are managed as individual complexes (previously they were managed as "other species"). Also in 2011, the rockfish categories were reorganized: widow and yellowtail rockfish were removed from the pelagic shelf rockfish complex leaving dusky rockfish as a single species category. Widow and yellowtail rockfish were added to the 15 species that were part of the former "other slope" rockfish group to form a new category in the Gulf of Alaska, "other rockfish". Previously, yellowtail and widow rockfish were part of the "pelagic shelf" rockfish group in the Gulf of Alaska, which no longer exists (for assessment purposes) since 2012. Both

shortraker rockfish and "other rockfish" are each presented as separate SAFE chapters in 2013. Separating these two chapters responds to recommendations from the Gulf of Alaska Plan Team and the NPFMC Scientific and Statistical Committee.

The FMP authorizes splitting species, or groups of species, from the complexes for purposes of promoting the goals and objectives of the FMP. Atka mackerel was split out from "other species" beginning in 1994. In 1998, black and blue rockfish were removed from the GOA FMP and management was conferred to the ADF&G. In 2008, dark rockfish were similarly removed from the GOA FMP with sole management taken over by the ADF&G. Beginning in 1999, osmerids (eulachon, capelin and other smelts) were removed from the "other species" category and placed in a separate forage fish category. In 2004, Amendment 63 to the FMP was approved which moved skates from the other species category into a target species category whereby individual OFLs and ABCs for skate species and complexes could be established.

Groundfish catches are managed against TAC specifications for the EEZ and near coastal waters of the GOA. State of Alaska internal water groundfish populations are typically not covered by NMFS surveys and catches from internal water fisheries generally not counted against the TAC. The Team has recommended that these catches represent fish outside of the assessed region, and should not be counted against an ABC or TAC. Beginning in 2000, the pollock assessment incorporated the ADF&G survey pollock biomass, therefore, the Plan Team acknowledged that it is appropriate to reduce the Western (W), Central (C) and West Yakutat (WY) combined GOA pollock ABC by the anticipated Prince William Sound (PWS) harvest level for the State fishery. The 2001 through 2013 W/C/WY pollock ABCs have been reduced by the PWS GHL as provided by ADF&G, before area apportionments were made. At the 2012 September Plan Team meeting, ADFG presented a proposal to set the PWS GHL in future years as a fixed percentage of the W/C/WY pollock ABC of 2.5%. That value is the midpoint between the 2001-2010 average GHL percentage of the GOA ABC (2.44%) and the 1996 and 2012 levels (2.55%). The Plan Team accepted this proposal, but noted concern regarding the lack of a biomass-based allocation in PWS. The Team encouraged the State to work with the AFSC in order to provide a biomass-based evaluation for PWS prior to fixing a percentage in regulation. In the interim, the Plan Team will deduct a value for the 2014 PWS GHL (equal to 2.5% of the recommended 2014 W/C/WY pollock ABC) from the recommended 2014 and 2015 W/C/WY pollock ABCs before area apportionments are made. It is important to note that the value of the PWS GHL is dependent on the final specified W/C/WY pollock ABC. The values used by the Plan Team to derive the 2014 and 2015 W/C/WY pollock ABCs (and PWS GHLs) are given in Table 4 of the SAFE Introduction.

The Plan Team has provided subarea ABC recommendations on a case-by-case basis since 1998 based on the following rationale. The Plan Team recommended splitting the EGOA ABC for species/complexes that would be disproportionately harvested from the West Yakutat area by trawl gear. The Team did not split EGOA ABCs for species that were prosecuted by multi-gear fisheries or harvested as bycatch. For those species where a subarea ABC split was deemed appropriate, two approaches were examined. The point estimate for WY biomass distribution based on survey results was recommended for seven species/complexes to determine the WY and East Yakutat/Southeast Outside subarea ABC splits. For some species/complexes, a range was recommended bounded by the point estimate and the upper end of the 95% confidence limit from all three surveys. The rationale for providing a range was based on a desire to incorporate the variance surrounding the distribution of biomass for those species/complexes that could potentially be constrained by the recommended ABC splits.

No Split	Split, Point Estimate	Split, Upper 95% CI
Pacific cod	Pollock	Pacific ocean perch
Atka mackerel	Sablefish	Dusky rockfish
Shortraker rockfish	Deep-water flatfish	
Rougheye/blackspotted rockfish	Shallow-water flatfish	
Thornyhead	Rex sole	
Northern rockfish	Arrowtooth flounder	
Demersal shelf rockfish	Flathead sole	
All skates	Other rockfish	

Biological Reference Points

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

Definition of Acceptable Biological Catch and the Overfishing Level

Amendment 56 to the GOA Groundfish FMP, approved by the Council in June 1998, defines ABC and OFL for the GOA groundfish fisheries. The new 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 stock 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% 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 $F=F_{40\%}$.

Tier

1) Information available: *Reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY}.*
   - 1a) Stock status: $B/B_{MSY} > 1$
     $F_{OFL} = \mu_A$, *the arithmetic mean of the pdf*
     $F_{ABC} \leq \mu_H$, *the harmonic mean of the pdf*
   - 1b) Stock status: $\alpha < B/B_{MSY} \leq 1$
     $F_{OFL} = \mu_A \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
     $F_{ABC} \leq \mu_H \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
   - 1c) Stock status: $B/B_{MSY} \leq \alpha$
     $F_{OFL} = 0$
     $F_{ABC} = 0$
2) Information available: *Reliable point estimates of B, B_{MSY}, F_{MSY}, $F_{35\%}$, and $F_{40\%}$.*
   - 2a) Stock status: $B/B_{MSY} > 1$
     $F_{OFL} = F_{MSY}$
     $F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%})$
   - 2b) Stock status: $\alpha < B/B_{MSY} \leq 1$
     $F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
     $F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - \alpha)/(1 - \alpha)$
   - 2c) Stock status: $B/B_{MSY} \leq \alpha$
     $F_{OFL} = 0$
     $F_{ABC} = 0$
3) Information available: *Reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.*
   - *3a) Stock status:* $B/B_{40\%} > 1$
     $F_{OFL} = F_{35\%}$
     $F_{ABC} \leq F_{40\%}$
   - *3b) Stock status:* $\alpha < B/B_{40\%} \leq 1$
     $F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
     $F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
   - *3c) Stock status:* $B/B_{40\%} \leq \alpha$
     $F_{OFL} = 0$
     $F_{ABC} = 0$
4) Information available: *Reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.*
   $F_{OFL} = F_{35\%}$
   $F_{ABC} \leq F_{40\%}$
5) Information available: *Reliable point estimates of B and natural mortality rate M.*
   $F_{OFL} = M$
   $F_{ABC} \leq 0.75 \times M$
6) Information available: *Reliable catch history from 1978 through 1995.*
   OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information
   $ABC \leq 0.75 \times OFL$

<u>Overfished or approaching an overfished condition</u> is determined for all age-structured stock assessments by comparison of the stock level in relation to its MSY level according to the following two harvest scenarios (Note for Tier 3 stocks, the MSY level is defined as $B_{35\%}$):

Overfished (listed in each assessment as 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 expected to be 1) above its MSY level in 2013 or 2) above ½ of its MSY level in 2013 and above its MSY level in 2023 under this scenario, then the stock is not overfished.)

Approaching an overfished condition (listed in each assessment as scenario 7):

In 2014 and 2015, 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 2026 under this scenario, then the stock is not approaching an overfished condition.)

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.

Overview of Stock Assessments

Due to the government shutdown in October 2013, stock assessments for an abbreviated suite of model runs were required only for Steller sea lion prey species (pollock, Pacific cod, Bering Sea/Aleutian Islands Atka mackerel), and species where a conservation concern has been noted. In such "abbreviated" assessments, authors were not required to include alternative models and were not required to respond to SSC or Team comments, among other things. For all other Tier 1-3 stocks, updated projections from last year using 2013 catch data were required at a minimum, with results presented in executive summaries using the "off-year" format for stocks on biennial assessment cycles. For stocks managed in Tiers 4-6, executive summaries using the "off-year" format for biennial assessment cycles were required. Tier 4-5 Gulf of Alaska assessments included the 2013 GOA trawl survey datum in their estimates of biomass and harvest recommendations.

The current status of individual groundfish stocks managed under the FMP is summarized in this section. The abundances of pollock, Pacific cod, Dover sole, flathead sole, northern and southern rocksole, arrowtooth flounder, Pacific ocean perch, rougheye and blackspotted rockfish, northern rockfish, and dusky rockfish are above target stock size. The abundances of sablefish are below target stock size (Fig. 2). The target biomass levels for deep-water flatfish (excluding Dover sole), shallow-water flatfish (excluding northern and southern rocksole), rex sole, shortraker rockfish, other rockfish (formerly other slope rockfish), demersal shelf rockfish, thornyhead rockfish, Atka mackerel, skates, sculpins, squid, octopus, and sharks are unknown.

Summary and Use of Terms

Tables 1 and 2 provide a summary of the current status of the groundfish stocks, including catch statistics, ABCs, and TACs for 2014, and recommendations for ABCs and overfishing levels (OFLs) for 2014 and 2015. The added year was included to assist NMFS management since the TAC setting process allows for a period of up to two years to review harvest specifications. Fishing mortality rates (*F*) and OFLs used to set these specifications are listed in Table 3. ABCs and TACs are specified for each of the Gulf of Alaska regulatory areas illustrated in Figure 1. Table 4 provides a list of species for which the ABC recommendations are below the maximum permissible. Table 5 provides historical groundfish catches in the GOA, 1956-2013.

The sum of the preliminary 2014, 2015 ABCs for target species are 640,675 t (2014), 644,165 (2015) which are within the FMP-approved optimum yield (OY) of 116,000 - 800,000 t for the Gulf of Alaska. The sum of 2014 and 2015 OFLs are 790,468 t and 808,215 t, respectively. The Team notes that because of halibut bycatch mortality considerations in the high-biomass flatfish fisheries, an overall OY for 2014 will be considerably under this upper limit. For perspective, the sum of the 2013 TACs was 436,255 t, and the sum of the ABCs was 595,920 t.

The following conventions in this SAFE are used:

(1) "Fishing mortality rate" refers to the full-selection *F* (i.e., the rate that applies to fish of fully selected sizes or ages). A full-selection *F* should be interpreted in the context of the selectivity schedule to which it applies.

(2) For consistency and comparability, "exploitable biomass" refers to projected age+ biomass, which is the total biomass of all cohorts greater than or equal to some minimum age. The minimum age varies from species to species and generally corresponds to the age of recruitment listed in the stock assessment. Trawl survey data may be used as a proxy for age+ biomass. The minimum age (or size), and the source of the exploitable biomass values are defined in the summaries. These values of exploitable biomass may differ from listed in the corresponding stock assessments if the technical definition is used (which requires multiplying biomass at age by selectivity at age and summing over all ages). In those models assuming knife-edge recruitment, age+ biomass and the technical definitions of exploitable biomass are equivalent.

(3) The values listed as 2012 and 2013 ABCs correspond to the values (in metric tons, abbreviated "t") approved by NMFS. The Council TAC recommendations for pollock were modified to accommodate revised area apportionments in the measures implemented by NMFS to mitigate pollock fishery interactions with Steller sea lions and for Pacific cod removals by the State water fishery of not more than 25% of the Federal TAC. The values listed for 2014 and 2015 correspond to the Plan Team recommendations.

(4) The exploitable biomass for 2012 and 2013 that are reported in the following summaries were estimated by the assessments in *those* years. Comparisons of the projected 2014 biomass with previous years' levels should be made with biomass levels from the revised hindcast reported in each assessment.

(5) The catches listed in the following summary tables are those reported by the Alaska Regional Office Catch Accounting System (CAS, http://alaskafisheries.noaa.gov/sustainablefisheries/catchstats.htm) unless otherwise noted.

(6) The values used for 2014 and 2015 were from modified assessments for selected species, rolled over (typically for Tiers 4-6) or based on updated projections. Note that projection values often assume catches and hence their values are likely to change (as are the Tiers 4-6 numbers when new data become available and/or is incorporated in the assessment).

(7) The GOA Plan Team recommends that all stock assessment authors evaluate the survey biomass apportionment scheme used in their assessments for consistency among areas (BSAI and GOA) and similar species or species groups, and follow any recommendations in this regard from the survey biomass working group.

Two year OFL and ABC Determinations

Amendment 48/48 to the GOA and BSAI Groundfish FMPs, implemented in 2005, made two significant changes with respect to the stock assessment process. First, annual assessments are no longer required for rockfishes, flatfish, and Atka mackerel since new data during years when no groundfish surveys are conducted are limited. Although 2013 is an on-year for the NMFS GOA groundfish trawl survey, only modified assessments for selected species and summaries for the other species were produced as a result of the government shutdown in October 2013.

The second significant change is that the proposed and final specifications are for a period of at least two years. This requires providing ABC and OFL levels for 2014 and 2015 (Table 1). In the case of stocks managed under Tier 3 and for which a modified assessments was produced, 2014 and 2015 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 3, 4 and 5 for which only a summary was produced, the latest survey data (2013) was reported and for Tier 5 species used for ABC and OFL calculations. Tier 6 stocks may have alternatives based on updated catch information.

The 2015 ABC and OFL values recommended in next year's SAFE report are likely to differ from this year's projections for 2015 in select assessments that only reported the latest survey data (2013). Incorporation of data from the 2013 surveys are anticipated in these assessments and a re-evaluation on the status of stocks will improve on the current available information for recommendations.

Economic Summary of the GOA commercial groundfish fisheries in 2011-12

The domestic groundfish fishery off Alaska (BSAI and GOA) is the largest fishery by volume in the U.S. With a total catch of 2.12 million metric tons (t), a retained catch of 2.05 million t, and an ex-vessel value of $1.05 million in 2012, it accounted for 47.4% of the weight and 19.9% of the ex-vessel value of total U.S. domestic landings as reported in Fisheries of the United States, 2011. The real ex-vessel value of all Alaska domestic fish and shellfish catch, including the estimated value of fish caught almost exclusively by catcher/processors, decreased from $2.12 billion in 2011 to $1.94 billion in 2012. The first wholesale

value of 2012 groundfish catch was $2.54 billion (F.O.B. Alaska). The 2012 total groundfish catch increased by 2.3% while the total first-wholesale value increased by 1.1% relative to 2011. The groundfish fisheries accounted for the largest share (54%) of the ex-vessel value of all commercial fisheries off Alaska in, while the Pacific salmon (*Oncorhynchus spp*.) fishery was second with $441 million or 23% of the total Alaska ex-vessel value. The value of the shellfish fishery amounted to $284 million or 15% of the total for Alaska and exceeded the value of Pacific halibut (*Hippoglossus stenolepis*) with $145 million or 7.4% of the total for Alaska (Figure 2).

The Economic SAFE report (appendix bound separately) contains detailed information about economic aspects of the groundfish fisheries, including figures and tables, catch share fishery indicators, a summary of the Alaskan community participation in fisheries, an Amendment 80 fishery economic data report (EDR) summary, market profiles for the most commercially valuable species, a summary of the relevant research being undertaken by the Economic and Social Sciences Research Program (ESSRP) at the Alaska Fisheries Science Center (AFSC) and a list of recent publications by ESSRP analysts. The figures and tables in the report provide estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, the ex-vessel value of the groundfish catch, the ex-vessel value of the catch in other Alaska fisheries, the gross product value 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 2008 through 2012, 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. Several series have been discontinued and new price/revenue tables from an alternative source are presented in Appendix A: Ex-vessel Economic Data Tables: alternative pricing based on CFEC fish tickets.

The Economic SAFE report updates the set of market profiles for pollock, Pacific cod, sablefish, and yellowfin sole that displays the markets for these species in terms of pricing, volume, supply and demand, and trade. In addition, the Economic SAFE contains links to data on some of the external factors that impact the economic status of the fisheries. Such factors include foreign exchange rates, the prices and price indices of products that compete with products from these fisheries, domestic per capita consumption of seafood products, and fishery imports.

The Economic SAFE report also updates a section that analyzes economic performance of the groundfish fisheries using indices. These indices are created for different sectors of the North Pacific, and relate changes in value, price, and quantity across species, product and gear types to aggregate changes in the market.

The tables from this and past Economic SAFE reports are available online at http://www.afsc.noaa.gov/REFM/Socioeconomics/documents.php

Decomposition of the change in first-wholesale revenues from 2011-12 in the GOA

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 2013 Economic SAFE report, the ex-vessel value of Alaska groundfish in the GOA was essentially the same in 2011 and2012, approximately $234.1 million and $235.3 million, respectively (Figure 3), and first-wholesale revenues from the processing and production of Alaska groundfish in the Gulf of Alaska (GOA) fell from approximately $408.2 million in 2011 to $374.1 million in 2012, a decrease of 8.3% (Figure 4). During that same time-period, the total quantity of groundfish products from the GOA increased from 104.0 thousand metric tons to 106.8 thousand metric tons, a difference of 2.8 thousand metric tons. These changes in the GOA account for part of the change in first-wholesale revenues from Alaska groundfish fisheries overall which increased by $27.9 million, a relative difference of 1.1%, in 2012 compared to 2011 levels.

By species, a negative price effect for sablefish of $34.6 million was the largest change in first-wholesale revenues from the GOA for 2011-12 (Figure 5). A negative net effect for Pacific cod of $17.4 million, was largely offset by a positive net effect for pollock of $15.1 million. By product group, negative effects for the total change in GOA first-wholesale revenues for 2011-2012 were mainly concentrated in the whole head & gut product group in the GOA first-wholesale revenue decomposition for 2011-12.

In summary, first-wholesale revenues from the GOA groundfish fisheries decreased by $34.1 million from 2011-12. This increase was concentrated in negative price effects sablefish, in the whole head & gut product group. Overall, price effects contributed more than quantity effects in the GOA. In comparison, first-wholesale revenues increased by $62.0 million from 2011-12 in the BSAI, due to positive net effects for flatfish, pollock, and Pacific cod.

Ecosystem Considerations-Gulf of Alaska

The Ecosystem Considerations chapter (appendix bound separately) consists of three sections: executive summary, ecosystem assessment, and ecosystem status and management indicators. The ecosystem assessment section combines information from the stock assessment chapters with the indicators followed in this chapter to summarize the climate and fishery effects on the ecosystem. A new Gulf of Alaska ecosystem assessment following the procedure and format of the Eastern Bering Sea and Aleutian Island assessments is planned for 2014 to capitalize on the results of the synthesis stage of the GOAIERP. Until then, we summarize GOA contributions to the ecosystem considerations chapter below.

New trends highlighted in the 2013 ecosystem considerations chapter include:

- North Pacific atmosphere-ocean system during 2012-2013 reflected the combination of mostly near-neutral ENSO conditions and intrinsic variability. Cooler than normal upper ocean temperatures prevailed in the eastern portion of the North Pacific. The Pacific Decadal Oscillation (PDO) has remained in a largely negative state since the latter part of 2007, and the North Pacific Gyre Oscillation has remained in a positive state during the same time period. Models indicate a greater likelihood of near-neutral versus either El Niño or La Niña conditions for the winter of 2013-14.
- The mixed layer depths in the Gulf were slightly deeper than usual during the winter of 2012-2013 suggesting that the supply of nitrate to the euphotic zone for the spring bloom was also enhanced. The winds during spring and summer 2013 were likely to increase coastal upwelling more than usual in the northern and eastern portions of the Gulf. Eddy Kinetic Energy (EKE) levels in the western Gulf of Alaska were high in 2012 and 2013. Thus, phytoplankton biomass likely extended farther off the shelf in those years and cross-shelf transport of heat, salinity and nutrients were probably stronger. In the northern Gulf, a spike of high EKE early in the year (February) was followed by low EKE from March through June 2013.
- The 2012/2013 PAPA trajectory index was notable as ending up the farthest east among trajectories in recent years. However, the ending latitude was only somewhat southerly of the average ending latitude for all trajectories and not atypical. This is consistent with the northeast Pacific wind forcing, which featured very strong westerly anomalies.
- The weather in the Gulf of Alaska included near normal air temperatures and below normal precipitation during fall 2012 to spring 2013. The 2013 pattern of water temperatures recorded during the bottom trawl survey was similar to the pattern seen in the 2011 survey. The water column appears stratified with relatively warm near-surface waters and temperatures rapidly dropping to 6°C or less in the upper 50 m across the entire Gulf. Overall water temperatures in GOA have been cooler since 2007 when compared with previous survey years.
- Icy Strait zooplankton density anomalies were strongly negative from 1997-2005, strongly positive in 2006-2009, and negative in 2010-2012. Total density showed little correspondence with annual temperature trends across years, with both positive and negative anomalies in both warm and cold years. Icy Strait zooplankton were numerically dominated by calanoid copepods, including small and large species.

- Lower trophic level productivity apparently increased in 2012 in the Alaskan Shelf region (northern GOA) in contrast to 2011. Copepod community size, mesozooplankton biomass, and large diatom abundance in 2012 all increased from 2011 levels. The 2010 and 2011 mean abundance values of all ichthyoplankton taxa except rockfish (*Sebastes* spp.) deviated moderately from the long-term survey means.
- Forage species catch rates remain at low levels, well below the peak values observed in the 1970s and early 1980s. Pink shrimp and juvenile pollock remain widespread but catch rates varied widely both between bays and within bays. Although the estimated total mature herring biomass in southeastern Alaska continues to be above the long-term (1980-2012) median, an apparent decrease in biomass was observed between 2011 and 2012.
- Marine survival of Prince William Sound hatchery pink salmon in 2010 (2008 brood year) was at an all-time high since 1977 but dropped in 2011. Pink salmon CPUE, peak migration month, NPI, percent pink in June-July trawl hauls, and the ADFG Escapement Index are significantly correlated with harvest and suggest a strong pink salmon harvest in 2013.
- The depth distribution of rockfish in the Gulf of Alaska has remained constant for each species over time with the exception of shortraker rockfish, which have moved to shallower waters.
- Arrowtooth flounder, flathead sole, and other flatfish continue to dominate the catches in the ADFG trawl survey. A decrease in overall biomass is apparent from 2007 to 2012 from years of record high catches seen from 2002 to 2005.
- At present, no GOA groundfish stock or stock complex is subjected to overfishing, and no GOA groundfish stock or stock complex is considered to be overfished or to be approaching an overfished condition. From 1990 to 2010, fishing community populations increased by 12.6% in the GOA. Discard rates in the Gulf of Alaska have varied over time but were lower than average in 2011 and 2012.
- Assorted invertebrates comprise the majority of non-target catch in groundfish fisheries in the GOA. Catches of Schyphozoan jellies have alternated annually between above and below-average since 2007. Catches of HAPC biota and assorted invertebrates have varied little since 2003.
- Jellyfish numbers were high (and highly variable) across the Gulf.

Other Plan Team discussions

There were three hot topics for this year. There were few reports of "mushy" halibut syndrome in 2013 which implies that foraging conditions were good for halibut. There was a large pulse of larval/age-0 pollock found along the south side of the Alaska Peninsula which could indicate a strong 2013 year class. There was a record high pink salmon harvest (and record high numbers) in 2013 (219 M fish) which could indicate favorable environmental conditions in the past two years while these pink salmon were at sea.

1. Walleye pollock

Status and catch specifications (t) of pollock and projections for 2014 and 2015. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9th, 2013. Note that the projections for 2015 are subject to change in 2014. The 2014 ABC incorporate the EFP catches in the model projection and have been reduced to accommodate the anticipated Prince William Sound GHL.

Area	Year	Age 3+ Bio.	OFL	ABC	TAC	Catch
GOA	2012	959,610	158,082	116,444	116,444	101,356
	2013	1,029,676	165,183	121,046	121,046	93,246
	2014	1,028,861	228,831	174,976		
	2015		265,217	193,809		
W/C/WYK	2012	911,725	143,716	105,670	105,670	101,356
	2013	981,791	150,817	110,272	110,272	93,246
	2014	972,750	211,998	162,351		
	2015		248,384	181,184		
SEO	2012	47,885	14,366	10,774	10,774	0
	2013	47,885	14,366	10,774	10,774	0
	2014	56,111	16,833	12,625		
	2015		16,833	12,625		

Changes in assessment methodology and data

The age-structured model developed using AD Model Builder and used for GOA W/C/WYK pollock assessment is very similar to the model used for the 2012 assessment. Three changes were implemented based on recommendations of the July 2012 Center for Independent Experts (CIE) review: 1) removing two years of Biosonics acoustic survey time series (1992 and 1993) that were actually produced using the EK500 with the acoustic data analyzed at a higher noise threshold, 2) setting the CVs for the Biosonics acoustic survey estimates equal to the nominal value (0.2) of later acoustic surveys, and 3) removing the ADFG survey length data and increasing the input sample sizes for the ADFG survey age data. Further changes to the assessment should be anticipated as other CIE recommendations are incorporated in the assessment. For comparison, two alternative models were also presented: 1) a model with last year's configuration updated with recent fishery and survey data, and 2) a model with the new configuration with 2013 recruitment (2012 year class) set to the average value for yield projections. The Plan Team agreed with the authors that the new model configuration was preferred since it performed well and incorporated a number of improvements over the 2012 configuration. Given the multiple observations of high age-1 abundance, the Plan Team agreed with the author that the 2013 estimate could be used directly and not replaced by an average.

This year's pollock chapter features the following new data: 1) 2012 total catch and catch-at-age from the fishery, 2) 2013 biomass and age composition from the Shelikof Strait acoustic survey, 3) 2013 biomass and length composition from the NMFS bottom trawl survey, 4) 2012 age composition and 2013 biomass from the ADFG crab/groundfish trawl survey. Model fits to fishery age composition data are reasonable. The largest residuals tended to be at ages 1-2 for the Shelikof Strait acoustic survey and the NMFS bottom trawl survey due to inconsistencies between the initial estimates of abundance and subsequent information about year class size. Model fits to survey time series are similar to previous assessments, and general trends are fit reasonably well. The discrepancy between the NMFS trawl survey and the Shelikof Strait acoustic survey biomass estimates in the 1980s accounts for the poor model fit to both

time series during those years. The model fit the rapid increase in the Shelikof Strait acoustic survey and the NMFS survey in 2013 poorly since an age-structured pollock population cannot increase as rapidly as is indicated by these surveys. In contrast, the model expectation is close to the ADFG survey in 2013. Although there is considerable variability in each survey time series, a fairly clear downward trend is evident to 2000, followed by a stable, though variable, trend to 2008. All surveys indicate a strong increase since 2008.

Status determination and stock trends

The 2013 Shelikof Strait acoustic survey biomass estimate is 2.7 times the biomass estimate for 2012, and is the largest biomass estimate from this survey since 1985. The 2013 NMFS bottom trawl survey biomass estimate is the highest in the time series, and is an increase of 43% from the 2011 estimate. In contrast, the ADFG crab/groundfish survey biomass estimate decreased by 40% from the 2012 estimate, but is close to the 2011 estimate. The estimated abundance of mature fish is projected to remain stable or to decrease gradually to 2015, and then to increase in subsequent years.

The model estimate of spawning biomass in 2014 is 308,541 t, which is 42.5% of unfished spawning biomass (based on average 1978-2012 one-year old recruitment). The $B_{40\%}$ estimate is 290,000 t. This represents a 2% decrease from the 2012 assessment, which is a mostly a result of the decrease in mean recruitment.

The Gulf of Alaska pollock is not being subjected to overfishing and is neither overfished nor approaching an overfished condition.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The Plan Team concurred with the author's recommendation to use the new model projection and the more conservative adjusted $F_{40\%}$ harvest rate. Because model estimated 2013 female spawning biomass is above $B_{40\%}$, the W/C/WYK Gulf of Alaska pollock stock is in Tier 3a. The Plan Team accepted the author's recommendation to reduce F_{ABC} from the maximum permissible using the "constant buffer" approach (first accepted in the 2001 GOA pollock assessment). The projected 2014 age-3+ biomass estimate is 972,750 t (for the W/C/WYK areas). Markov Chain Monte Carlo analysis indicated the probability of the stock being below $B_{20\%}$ will be negligible in the next 5 years.

An exempted fishing permit (EFP) has been granted to evaluate the effect of salmon excluder devices in the pollock fishery in 2013 and 2014. Based on the Plan Team recommendation, the assessment author used a projection model that accounted for the EFP catches by including the actual EFP pollock catch in 2013, and the projected 2014 EFP catch at the start of year in 2014.

Therefore, the 2014 ABC accounting for these adjustments is 166,514 t (F_{ABC} = 0.20) for GOA waters west of 140°W longitude. To account for the Prince William Sound GHL this is reduced by 2.5% (4,163 t) to a 2014 ABC of 162,351 t. The 2014 OFL is 211,998 t (F_{OFL}= 0.26). In 2015, the recommended ABC and OFL values are 181,184 t (reduced by 4,646 t to account for the Prince William Sound GHL) and 248,384 t, respectively.

The Southeast Alaska pollock component (East Yakutat and Southeast areas) is in Tier 5 and the ABC and OFL recommendations are based on natural mortality (0.30) and the estimated biomass in 2014 and 2015 from a random effects model fit to the 1990-2013 bottom trawl survey biomass estimates in Southeast Alaska. This results in a 2014 ABC of 12,625 t, and a 2014 OFL of 16,833 t. Recommendations for 2015 are the same as 2014.

Additional Plan Team Recommendations

The Plan Team **recommends** that revised winter acoustic survey numbers at age and biomass be evaluated to account for net selectivity and that the NMFS 2013 summer acoustic trawl survey be used.

From 2012 Plan Team and SSC comments the authors should: 1) estimate *M* to at least two significant digits, 2) consider using inter-annual smoothing for selectivity, 3) model the age 1 (and possibly age 2) age classes separately from the other age classes with their own variance structure, 4) explore spatial variations in female relative abundance.

The Plan Team discussed the practice of including a year-class estimate for projections and excluding it from the reference point ($B_{100\%}$) calculations.

The Team **recommends** that the authors consider the relevant sections of the stock recruitment working group report on which recent year classes should be used in reference points and/or projections.

Area apportionment

The assessment was updated to include the most recent data available for area apportionments within each season (Appendix C of the GOA pollock chapter). The Team concurred with these updates since they are more likely to represent the current distribution. Area apportionments, reduced by 2.5% of the ABC (4,163 t in 2014 and 4,646 t in 2015) for the State of Alaska managed pollock fishery in Prince William Sound, are tabulated below:

Area apportionments (with EFP incorporated in the model projection and ABCs reduced by Prince William Sound GHL) for 2014 and 2015 pollock ABCs for the Gulf of Alaska (t).

Year	610	620	630	640	650	
	W	Central	Central	W. Yakutat	SEO	Total
2014	36,070	81,784	39,756	4,741	12,625	174,976
2015	40,254	91,272	44,367	5,291	12,625	193,809

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 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9th 2013.

Year	Age 0+ biomass	OFL	ABC	TAC	Catch
2012	521,000	104,000	87,600	65,700	56,520
2013	449,300	97,200	80,800	60,600	46,642
2014	422,000	107,300	88,500		
2015		101,800	84,100		

Changes in assessment methodology and data

The fishery data series was updated with catch for 2003-2013 (projected for 2013 expected totals) and updated 1997-2012 seasonal and gear-specific catch-at-length. The survey data series was updated with 2013 NMFS bottom trawl survey data for abundance and length composition. The 2013 trawl survey biomass estimate increased by 1% from the 2011 value.

The 2013 GOA Pacific cod assessment author evaluated two models. Model 1 is identical to the final model configuration from 2012 that omitted all of the sub-27 survey data (abundances and size composition data for Pacific cod that are 27cm or less). Model 2 is identical to Model 1 but with age-0 recruits excluded from estimation for the 2010 and 2011 year classes (they are set to average levels). Model 1 only had the 2012 and 2013 year classes set to the average.

Author and Team evaluation of alternative models

Model 2 was selected by the author as the preferred model primarily because the estimate of recruitment for the 2010 and 2011 year classes is highly uncertain and there is limited information in the data to estimate these year classes. The Plan Team accepted the author's recommendation to use Model 2 as the preferred model. The Team also noted that comparison of likelihood components indicated small differences in fits between the two model configurations, signifying that estimation of the two additional recruitment parameters in Model 1 is not justified.

Status determination and stock trends

Estimated age-0 recruitment has been relatively strong since 2005, and stock abundance is expected to be stable in the near term. The stock is not being subjected to overfishing and is neither overfished nor approaching an overfished condition.

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

$B_{40\%}$ for this stock is estimated to be 91,100 t and projected spawning biomass in 2013 according to Model 2 is 120,100 t, therefore this stock is determined to be in Tier 3a. Neither the author nor the Team saw any compelling reason to recommend OFL or ABC values lower than prescribed by the standard control rule. The current values of $F_{35\%}$ and $F_{40\%}$ are 0.69 and 0.54.

Area apportionment

In 2012 the ABC of Pacific cod was apportioned among regulatory areas based on trawl surveys using a Kalman filter approach. The SSC concurred with this method in December 2012. In this year's assessment the random-effects model was used (which is similar to the Kalman filter approach and adopted by the survey average working group). Using this method with the updated trawl survey data results in apportionments of 37% in the Western GOA, 60% in the Central GOA, and 3% in the Eastern GOA and results in the following area-apportioned ABCs:

	Western	Central	Eastern	Total
2014	32,745	53,100	2,655	88,500
2015	31,117	50,460	2,523	84,100

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 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9th 2013.

Year	Age 4+ biomass	OFL	ABC	TAC	Catch
2012	180,000	15,330	12,960	12,960	11,914
2013	167,000	14,780	12,510	12,510	11,825
2014	149,000	12,500	10,572		
2015		11,300	9,554		

Changes in assessment methodology and data

Relative abundance and length data from the 2013 longline survey, relative abundance and length data from the 2012 longline and trawl fisheries, age data from the 2012 longline survey and 2012 longline fixed gear fishery, 2013 NMFS bottom trawl survey biomass, updated 2012 catch, and projected 2013 catch were added to the assessment model. The fishery abundance index decreased 3% from 2011 to

2012 (the 2013 data are unavailable). The longline survey abundance index decreased 5% from 2012 to 2013 following a 21% increase from 2011 to 2012. Relative to the 2012 survey, the 2013 longline survey RPNs were stable in the western GOA, and down in the central and eastern GOA and are now at the lowest levels in the time series. The GOA trawl survey biomass index decreased 29% from the last trawl survey in 2011. All three abundance indices have dropped from peak levels: the domestic RPN is down 20%, the IFQ fishery is down 15%, and the GOA trawl survey is down 65% from peak levels. There were no changes in the assessment model.

Author and Team evaluation of alternative models

The model likelihood components and key parameter estimates from 2012 were compared with the 2013 updated model. The 2013 update shows a slight increase in recent recruitment, and a decrease in spawning and total biomass from previous projections.

An analysis of the longline survey index to address the depredation issues with both killer whales and sperm whales is ongoing. Work is also in progress on an updated migration model and development of a spatially-explicit model.

Status determination and stock trends

Spawning biomass has increased from a low of 30% of unfished biomass in 2002 to 34% projected for 2014 and is now trending downward. The 1997 year class has been an important contributor to the population but has been reduced and is expected to comprise less than 8% of the 2014 spawning biomass. The 2000 year class is still the largest contributor, with 18% of the spawning biomass in 2014. The 2008 year class is slightly above average and will comprise 8% of spawning biomass in 2014 even though it is only 40% mature.

Recent catches have been below OFL therefore overfishing is not occurring. The Alaska-wide sablefish stock is not overfished and is not approaching an overfished condition.

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

$B_{40\%}$ for this stock is estimated to be 106,361 t and projected spawning biomass in 2014 is 83,784 t, so this stock is assigned to Tier 3b. Neither the author nor the Team saw any compelling reason to recommend OFL or ABC values lower than prescribed by the standard control rule. The Tier 3b adjusted values of $F_{35\%}$ and $F_{40\%}$ are 0.095 and 0.080, respectively. This results in 2014 ABC and OFL of 10,572 and 12,500 t respectively.

Area apportionment

Sablefish are apportioned based on a 5-year exponential weighting of the survey and fishery abundance indices to account for current changes in the distribution of the population, and reduce inter-annual variability in area ABCs. Over time this apportionment scheme has become too volatile, and large changes in apportionment may not reflect actual distributional shifts. These problems could be attributed to measurement error which is not accounted for.

Two options for apportionment were presented: 1) utilize model results and standard apportionment with updated data, or 2) use model results and last year's apportionment (fixed from 2013), which would apply a 15% decrease across all areas. Option 2 was the authors' recommendation. The Teams noted that last year's apportionment scheme was also problematic. However, as a clear biological concern has not been raised, the Teams provide both options but support the authors' recommended apportionment (fixed from 2013) as an interim measure. Work is currently underway to conduct management strategy evaluations to re-examine the apportionment strategy.

Option 1) Standard apportionment with updated data to apportion the 2014 and 2015 ABC and OFL.

	2013				2014		2015	
Region	OFL	ABC	TAC	Catch*	OFL	ABC	OFL	ABC
BS	1,870	1,580	1,580		2,250	1,900	2,033	1,717
AI	2,530	2,140	2,140		2,130	1,801	1,925	1,628
GOA	14,780	12,510	12,510	11,825	11,850	10,021	10,709	9,055
Alaska-wide	19,180	16,230	16,230		16,230	13,722	14,667	12,400
W	--	1,750	1,750	1,383	--	1,350	--	1,220
C	--	5,540	5,540	5,118	--	4,391	--	3,968
WYAK+	--	1,860	1,860	2,082	--	1,615	--	1,459
SEO+	--	3,360	3,360	3,242	--	2,665	--	2,408
GOA total	14,780	12,510	12,510	11,825	--	10,021	--	9,055

Option 2, Recommended) Fixed 2013 apportionment to apportion the 2014 and 2015 ABC and OFL.

	2013				2014		2015	
Region	OFL	ABC	TAC	Catch*	OFL	ABC	OFL	ABC
BS	1,870	1,580	1,580		1,584	1,339	1,432	1,210
AI	2,530	2,140	2,140		2,141	1,811	1,936	1,636
GOA	14,780	12,510	12,510	11,825	12,500	10,572	11,300	9,553
Alaska-wide	19,180	16,230	16,230		16,225	13,722	14,667	12,400
W	--	1,750	1,750	1,383	--	1,480	--	1,338
C	--	5,540	5,540	5,118	--	4,681	--	4,230
WYAK+	--	1,860	1,860	2,082	--	1,716	--	1,551
SEO+	--	3,360	3,360	3,242	--	2,695	--	2,435
GOA total	14,780	12,510	12,510	11,825		10,572		9,554

* Catch through Nov 9 2013.

+ 95:5 split in the EGOA following the trawl ban in SEO

4. Shallow water flatfish

Status and catch specifications (t) of shallow water flatfish and projections for 2014 and 2015. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. Catch data are current through November 9th, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	329,217	61,681	50,683	37,029	4,022
2013	433,869	55,680	45,484	37,077	5,225
2014	384,134	50,007	40,805		
2015		46,207	37,505		

Changes in assessment methodology and data

An executive summary was presented which included updated 2012 catch and the partial 2013 catch as well as projections using the updated catches from the northern and southern rock sole assessment.

Author and Team evaluation of alternative models

The shallow water complex is comprised of northern rock sole, southern rock sole, yellowfin sole, butter sole, starry flounder, English sole, sand sole and Alaska plaice. The rock sole model will be updated and presented in 2014.

Status determination and stock trends

Stock status for shallow-water flatfish is based on the NMFS bottom trawl survey (triennial from 1984 to 1999 and biennial from 1999 to 2013). Survey abundance estimates for the entire shallow-water complex were lower in 2013 compared to 2011; decreasing by 35,156 t. By species, southern rock sole has a generally increasing trend in abundance. Northern rock sole survey trend has been variable in recent years and increased between 2011 and 2013. The remainder of the species in the shallow-water flatfish complex have varying trends. Notable declines were observed in the trends for butter sole and yellowfin sole from 2011 to 2013.

Information is insufficient to determine stock status relative to overfished criteria for the complex. For the rock sole species, the assessment model indicates they are not overfished nor are they approaching an overfished condition. Catch levels for this complex remain below the TAC and below levels where overfishing would be a concern.

Tier determination/Plan Team discussion resulting ABCs and OFLs

The shallow water complex is comprised of northern rock sole, southern rock sole, yellowfin sole, butter sole, starry flounder, English sole, sand sole and Alaska plaice. Northern and southern rock sole are in Tier 3a while the other species in the complex are in Tier 5. An updated projection model for northern and southern rock sole was run this year; the remaining shallow water flatfish biomass estimates were from the 2013 survey.

For the shallow water flatfish complex, ABC and OFL for southern and northern rock sole are combined with the ABC and OFL for the rest of the shallow water flatfish complex. This yields a combined ABC of 40,805 t and OFL of 50,007 t for 2014. For 2015, the combined ABC is 37,505 t and the OFL is 46,207 t.

The GOA Plan Team agrees with authors' recommended ABC for the shallow water flatfish complex which was equivalent to maximum permissible ABC.

Area apportionment

The recommended apportionment percentages based on the 2013 survey biomass abundances by area.

Year	Western	Central	West Yakutat	SEO	Total
2014	20,376	17,813	2,039	577	40,805
2015	18,728	16,372	1,875	530	37,505

5. Deep water flatfish complex (Dover sole and others)

Status and catch specifications (t) of deep water flatfish (Dover sole and others) and projections for 2014 and 2015. Biomass for each year corresponds to the estimate given when the ABC was determined. Catch data in this table are current through November 9th, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	77,531[a]	6,834	5,126	5,126	295
2013	77,531[a]	6,834	5,126	5,126	225
2014	66,147[b]	16,159	13,472		
2015		15,955	13,303		

[a] In 2012 and 2013 Dover sole biomass was based on Tier 5 calculations.

[b] For 2014, Dover sole biomass is based on the author's preferred model and assigned to Tier 3a.

Changes in assessment methodology and data

The deep water flatfish complex is comprised of Dover sole, Greenland turbot, and deepsea sole. The assessment included updated fisheries catch data for all three species through 2013. Dover sole fishery and survey length compositions, and survey age compositions were also updated. The 2013 survey biomass estimate was included in the Dover sole model. The 1984, 1987, and 2001 length and age at length data were excluded from the Dover sole model due to survey biases in these years. The Stock Synthesis assessment platform was used to conduct the Dover sole assessment. A survey averaging random effects model was used to estimate survey biomass and variance in missing depth and area strata and these estimates were included in the survey biomass index. Male and female selectivity curves were estimated based on the survey biomass index and composition data from surveys that covered more than 500m in depth. Separate sex-specific selectivity curves were estimated using only composition data from surveys that covered no more than 500 m in depth. A conditional age-at-length approach was used in the model and growth parameters were estimated internally. Fishery selectivity was changed to be length-based and double-normal, allowing for dome-shaped selectivity. An initial equilibrium fishing mortality rate was estimated. An ageing error matrix was incorporated into the model. Recruitment deviations prior to 1984 (1967–1983) were estimated separately from main-period recruitment deviations (1984–2008). Composition data sources were weighted using a method that accounted for intra-year correlations in residuals.

Author and Team evaluation of alternative models

The Plan Team endorsed the use of the author's recommended model for setting catch limits. In addition to the author's recommended model, three alternate models were also presented. These encompassed treatment of early recruitment, and the exclusion of the 1984 and 1987 survey biomass estimates.

Status determination and stock trends

The model estimate of spawning stock biomass in 2013 is 66,147 t, which is well above $B_{35\%}$ (24,690 t). Thus the Dover sole stock is not overfished. Information is insufficient to determine stock status relative to overfished criteria for Tier 6 species. Catch levels for this complex remain well below the TAC and below levels where overfishing would be a concern.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

Dover Sole was in Tier 5 last year (2012). This year (2013) the author and Plan Team recommend that Dover sole be moved to Tier 3a management. $B_{40\%}$ for this stock is estimated to be 28,128 t and projected spawning biomass is 66,147 t. For the Dover sole Tier 3a assessment, the 2014 and 2015 ABC are 13,289 t and 13,120 t, respectively. The 2014 and 2015 OFL using Tier 3a results are 15,915 t and 15,711 t, respectively. Both Greenland turbot and deepsea sole are in Tier 6. The Tier 6 calculation (based on average catch from 1978–1995) for the remaining species in the deep water flatfish complex ABC is 183 t and the OFL is 244 t. These values apply for 2014 and 2015 ABC and OFLs. The GOA Plan Team agrees with the authors' recommendation to use the combined ABC (13,473 t) and OFL (16,159 t) for the deep water flatfish complex for 2014 and 2015. The ABC is equivalent to the maximum permissible ABC.

Area apportionment

Area apportionments of deep water flatfish are based on the relative abundance (biomass) of each species in the stock complex in each management area.

Area apportionments of deep water flatfish (*Dover sole and others*) ABCs for 2014 and 2015 are based on the fraction of the 2013 survey biomass in each area for Dover sole and the estimate of 2013 catch by area for Greenland turbot and deepsea sole.

Year	Western	Central	West Yakutat	SEO	Total
2014	302	3,727	5,532	3,911	13,472
2015	300	3,680	5,462	3,861	13,303

6. Rex Sole

Status and catch specifications (t) of rex sole and projections for 2014 and 2015. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. Catch data are current through November 9th, 2013.

Year	Biomass	OFL	ABC[a]	TAC	Catch
2012	87,162	12,561	9,612	9,612	2,426
2013	86,684	12,492	9,560	9,560	3,573
2014	84,702	12,207	9,341		
2015		11,963	9,155		

[a]ABC values are calculated using the catch equation applied to beginning year biomass values estimated by authors' age structured model.

Changes in assessment methodology and data

Rex sole are assessed on a biennial schedule to coincide with the timing of survey data. This year an executive summary of the assessment was presented due to the government shutdown. The author updated the assessment by running the single-species projection model using parameter values from the accepted 2011 assessment model, together with updated catch information for 2011–2013, to predict adult biomass for rex sole in 2014 and 2015.

Status determination and stock trends

The assessment model biomass estimates (age 3+) decreased from 86,684 t in 2013 to 84,702 t in 2014 and a continuing decrease into 2015 is expected. The model estimate of female spawning biomass in 2014 is 52,807 t, which is greater than $B_{35\%}$ (19,434 t). The stock is not considered overfished. Catches of rex sole are well below TACs and below levels where overfishing would be a concern.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

In 2005, the Plan Team adopted a Tier 5 approach (using model estimated adult biomass) for rex sole ABC recommendations due to unreliable estimates of $F_{40\%}$ and $F_{35\%}$. Using $F_{ABC} = 0.75M = 0.128$ results in a 2014 ABC of 9,341 t. The 2014 OFL using $F_{OFL} = M = 0.17$ is 12,207 t. The Plan Team concurs with the author's recommended maximum permissible ABCs for 2014 and 2015.

Area apportionment

Area apportionments of rex sole ABC's for 2014 and 2015 are based on the fraction of the 2011 GOA bottom trawl survey biomass in each area.

Year	Western	Central	West Yakutat	SEO	Total
2014	1,270	6,231	813	1,027	9,341
2015	1,245	6,106	796	1,008	9,155

7. Arrowtooth flounder

Status and catch specifications (t) of arrowtooth flounder and projections for 2014 and 2015. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. Catch data in this table are current through November 9th, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	2,161,690	250,100	212,882	103,300	20,714
2013	2,055,560	247,196	210,451	103,300	19,956
2014	1,978,340	229,248	195,358		
2015		222,160	189,556		

Changes in assessment methodology and data

The 2013 NMFS GOA trawl survey biomass and length data were added to the model. Catch for 2011 was updated, and updated catch for 2012 and 2013 was added. Fishery length data was updated for 2011 and fishery length data from 2012 and 2013 was added to the model. No new age data were available.

There were no changes in assessment methodology. Arrowtooth flounder are managed as a Tier 3 stock, using a statistical age-structured model as the primary assessment tool. An age-based model was used with the same configuration as the 2011 assessment.

Status determination and stock trends

The estimated age 3+ biomass from the model has increased by an order of magnitude since 1961 and peaked at about 2.2 million t in 2006. The age 3+ biomass estimates are slightly lower in the current assessment for the years since 2000 when compared to estimates from the 2011 assessment. Female spawning biomass in 2013 was estimated at 1,200,320 t, which is <1% less than the projected 2013 biomass of 1,278,530 t from the 2011 assessment. Age 3+ biomass is expected to decrease in 2015.

The stock is not overfished nor approaching an overfished condition. Catch levels for this stock remain below the TAC and below levels where overfishing would be a concern.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

Arrowtooth flounder has been determined to fall under Tier 3a. The 2014 ABC using $F_{40\%}$=0.172 is 195,358 t, a decrease from the 2013 ABC of 210,451 t. The 2014 OFL using $F_{35\%}$=0.204 is 229,248 t. The 2015 ABC (189,556 t) and OFL (222,160 t) were estimated using the projection model and with total catch in 2012 and the estimated catch for 2013 and 2014. Catch in 2013 and 2014 was estimated using the recent 5-year average (F=0.02).

The Plan Team agrees with author's recommended ABC for arrowtooth flounder which is the maximum permissible ABC.

Area apportionment

Area apportionments of arrowtooth flounder for 2014 and 2015 are based on the fraction of the 2013 survey biomass in each area.

Year	Western	Central	West Yakutat	East Yakutat/SE	Total
2014	31,142	115,612	37,232	11,372	195,358
2015	30,217	112,178	36,126	11,035	189,556

8. Flathead sole

Status and catch specifications (t) of flathead sole and projections for 2014 and 2015. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. Catch data in this table are current through November 9th, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	292,189	59,380	47,407	30,319	2,166
2013	288,538	61,036	48,738	30,496	2,627
2014	252,361	50,664	41,231		
2015		50,376	41,007		

Changes in assessment methodology and data

A full assessment with a new model was presented. Catch data for 1978-1983 and 2012-2013 catch data were included in the model. 2012 and 2013 fishery length composition data were added and 1985-1988, 2000, and 2008 fishery length composition data were excluded from the model due to low sample size. The number of hauls was used as the effective sample size of fishery length-composition data. The 2013 survey biomass index and survey length composition data were added to the model. Conditional age-at-length data were used instead of marginal age composition data. 2011 age composition data (within each length bin) were added to the model. The "plus" group was increased to age 29.

The assessment was conducted using the Stock Synthesis modeling platform. The fishery and survey selectivity curves were estimated using an age-based double-normal function without a descending limb instead of an age-based logistic function. A conditional age-at-length likelihood approach was used: expected age composition within each length bin was fit to age data conditioned on length in the likelihood function, rather than fitting the expected marginal age-composition to age data that weren't conditioned on length. Growth parameters and an initial equilibrium fishing mortality rate were estimated within the model. Relative weights of composition data were adjusted using a data-weighting method that accounted for correlations in composition data. An ageing error matrix was incorporated into the model. Recruitment deviations prior to 1984 were estimated as "early-period" recruits separately from main-period recruitment deviations (1984-2008). The Plan Team endorsed the author's recommended model.

Status determination and stock trends

The 2014 spawning biomass estimate (84,076 t) is above $B_{40\%}$ (35,532 t) and projected to be stable through 2015. The stock is not overfished nor approaching an overfished condition. Catch levels for this species remain below the TAC.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

Flathead sole are determined to be in Tier 3a. For 2014 the Plan Team concurred with the authors' recommendation to use the maximum permissible ABC of 41,231 t. The F_{OFL} is set at $F_{35\%}$ (0.61) and gives an OFL of 50,664 t.

Area apportionment

Area apportionments of flathead sole ABCs for 2014 and 2015 are based on the fraction of the 2013 GOA bottom trawl survey biomass in each area.

Year	Western	Central	West Yakutat	SEO	Total
2014	12,730	24,805	3,525	171	41,231
2015	12,661	24,670	3,506	170	41,007

9. Pacific ocean perch

Status and catch specifications (t) of Pacific ocean perch and projections for 2014 and 2015. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current as of November 9th 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	348,168	19,498	16,918	16,918	14,911
2013	345,260	18,919	16,412	16,412	12,890
2014	410,712	22,319	19,309		
2015		22,849	19,764		

Changes in assessment methodology and data

Pacific ocean perch (POP) are assessed on a biennial schedule to coincide with the timing of survey data. During on-cycle (odd) years, a full assessment model with updated assessment and projection model results are presented. Due to the 2013 government shutdown, alternative model configurations for this year's assessment were not presented. The assessment methodology was the same as the full 2011 assessment with updated input data. New information included 2013 survey biomass estimates, 2011 survey age compositions, 2012 fishery age compositions, updated 2012 catch, and estimated catch for 2013.

Status determination and stock trends

The 2013 spawning biomass estimate (120,356 t) is above $B_{40\%}$ (103,079 t) and projected to increase in the near term.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The GOA Pacific ocean perch stock was determined to be in Tier 3. The F_{OFL} is set at $F_{35\%}$ (0.132) and gives an OFL of 22,319 t. The Plan Team accepted the author recommended ABC of 19,309 t (with F_{ABC} $=F_{40\%}$ of 0.113).

Area apportionment

Apportionment of ABCs is based on a weighted average of the percent distribution of biomass for each area using the three most recent trawl survey estimates (from 2009, 2011, and 2013). Each successive survey is given a progressively heavier weighting using factors of 4, 6, and 9, respectively. The apportionment values are: Western area, 11%; Central area, 69%; and Eastern area, 20%.

Amendment 41 prohibited trawling in the Eastern area east of 140° W longitude. Since POP are caught exclusively with trawl gear, there is concern that the entire Eastern area TAC could be taken in the area that remains open to trawling (between 140° and 147° W longitude). Thus, as was done for the last four years, the Team recommends that a separate ABC be set for POP in WYAK. The ratio of biomass still obtainable in the W. Yakutat area (between 140° W and 147° W) is higher than last year at 0.71. This corresponds to a 2014 ABC of 2,772 t for WYAK. Under this apportionment, it is unlikely that the 1,128 t assigned to the remaining Eastern area (East Yakutat/Southeast Outside area) will be harvested.

The OFL is apportioned to two areas, the area that is currently fished (the Western, Central, WYAK GOA combined) and the remaining Eastern GOA (East Yakutat/Southeast Outside area). The Plan Team recommended OFL value for the combined Western, Central and WYAK area is 21,016 t (94%). The remaining area (SEO) OFL is 1,303 t (6%).

Area apportionment of 2014-2015 ABC and OFL for POP in the Gulf of Alaska:

Year		Western	Central	WYAK	SEO	Total
2014	ABC	2,086	13,323	2,772	1,128	19,309
2015	ABC	2,135	13,637	2,838	1,154	19,764
			W-C GOA		**SEO**	**Total**
2014	OFL		21,016		1,303	22,319
2015	OFL		21,515		1,334	22,849

10. Northern Rockfish

Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9, 2013. Note that for management purposes, the ABC in the EGOA of 2 t is combined with other rockfish. The 2014 and 2015 ABCs listed below are reduced by 2 t.

Year	Age 2+ biomass	OFL	ABC	TAC	Catch
2012	104,155	6,574	5,507	5,507	5,063
2013	99,089	6,124	5,130	5,130	4,690
2014	102,893	6,349	5,322		
2015		5,978	5,010		

Changes in assessment methodology and data

There is no change to the assessment methodology from the 2011 assessment. Catches were updated for 2012 and 2013. Survey age compositions for 2011 and 2011 fishery length compositions were added. The 2013 trawl survey biomass was incorporated.

Status determination and stock trends

The model does not fit the 2013 survey estimate well, likely due to the large increase in this estimate, with associated large uncertainty. The 2013 update shows recent recruitment is low but stable, and there was a slight increase in spawning and total biomass from previous projections. The estimates of current population abundance indicate that it is dominated by older fish from the 1976 and 1984 year class, and the above average 1993 and 1997 year-classes.

The stock is not overfished, nor is it approaching an overfished condition. Catches remain well below levels where overfishing would be a concern.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

Northern rockfish are determined to be in Tier 3a. The recommended ABC for 2014 is 5,324 t. The corresponding reference values for northern rockfish recommended for this year and projected one additional year are summarized below. The value for $B_{40\%}$ is 30,073 t compared to a 2013 estimate of 21,193 t of female spawning biomass. The F_{ABC} is set to $F_{40\%}$ (0.061) and F_{OFL} set to $F_{35\%}$ (0.073). The 2014 OFL is 6,349 t.

Area apportionment

Apportioning the 2014 and 2015 ABC is based on the same method used last year (weighted average of 3 most recent surveys) updated with the 2013 survey distribution, resulting in the following percentage apportionments by area: Western 24.52%, Central 74.45% and Eastern 0.03%. The small northern rockfish ABC apportionments for the Eastern Gulf are combined with other slope rockfish for management purposes.

Northern rockfish area apportionments for ABCs in 2014-2015:

Year	Western	Central	Eastern	West Yakutat	East Yak./SE	Total
2014	1,305	4,017	2	-	-	5,324
2015	1,229	3,781	2	-	-	5,012

11. Shortraker rockfish

Status and catch specifications (t) of shortraker rockfish and projections for 2014 and 2015. Biomass estimates are based on the three most recent trawl surveys. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current as of November 9th, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	48,048	1,441	1,081	1,081	728
2013	48,048	1,441	1,081	1,081	784
2014	58,797	1,764	1,323		
2015		1,764	1,323		

Changes in assessment methodology and data

Although this year was scheduled to be a full stock assessment, due to the 2013 government shutdown, an enhanced executive summary was provided. Current exploitable biomass was based on averaging the biomass estimates from the last three Gulf of Alaska trawl surveys. The only new assessment information was the 2013 trawl survey data and updated catches for 2012 and 2013. A full stock assessment with updated assessment results will be presented in 2014.

Status determination and stock trends

Information is insufficient to determine stock status relative to overfished criteria. Catch levels for this stock remain below levels where overfishing would be a concern.

Averaging the biomass from the last three Gulf of Alaska trawl surveys (2009, 2011, and 2013) results in an exploitable biomass of 58,797 t for shortraker rockfish, a 22% increase from the previous year's biomass (48, 048 t). The large increase in biomass for shortraker rockfish is mostly attributed to a very large catch in a single haul in the Yakutat area.

Tier determination, ABCs, and OFLs

Shortraker rockfish are Tier 5 species for specifications where $F_{\mathrm{ABC}} = 0.75M = 0.0225$ and $F_{OFL} = 0.03$. Applying this definition to the exploitable biomass of shortraker rockfish results in a 2014 ABC of 1,323 t and an OFL of 1,764 t.

Area apportionment

Area apportionments are based on the three most recent trawl surveys. The following table shows the recommended apportionment for 2014. Apportionment values for shortraker rockfish are: Western area, 6.98%; Central area, 29.94%; and Eastern area, 63.08%.

Area apportionment of 2014 and 2015 ABC for shortraker rockfish in the Gulf of Alaska:

Western	Central	Eastern	Total
92	397	834	1,323

12. Dusky rockfish

Status and catch specifications (t) of dusky rockfish in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. Years prior to 2012 include yellowtail and widow rockfish. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9th 2013.

Year	Age 4+ biomass	OFL	ABC	TAC	Catch
2012	66,771	6,257	5,118	5,118	4,012
2013	63,515	5,746	4,700	4,700	2,886
2014	69,371	6,708	5,486		
2015		6,213	5,081		

Changes in assessment methodology and data

The 2013 assessment is a full assessment document with updated assessment and projection model results. The input data were updated to include the 2013 trawl survey biomass estimate, final catches for 2012, preliminary catch for 2013, survey age compositions for 2011, and final fishery length compositions for 2011. The assessment methodology is the same as the 2011 assessment and uses the recommended 2011 model configuration with updated input data.

Author and Team evaluation of alternative models

Alternative model configurations are not included in this year's assessment because of the government shutdown.

Status determination and stock trends

The 2014 spawning biomass estimate (29,256 t) is above $B_{40\%}$ (20,906 t) and projected to decrease slightly to 27,200 t in 2015. Dusky rockfish are not overfished, nor approaching an overfished condition.

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

Dusky rockfish are in Tier 3a. The Plan Team agreed with the authors' recommendation to use the maximum permissible ABC and OFL of 5,486 t and 6,708 t from the updated assessment model for 2014.

Area apportionment

The methodology for apportioning the ABC among areas remains unchanged from the 2011 assessment model, with the recommended apportionments for 2014 shown below:

	Western	Central	Eastern	Total
Percentage	5.8%	65.3%	28.9%	100%
Area ABC (t)	317	3,584	1,585	5,486

Additional apportionment exists in the West Yakutat area because of prohibited trawling (Amendment 41). The results are the following:

	W. Yakutat	E. Yakutat/Southeast
Area ABC (t)	1,384	201

13. Rougheye and blackspotted rockfish

Status and catch specifications (t) of rougheye and blackspotted rockfish and projections for 2014 and 2015. Biomass for each year corresponds to the projections given in the SAFE report issued in the preceding year. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current as of November 9th, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	42,856	1,472	1,223	1,223	593
2013	42,883	1,482	1,232	1,232	635
2014	42,810	1,497	1,244		
2015		1,518	1,262		

Changes in assessment methodology and data

Rockfish are assessed on a biennial schedule to coincide with the timing of survey data. During on-cycle (odd) years, a full assessment model with updated assessment and projection model results are presented. Due to the 2103 government shutdown, an executive summary of the assessment and updated projection model were presented. New information included updated 2011 and 2012 catch and estimated catches for 2013. A full assessment will be presented next year.

Status determination and stock trends

Female spawning biomass (12,897 t) is well above $B_{40\%}$ (9,732 t). The updated 2013 projection model indicates stable biomass. Catches remain well below levels where overfishing would be a concern (45% of ABC). The stock is not overfished, nor is it approaching an overfished condition.

Tier determination, ABCs and OFLs

The rougheye and blackspotted complex is in Tier 3a. For the 2014 fishery, the Team accepts the authors' recommended maximum allowable ABC of 1,244 t ($F_{ABC} = F_{40\%} = 0.039$) and OFL of 1,497 t ($F_{OFL}=F_{35\%} = 0.047$).

Area apportionment

The apportionment percentages are the same as presented in the 2011 full assessment and does not include data from the 2013 survey. The following table shows the recommended apportionment for 2014. Apportionment values for rougheye and blackspotted rockfish are: Western area, 6.60%; Central area, 69.46%; and Eastern area, 23.94%.

Area apportionment of the 2014 and 2015 ABCs for the rougheye and blackspotted rockfish complex in the Gulf of Alaska are:

Year	Western	Central	Eastern	Total
2014	82	864	298	1,244
2015	83	877	302	1,262

14. Demersal shelf rockfish

Status and catch specifications (t) of demersal shelf rockfish and projections for 2014 and 2015. Biomass for each year corresponds to the survey biomass estimates given in the SAFE report issued in the preceding year(s). The 2013 catch data are from the NMFS Catch Accounting System through November 9th 2013.

Year	Biomass	OFL	ABC	TAC	Catch[1]
2012	14,307	467	293	240	178
2013	14,588	487	303	249	217
2014	13,274	438	274		
2015		438	274		

[1] Catch estimates do not include recreational catch which corresponds to 46 t in 2012 and 35 t in 2013

Changes in assessment methodology and data

An executive summary assessment was prepared this year. For this assessment, yelloweye rockfish density was updated for one of the four management areas, Central Southeast Outside (CSEO). An alternate survey vehicle (ROV in lieu of a submersible) was used to collect this data in 2012. New information included updated average weight estimates for yelloweye by area and demersal shelf rockfish (DSR) habitat area updates for the CSEO region. An appendix was provided presenting the results of a preliminary random effects model to estimate DSR biomass.

Status determination and stock trends

Density and biomass estimates for this complex are based on yelloweye rockfish only. Yelloweye rockfish biomass are based on the most recent estimate by management area. As in previous assessments, biomass is estimated using the lower 90% confidence limit of the point estimate by management area. Changes in average weight computations resulted in small decreases in the biomass estimates in the Southern Southeast Outside (SSEO) and East Yakutat (EYKT) areas. The Northern Southeast Outside (NSEO) area remained the same as no new fishery weights were available in 2013. There was a relatively large decrease in biomass (4,051 to 3,247 t) in the CSEO due to a decrease in average weight as well as the decline based on the most recent 2012 density estimate. The overall biomass estimate for 2014 is 13,274 t; a decrease from 14,588 t in 2013.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

There are reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$ for yelloweye rockfish, therefore the species complex is managed under Tier 4. Maximum allowable ABC under Tier 4 is based on $F_{40\%}$ which is equal to 0.026. This would result in a maximum permissible ABC of 356 t. Demersal shelf rockfish are particularly vulnerable to overfishing given their longevity, late maturation, and sedentary and habitat-specific residency. As in previous assessments, the Plan Team concurred with the authors' recommendation to establish a harvest rate lower than the maximum allowed under Tier 4 by applying F=M=0.02 to the biomass estimate. This results in a recommended 2014 ABC of 274 t for DSR. The OFL fishing mortality rate under Tier 4 is $F_{35\%}$=0.032. The OFL for the DSR complex in 2014 is 438 t.

Assessment work for DSR is complicated by a lack of federal funding and the availability of the Delta submersible for surveys. The Team was supportive of the ROV work as a viable alternative to the submersible surveys and suggests continuing this effort. In light of the recent low biomass in the CSEO region coupled with the decreasing trend over time, the Team discussed the potential of a conservation concern for this area. The Team supports continued development of the random effects model for estimating biomass in this assessment, contingent on the working group's recommendations. Additionally, the Team looks forward to seeing the age structured model currently being developed for yelloweye rockfish as an alternative to the current methodology.

Area apportionment

The ABC and OFL for DSR are for the SEO Subdistrict. DSR management is deferred to the State of Alaska and any further apportionment within the SEO Subdistrict is at the discretion of the State.

15. Thornyheads

Status and catch specifications (t) of thornyheads in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. Catch data for 2013 are current through November 9th 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	73,990	2,220	1,665	1,665	746
2013	73,990	2,220	1,665	1,665	1,136
2014	81,816	2,454	1,841	1,841	
2015		2,454	1,841	1,841	

Changes in assessment methodology and data

Thornyheads are assessed on a biennial schedule to coincide with the timing of survey data. The last complete assessment was presented in 2011. An enhanced executive summary is presented this year incorporating the 2013 bottom trawl survey estimates. New catch information includes updated 2012 and estimated 2013 catch.

Status determination and stock trends

Information is insufficient to determine stock status relative to overfished criteria as estimates of spawning biomass are not available. Catch levels for this stock remain below the TAC and below levels where overfishing would be a concern.

Estimates of spawning biomass are not available for thornyheads which are assessed under Tier 5. The 2013 GOA bottom trawl survey covered depths shallower than 701 m, similar to what was done in 2011. To correct for this, the 2013 survey biomass estimate was inflated to account for the lack of sampling in the 701-1000 m depth stratum, identical to the method used in the 2011 assessment. This results in a total estimated biomass of 81,816 t, a 17% increase from the 2011 total biomass estimate. This includes large increases in the Central Gulf and Western Gulf.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The Gulf-wide catch of thornyheads increased 49% from 2012, but still was only 63% of the ABC. Thornyhead rockfish are in Tier 5. The Plan Team concurred with the author's recommendation for OFL and ABC for 2014 and 2015. The 2014 (and 2015) ABC recommendation (F_{ABC} =0.0225) is 1,841 t and the OFL (F_{OFL} =0.03) is 2,454 t.

Additional Plan Team recommendations

The Team noted that for thornyheads (and a number of other species), it is critically important to the assessment that the GOA trawl surveys continue and that they extend to 1000 m in order to more completely cover their habitat. The use of the random effects model will be assessed by a working group to determine a consistent method of its use. Contingent on this work, the random effects method may be applied to thornyheads in the future.

Area apportionment

Area apportionments have been updated for this assessment and are based upon the relative distribution of biomass by area from the 2013 GOA bottom trawl survey. Area apportionment of the 2014-2015 ABC for thornyhead rockfish is:

Year	Western	Central	Eastern	Total
2014 and 2015	235	875	731	1,841

16. Other rockfish

Status and catch specifications (t) of other rockfish. In 2013, the seven species of DSR rockfish were included in the WGOA and CGOA areas. Biomass estimates are based on the three most recent trawl survey estimates. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9th, 2013. Note that 2 t of Northern rockfish have been added for management purposes to "other rockfish" in the EGOA.

Year	Survey biomass	OFL	ABC	TAC	Catch
2012	85,774	5,305	4,045	1,080	1,039
2013	85,774	5,305	4,045	1,080	790
2014	83,383	5,347	4,079		
2015		5,347	4,079		

Changes in assessment methods and data

The 2013 GOA trawl survey data was included in the assessment.

Beginning in 2013, the seven species of Demersal Shelf Rockfish (DSR; copper rockfish, rosethorn rockfish, quillback rockfish, China rockfish, tiger rockfish, canary rockfish and yelloweye rockfish) are included in the Other Rockfish species complex outside of area 650 (where they are managed in the DSR complex). In this assessment, these seven species are included in the biomass estimates in the Central and Western GOA areas. Future assessments will partition the survey biomass estimates in WYAK/EYAK to those west of 140° W, as bottom trawling is prohibited east of this longitude. Natural mortality parameters were updated for darkblotched rockfish, sharpchin rockfish, widow rockfish., and growth parameters were updated for sharpchin rockfish.

Status determination and stock trends

The estimated biomass, based on an average from the three most recent GOA trawl surveys, is 83,383 t. In 2013, the GOA-wide catch of Other Rockfish (as of Oct 24, 2013) was 27% less than the 2012 catch. The ABC was exceeded in the WGOA area in 2013.

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

GOA other rockfish are a Tier 5 stock complex. The Plan Team agreed with the authors' recommendation of the maximum permissible ABC and OFL of 5,347 t and maximum permissible ABC of 4,079 t.

Area apportionment

The Plan Team recommends a single ABC for the combined WGOA and CGOA areas to address management concerns with a small ABC in the WGOA. The recent overages in the WGOA are not viewed as a conservation concern because the primary catch in this region consist primarily of harlequin rockfish, which generally occur in untrawlable grounds. Thus, the biomass in this area is likely

underestimated due to lack of sampling in untrawlable areas. The apportionments recommended for 2014 are shown below:

Area Apportionment	Western and Central GOA	Eastern GOA W. Yakutat	Eastern GOA E Yakutat/Southeast	Total
	25.3%	14.2%	60.5%	100%
Area ABC (t)	1,031	580	2,468	4,079
OFL (t)				5,347

Additional Plan Team Recommendations

The Team recommends using observer data to examine bycatch rates (i.e., tons of the bycatch species caught per ton of target species catch) to further examine fishery harvest in the GOA. The Team also notes that this stock complex would be amenable to the random effects survey averaging model, and encourages the survey averaging work group to consider how the random effects model could be adapted to apply to stock complexes, and consider the particular case study of GOA Other Rockfish.

17. Atka mackerel

Status and catch specifications (t) of Atka mackerel in recent years. Atka mackerel are managed under Tier 6 and reliable estimates of biomass are not available. The OFL and ABC for 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9th, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	-	6,200	4,700	2,000	1,187
2013	-	6,200	4,700	2,000	1,244
2014	-	6,200	4,700		
2015		6,200	4,700		

Changes in assessment methodology and data

Atka mackerel are assessed on a biennial schedule to coincide with the timing of survey data. The last complete assessment was in 2011. An executive summary is presented this year due to the furlough. New catch information includes updated 2012 and 2013 catches. Since the 2011 assessment, and 2012 update, ages from the 2011 GOA survey and 2012 fishery have become available and are comprised of mostly of fish from the 2006 and 2007 year classes which are also prevalent in the Aleutian Islands.

Survey biomass estimates are not considered consistent reliable indicators of absolute abundance or indices of trend.

Status determination and stock trends

Gulf of Alaska Atka mackerel have been managed under Tier 6 specifications since 1996. In 2007, The Plan Team, SSC, and Council agreed with the authors that there is no reliable estimate of Atka mackerel biomass and recommended continuing management under Tier 6.

Information is insufficient to determine stock status relative to overfished criteria. Catches are below ABC and below levels where overfishing would be a concern.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

Since 1996, the maximum permissible ABC has been 4,700 t under Tier 6 and the OFL has been 6,200 t. Given the very patchy distribution of GOA Atka mackerel which results in highly variable estimates of abundance, the Plan Team continues to recommend that GOA Atka mackerel be managed under Tier 6.

The Plan Team recommends a 2014 ABC for GOA Atka mackerel equal to the maximum permissible value of 4,700 t. The 2014 OFL is 6,200 t under Tier 6.

Additional Plan Team recommendations

Due to concerns over uncertainty with the ABC estimates using Tier 6, a low TAC is recommended to provide for anticipated incidental catch needs of other fisheries, principally for Pacific cod, rockfish and pollock fisheries.

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 2014 and 2015 are those recommended by the Plan Team. Catch data are current through November 9th 2013.

Species	Year	Biomass	OFL	ABC	TAC	Catch
Big Skate	2012	50,229	5,023	3,767	3,767	1,999
	2013	50,229	5,023	3,767	3,767	2,329
	2014	50,155	5,016	3,762		
	2015		5,016	3,762		
Longnose Skate	2012	34,995	3,500	2,625	2,625	886
	2013	34,995	3,500	2,625	2,625	1,650
	2014	38,349	3,835	2,876		
	2015		3,835	2,876		
Other Skates	2012	27,061	2,706	2,030	2,030	1,222
	2013	27,061	2,706	2,030	2,030	1,611
	2014	26,518	2,652	1,989		
	2015		2,652	1,989		

Changes in assessment methodology and data

Skates are normally assessed on a biennial schedule, with full assessments due in odd years, to coincide with the timing of survey data. Due to the 2013 government shutdown only an executive summary is provided this year. The new assessment includes 2013 survey biomass data and updated 2012-2013 catch. An updated 3-year average survey biomass estimate is used for harvest recommendations that include the 2009, 2011, and 2013 surveys.

Status determination and stock trends

The 2013 survey biomass estimates for longnose skate and “other skates” increased substantially relative to the 2011 estimate, with CVs similar to earlier years. The estimate for longnose skates is the highest in the 1984-2013 time series. The 2013 survey biomass estimate for big skate was down considerably from 2011.

Estimates of incidental catches increased substantially for longnose skates and “other skates” in 2013, mainly in the IFQ halibut target fishery. For longnose skates, most of the increased catch occurred in the EGOA. For “other skates” the increased catches occurred in the CGOA and EGOA. It is likely that this increased level of catch is due to the increased catch reporting from the halibut IFQ fishery as a result of increased observer coverage in 2013. Catch of big skates in the CGOA exceeded the ABC for that area, as it has every year since 2010. Retention of skates during 2013 decreased relative to 2012, contrary to the recent trend of increasing skate retention.

Catch as currently estimated does not exceed any gulf-wide OFLs, and therefore, is not subject to overfishing. It is not possible to determine the status of stocks in Tier 5 with respect to overfished status.

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

Skates are managed in Tier 5, where OFL and ABC are based on survey biomass estimates and natural mortality rate. A single value of M=0.10 is applied to area-specific (for big and longnose skates) and gulf-wide (for other skates) average biomass from the most recent three GOA trawl surveys to estimate the ABCs listed above using the maximum permissible F_{ABC} =0.075 (0.75M), and the OFLs using F_{OFL} =0.10. The Team concurred with the authors' recommendation of area specific ABCs and gulf-wide OFLs. This is identical to the Team recommendations from previous years.

Additional Plan Team Recommendations

The Plan Team requests the author complete the stock structure template and provide any additional information needed to explore whether the overages are a conservation concern. The Plan Team also recommends researching discard mortality rates by gear type.

Area apportionment

The Plan Team concurred with the authors recommended area-specific ABCs (shown above) based on the average of the three most recent GOA bottom trawl surveys (2009, 2011, and 2013). Big and longnose skates have area-specific ABCs and gulf-wide OFLs; other skates have a gulf-wide ABC and OFL.

Year	Species	Western	Central	Eastern	Total
2014 and 2015	Big skate	589	1,532	1,641	3,762
2014 and 2015	Longnose skate	107	1,935	834	2,876
2014 and 2015	other skates				1,989

19. Sculpins

Status and catch specifications (t) of GOA 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 2014 and 2015 are those recommended by the Plan Team. Catch data for 2013 are current through November 9, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	34,610	7,641	5,731	5,731	875
2013	34,732	7,614	5,884	5,884	1,433
2014	33,550	7,448	5,569		
2015		7,448	5,569		

Changes in assessment methodology and data

GOA sculpins continue to be on a biennial stock assessment schedule to coincide with the timing of the NMFS bottom trawl survey. An executive summary is presented in this SAFE Report with last year's key assessment parameters and projections for 2014 and 2015. New information includes catch data updated for 2012 and partial data for 2013, by target fishery and area. The OFL and ABC recommendations were adjusted slightly from last year reflecting updates and corrections to the data.

There were no changes to the Tier 5 approach used in 2011. The biomass estimate was based on the average biomass estimate of the last four NMFS bottom trawl surveys in 2007, 2009, 2011, and 2013. The sculpin complex mortality rate is based on a biomass-weighted average of the instantaneous mortality rates for the four most abundant sculpins in the GOA; bigmouth, great, plain, and yellow Irish lord sculpins from the 2013 survey. As a result, the sculpin complex M was calculated as 0.222.

Status determination and stock trends

As a Tier 5 stock there is not sufficient data to determine if the sculpin complex is in an overfished condition and therefore the status is unknown. Recent catches of sculpins have been well below the ABC first established for the sculpin complex in 2011. The stock status trend is stable. The sculpin complex is not currently being subjected to overfishing.

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

The Plan Team concurred with the Tier 5 approach, including the biomass estimates based on the most recent 4 surveys, and authors' recommendations for ABC and OFL. Based on the Tier 5 approach the gulfwide OFL and ABC for the sculpin complex in 2014 and 2015 is 7,448 t and 5,569 t respectively.

Area apportionment

The GOA sculpins are managed gulf-wide.

20. Sharks

Status and catch specifications (t) of GOA shark 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 2014 and 2015 are those recommended by the Plan Team. Catch data for 2013 are current through November 9, 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	76,979	8,037	6,028	6,197	636
2013	76,979	8,037	6,028	6,028	2,083
2014	76,452	7,986	5,989		
2015		7,986	5,989		

Changes in assessment methodology and data

There was no change in assessment methodology. The GOA shark complex (spiny dogfish, Pacific sleeper shark, salmon shark, and other/unidentified sharks) continues to be on a biennial stock assessment schedule to coincide with the timing of the NMFS bottom trawl survey. The biomass estimates were updated to include the 2013 GOA biennial trawl survey data. The total catch for the GOA sharks from 2003 through 2013 was updated, including 2013 catch data. This assessment represents an enhanced executive summary due to the federal government shutdown.

Status determination and stock trends

Sharks are caught incidentally in other target fisheries. Recent catches of sharks, from 1992 through 2013, have been well below the ABC first established for the shark complex in 2011. Reliable total biomass estimates for the shark complex do not exist, thus there can be no determination of spawning biomass or stock status trend. The shark complex is in Tier 6. A Tier 5 assessment approach is used for spiny dogfish but reliable biomass estimates do not exist thus they are considered Tier 6.

There is insufficient data to determine if the shark complex is in an overfished condition and therefore the status is unknown. The shark complex is not currently being subjected to overfishing. The authors noted that the implementation of the restructured observer program in 2013 may have influenced the increase in catch estimates for shark species in 2013, as some smaller vessels and vessels fishing for halibut IFQ are now observed.

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

The complex is in Tier 6. Catch specifications for spiny dogfish employ a Tier 5 approach where OFL = B (3-year survey average) * M (0.097) and ABC = 0.75 * OFL. For the remainder of the species in the shark complex, OFL = average catch from 1997 to 2007 and ABC = OFL * 0.75. The resulting OFL for the complex in 2014 and 2015 is 7,986 t and the ABC is 5,989 t. The Plan Team recommended that the authors provide additional information in 2014 on the catch from inside State waters in Prince William Sound (area 659) and the Southeast Inside district (area 659).

Area apportionment

GOA sharks are managed Gulf-wide.

21. Squid

Status and catch specifications (t) of GOA 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 2014 and 2015 are those recommended by the Plan Team. Catch data for 2013 are current through November 9th 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	-	1,530	1,148	1,148	18
2013	-	1,530	1,148	1,148	322
2014	-	1,530	1,148	1,148	
2015		1,530	1,148	1,148	

Changes in assessment methodology and data

Biomass estimates from the 2013 GOA bottom trawl survey have been added.

An executive summary is presented in this SAFE Report with last year's key assessment parameters and projections for 2014 and 2015. New information includes catch data updated for 2012 and partial data for 2013, by target fishery and area.

There were no changes to the modified Tier 6 assessment method used since 2011, This method uses maximum historical catch during 1997-2007 as the basis for OFL and ABC calculations.

Status determination and stock trends

Estimates of spawning biomass are unavailable as reliable biomass estimates for squid do not exist. The squid complex is not currently being subjected to overfishing. As a Tier 6 stock, there is insufficient data to determine if the squid complex is in an overfished condition and therefore the status is unknown.

Total squid catches, for years which data are available, from 1990 through 2013, have been well below the ABC first established for the squid complex in 2011, with the exception of 2006, the year in which the highest historical catch was observed (1,530 t, the basis for the OFL level adopted). Squid catch in 2012 is the lowest on record. There is no directed fishery for squid and historically the majority of squid catch has usually occurred as incidental catch in the walleye pollock fishery. Most of the catch in recent years has occurred in NMFS Area 620.

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

The Plan Team concurred with the author's recommendation to set the OFL equal to the maximum historical catch between 1997 and 2007 (1,530 t) and the ABC equal to 0.75 * OFL (1,148 t).

Area apportionment

GOA squid are managed gulf-wide.

22. Octopus

Status and catch specifications (t) of GOA 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 2014 and 2015 are those recommended by the Plan Team. Catch data for 2013 are current through November 9th 2013.

Year	Biomass	OFL	ABC	TAC	Catch
2012	-	1,941	1,455	1,455	421
2013	-	1,941	1,455	1,455	315
2014	-	2,009	1,507		
2015		2,009	1,507		

Changes in assessment methodology and data

The GOA octopus stock complex consists of at least seven species of octopus. GOA octopuses continue to be on a biennial stock assessment schedule to coincide with the timing of the NMFS bottom trawl survey. A full assessment was provided this year including 2013 survey biomass data. Catch data were updated for 2012 and partial data reported for 2013.

Author and Team evaluation of alternative models

Two different approaches were presented for estimating survey biomass; the average of the last three survey biomass estimates and a random effects model based on the entire survey time series. The Team recommended the status quo (three year survey biomass average) to calculate the OFL and ABC. The Team did not recommend using the biomass estimated from the random effects model.

Status Determination and Stock Trends

The estimated survey biomass of all octopus species for the GOA in 2013 was 2,686 t, 90% of which was identified as *E. dofleini*. This biomass is lower than seen in the 2009 and 2011 surveys, but similar to other historical surveys. Octopuses are taken as incidental catch in trawl, longline, and pot fisheries. The highest octopus catch rates are from Pacific cod pot fisheries in the CGOA and WGOA. The author noted that the trawl biomass estimate and incidental catch of octopuses in 2011 were the highest on record.

Recent catches of octopus, from 1997 through 2013, have been well below the ABC first established for the octopus complex in 2011. As reliable total biomass estimates for octopuses do not exist, there can be no determination of spawning biomass or stock status trends.

As a Tier 6 stock, there is insufficient data to determine if the complex is in an overfished condition and therefore the status is unknown. The octopus complex is not currently being subjected to overfishing.

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

The status quo assessment method used last year, and recommended by the Plan Team for 2013, is a modified Tier 6 approach that includes a conservative natural mortality estimate of 0.53 and a minimum biomass estimate using the average of the last three surveys. Using a Tier 5-like calculation of OFL, average minimum B×M (3,791 t × 0.53 = 2,009 t) and the ABC equal to 0.75 × OFL (1,507 t) is estimated.

Area apportionment

GOA octopus complex is currently managed gulf-wide. However, the Council requested that the GOA Plan Team provide area apportionments for this stock because opening a directed octopus fishery is being considered. The Team recommends that should a directed fishery be opened for octopus, the ABC should be apportioned by area. The Team provides the following apportionments based upon the average biomass proportions from the most recent 3 surveys: Western 35%, Central 63%, East 2%.

Appendix 1: Grenadiers

An executive summary of the grenadier 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 GOA Plan Team continues to recommend that the Council add grenadiers to the GOA FMP so that annual catch limits can be established.

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

The estimated annual catches of grenadiers in Alaska for the years 1997-2012 ranged between 11,700-21,300 t, with an average for this period of 15,400 t. Thus far in 2013 the catch is 14,374 t. Highest catches have consistently been in the GOA. By region, annual catches have ranged between 5,400-14,700 t in the GOA, 1,600-5,000 t in the EBS, and 1,300-4,600 t in the AI. Most of the catch occurs in longline and pot fisheries.

Changes in assessment methodology and data

There were no changes in the assessment methodology.

New data for this assessment includes: 1) updated catch estimates for 2012-2013; 2) trawl survey results for the GOA in 2013; and 3) NMFS longline survey results for the GOA and EBS in 2013.

Tier determination and resulting ABCs and OFLs

If included in the fishery in the FMPs, Tier 5 determinations would result in the following OFLs and ABCs for 2014.

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

For the EBS and GOA these Tier 5 calculations are based on the average of the three most recent deep-water trawl surveys that sampled down to at least 1,000 and an M = 0.078. In the EBS, these are the 2008, 2010, and 2012 surveys. In the GOA, these are the 2005, 2007, and 2009 surveys. Because biomass estimates are only available in the Aleutian Islands down to 500 m, a ratio of “shallow” biomass estimates from the trawl survey (1-500 m) to “shallow” relative population weights from the longline survey (1-500 m) is used to extrapolate total biomass from longline survey RPWs for 1-1000 m. The ABC and OFL values are the same as in last year’s SAFE report because no new biomass estimates are available for the deep trawl survey strata (700 -1000 m).

Tables

Table 1. Gulf of Alaska groundfish 2014 - 2015 OFLs and ABCs, 2013 TACs, and 2013 catches (reported through November 9th, 2013).

		2013				2014		2015	
Species	Area	OFL	ABC	TAC	Catch	OFL	ABC	OFL	ABC
Pollock	W (61)		28,072	28,072	7,700		36,070		40,254
	C (62)		51,443	51,443	52,863		81,784		91,272
	C (63)		27,372	27,372	29,743		39,756		44,367
	WYAK		3,385	3,385	2,940		4,741		5,291
	Subtotal	150,817	110,272	110,272	93,246	211,998	162,351	248,384	181,184
	EYAK/SEO	14,366	10,774	10,774	0	16,833	12,625	16,833	12,625
	Total	165,183	121,046	121,046	93,246	228,831	174,976	265,217	193,809
Pacific Cod	W		28,280	21,210	17,179		32,745		31,117
	C		49,288	36,966	29,044		53,100		50,460
	E		3,232	2,424	419		2,655		2,523
	Total	97,200	80,800	60,600	46,642	107,300	88,500	101,800	84,100
Sablefish	W		1,750	1,750	1,383		1,480		1,338
	C		5,540	5,540	5,118		4,681		4,230
	WYAK		2,030	2,030	2,082		1,716		1,551
	SEO		3,190	3,190	3,242		2,695		2,435
	Total	14,780	12,510	12,510	11,825	12,500	10,572	11,300	9,554
Shallow-Water Flatfish	W		19,489	13,250	154		20,376		18,728
	C		20,168	18,000	5,068		17,813		16,372
	WYAK		4,647	4,647	1		2,039		1,875
	EYAK/SEO		1,180	1,180	2		577		530
	Total	55,680	45,484	37,077	5,225	50,007	40,805	46,207	37,505
Deep-Water Flatfish	W		176	176	21		302		300
	C		2,308	2,308	196		3,727		3,680
	WYAK		1,581	1,581	4		5,532		5,462
	EYAK/SEO		1,061	1,061	4		3,911		3,861
	Total	6,834	5,126	5,126	225	16,159	13,472	15,955	13,303
Rex Sole	W		1,300	1,300	98		1,270		1,245
	C		6,376	6,376	3,475		6,231		6,106
	WYAK		832	832	0		813		796
	EYAK/SEO		1,052	1,052	0		1,027		1,008
	Total	12,492	9,560	9,560	3,573	12,207	9,341	11,963	9,155
Arrowtooth Flounder	W		27,181	14,500	836		31,142		30,217
	C		141,527	75,000	18,632		115,612		112,178
	WYAK		20,917	6,900	52		37,232		36,126
	EYAK/SEO		20,826	6,900	76		11,372		11,035
	Total	247,196	210,451	103,300	19,596	229,248	195,358	222,160	189,556
Flathead Sole	W		15,729	8,650	582		12,730		12,661
	C		26,563	15,400	2,045		24,805		24,670
	WYAK		4,686	4,686	0		3,525		3,506
	EYAK/SEO		1,760	1,760	0		171		170
	Total	61,036	48,738	30,496	2,627	50,664	41,231	50,376	41,007

Table 1 (continued)

Species	Area	2013 OFL	2013 ABC	2013 TAC	2013 Catch	2014 OFL	2014 ABC	2015 OFL	2015 ABC
Pacific ocean perch	W		2,040	2,040	445		2,086		2,135
	C		10,926	10,926	10,908		13,323		13,637
	WYAK		1,641	1,641	1,537		2,772		2,838
	W/C/WYAK	16,838			12,890	21,016		21,515	
	SEO	2,081	1,805	1,805	0	1,303	1,128	1,334	1,154
	E(subtotal)				1,537				
	Total	18,919	16,412	16,412	12,890	22,319	19,309	22,849	19,764
Northern Rockfish	W		2,008	2,008	2,169		1,305		1,229
	C		3,122	3,122	2,521		4,017		3,781
	E		0	0	0		0		0
	Total	6,124	5,130	5,130	4,690	6,349	5,322	5,978	5,010
Shortraker Rockfish	W		104	104	40		92		92
	C		452	452	477		397		397
	E		525	525	267		834		834
	Total	1,441	1,081	1,081	784	1,764	1,323	1,764	1,323
Dusky Rockfish	W		377	377	216		317		295
	C		3,533	3,533	2,918		3,584		3,318
	WYAK		495	495	3		1,384		1,277
	EYAK/SEO		295	295	8		201		191
	Total	5,746	4,700	4,700	3,145	6,708	5,486	6,213	5,081
Rougheye and Blackspotted Rockfish	W		81	81	20		82		83
	C		856	856	415		864		877
	E		295	295	200		298		302
	Total	1,482	1,232	1,232	635	1,497	1,244	1,518	1,262
Demersal shelf rockfish	Total	487	303	303	217	438	274	438	274
Thornyhead Rockfish	W		150	150	298		235		235
	C		766	766	530		875		875
	E		749	749	308		731		731
	Total	2,220	1,665	1,665	1,136	2,454	1,841	2,454	1,841
Other Rockfish	W		44	44	196				
	C		606	606	462				
	W/C						1,031		1,031
	WYAK		230	230	70		580		580
(Other slope)	EYAK/SEO		3,165	200	62		2,470		2,470
	Total	5,305	4,045	1,080	790	5,347	4,081	5,347	4,081
Atka mackerel	Total	6,200	4,700	2,000	1,244	6,200	4,700	6,200	4,700
Big Skate	W		469	469	111		589		589
	C		1,793	1,793	2,147		1,532		1,532
	E		1,505	1,505	71		1,641		1,641
	Total	5,023	3,767	3,767	2,329	5,016	3,762	5,016	3,762
Longnose Skate	W		70	70	79		107		107
	C		1,879	1,879	1,176		1,935		1,935
	E		676	676	395		834		834
	Total	3,500	2,625	2,625	1,650	3,835	2,876	3,835	2,876
Other Skates	Total	2,706	2,030	2,030	1,611	2,652	1,989	2,652	1,989
Sculpins	GOA-wide	7,614	5,884	5,884	1,433	7,448	5,569	7,448	5,569
Sharks	GOA-wide	8,037	6,028	6,028	2,083	7,986	5,989	7,986	5,989
Squids	GOA-wide	1,530	1,148	1,148	322	1,530	1,148	1,530	1,148
Octopuses	GOA-wide	1,941	1,455	1,455	315	2,009	1,507	2,009	1,507
Total		738,676	595,920	436,255	218,233	790,468	640,675	808,215	644,165

Table 2. Gulf of Alaska 2014 ABCs, biomass, and overfishing levels (t) for Western, Central, Eastern, Gulfwide, West Yakutat, and Southeast Outside regulatory areas.

		2014		
Species/Assemblage	**Area**	**ABC**	**Biomass**	**OFL**
Pollock	W(61)	36,070		
	C(62)	81,784		
	C(63)	39,756		
	WYAK	4,741		
	Subtotal	162,351	972,750	211,998
	EYAK/SEO	12,625	56,111	16,833
	Total	174,976	1,028,861	228,831
Pacific Cod	W	32,745		
	C	53,100		
	E	2,655		
	Total	88,500	422,000	107,300
Sablefish	W	1,480		
	C	4,681		
	WYAK	1,716		
	EY/SEO	2,695		
	Total	10,572	149,000	12,500
Shallow water Flatfish	W	20,376		
	C	17,813		
	WYAK	2,039		
	EYAK/SEO	577		
	Total	40,805	384,134	50,007
Deepwater Flatfish	W	302		
	C	3,727		
	WYAK	5,532		
	EYAK/SEO	3,911		
	Total	13,472	66,147	16,159
Rex sole	W	1,270		
	C	6,231		
	WYAK	813		
	EYAK/SEO	1,027		
	Total	9,341	84,702	12,207
Arrowtooth Flounder	W	31,142		
	C	115,612		
	WYAK	37,232		
	EYAK/SEO	11,372		
	Total	195,358	1,978,340	229,248
Flathead sole	W	12,730		
	C	24,805		
	WYAK	3,525		
	EYAK/SEO	171		
	Total	41,231	252,361	50,664

Table2. Continued…

	2014			
Species/Assemblage	**Area**	**ABC**	**Biomass**	**OFL**
Pacific ocean perch	W	2,086		
	C	13,323		21,016
	WYAK	2,772		
	EY/SEO	1,128		1,303
	Total	19,309	410,712	22,319
Northern rockfish	W	1,305		
	C	4017		
	E	[2]		
	Total	5,322	102,893	6,349
Shortraker	W	92		
	C	397		
	E	834		
	Total	1,323	58,797	1,764
Dusky rockfish	W	317		
	C	3,584		
	WYAK	1,384		
	EYAK/SEO	201		
	Total	5,486	69,371	6,708
Rougheye/blackspotted rockfish	W	82		
	C	864		
	E	298		
	Total	1,244	42,810	1,497
Demersal shelf rockfish	Total	274	13,274	438
Thornyhead rockfish	Western	235		
	Central	875		
	Eastern	731		
	Total	1,841	81,816	2,454
Other rockfish	W/C	1,031		
	WYAK	580		
	EY/SEO	2,470		
	Total	4,081	83,383	5,347
Atka mackerel	Total	4,700	Unknown	6,200
Big skates	W	589		
	C	1,532		
	E	1,641		
	Total	3,762	50,155	5,016
Longnose skates	W	107		
	C	1,935		
	E	834		
	Total	2,876	38,349	3,835
Other Skates	Total	1,989	26,518	2,652
Sculpins		5,569	33,550	7,448
Sharks		5,989	76,452	7,986
Squid		1,148	NA	1,530
Octopus		1,507	NA	2,009
Total		640,675	5,453,625	790,468

[1]For management purposes 2t of northern rockfish are moved into “other rockfish” in the eastern GOA.

Table 3. Summary of fishing mortality rates and overfishing levels for the Gulf of Alaska, 2014.

Species	Tier	F_{ABC}[1]	Strategy	F_{OFL}[2]	Strategy
Pollock (W/C/WYK)	3a	0.20	F_{ABC}	0.26	$F_{35\%}$
(SEO)	5	0.225	F=.75M	0.30	F=M
Pacific cod	3a	0.54	$F_{40\%}$	0.69	$F_{35\%}$
Sablefish	3b	0.080	$F_{40\%}$ adjusted	0.095	$F_{35\%\ adjusted}$
Deepwater flatfish	3a, 6[3]	0.10	$F_{40\%}$, F_{ABC}[3]	0.12	$F_{35\%}$, F_{OFL}[4]
Rex sole	5	0.128	F=.75M	0.17	F=M
Flathead sole	3a	0.47	$F_{40\%}$	0.61	$F_{35\%}$
Shallow water flatfish (excl. rocksoles)	5	0.15	F=.75M	0.20	F=M
Northern rocksole	3a	0.152	$F_{40\%}$	0.18	$F_{35\%}$
Southern rocksole	3a	0.193	$F_{40\%}$	0.23	$F_{35\%}$
Arrowtooth	3a	0.172	$F_{40\%}$	0.204	$F_{35\%}$
Pacific ocean perch	3a	0.113	$F_{40\%}$	0.132	$F_{35\%}$
Rougheye and blackspotted rockfish	3a	0.039	$F_{40\%}$	0.047	$F_{35\%}$
Shortraker rockfish	5	0.0225	F=.75M	0.03	F=M
Other rockfish (“other slope” rockfish)	4, 5[5]	0.065, 0.0015-0.075	$F_{40\%}$, F=.75M[5]	0.079, 0.02, 0.10	$F_{35\%}$, F=M[6]
Northern rockfish	3a	0.061	$F_{40\%}$	0.073	$F_{35\%}$
Dusky rockfish[7] (formerly “pelagic shelf” rockfish)	3a	0.098	$F_{40\%}$	0.122	$F_{35\%}$
Demersal shelf rockfish	4	0.02	F=M	0.032	$F_{35\%}$
Thornyhead rockfish	5	0.0225	F=.75M	0.03	F=M
Atka mackerel	6	NA	F_{ABC}[8]	NA	F_{OFL}[9]
Skates	5	0.075	F=.75M	0.10	F=M
Sculpins	5	0.166	F=.75M	0.222	F=M
Squid	6	NA	F_{ABC}[10]	NA	F_{OFL}[11]
Octopus	6	0.3975	F=.75M[12]	0.53	F=M[13]
Sharks	6[14]	0.073	F=.75M,F_{ABC}[14]	0.097	F=M,F_{OFL}[15]

1/ Fishing mortality rate corresponding to acceptable biological catch.
2/ Maximum fishing mortality rate allowable under overfishing definition.
3/ $F_{40\%}$ for Dover sole (Tier 3a), ABC=.75 x average catch (1978-1995) for other deepwater flatfish (Tier 6).
4/ $F_{35\%}$ for Dover sole (Tier 3a), average catch (1978-1995) for other deepwater flatfish (Tier 6).
5/ $F_{40\%}$ for sharpchin rockfish (Tier 4), F=.75M for other rockfish species (Tier 5). The other rockfish category (formerly the “other slope” rockfish category now includes widow and yellowtail rockfish.
6/ $F_{35\%}$ for sharpchin (Tier 4), F=M for other species (Tier 5). The other rockfish category (formerly the “other slope” rockfish category now includes widow and yellowtail rockfish.
7/ Dusky rockfish were formerly in the “pelagic shelf” rockfish category which no longer exists. Widow and yellowtail rockfish which were in the former “pelagic shelf” category have been moved to the other rockfish category.
8/ ABC for Atka mackerel is equal to 0.75 x average catch from 1978 to 1995. This maximum permissible ABC is intended for bycatch in other target fisheries and to minimize targeting.
9/ OFL for Atka mackerel is equal to average catch from 1978 to 1995.
10/ ABC for squid is equal to 0.75 x the maximum catch of squid from 1997-2007. This is a modified Tier 6 recommendation.
11/ OFL for squid is equal to the maximum catch of squid from 1997-2007. This is a modified Tier 6 recommendation.
12/ ABC for octopus is equal to F=.75M x the average estimate of biomass from the 2009, 2011, and 2013 surveys. This is a modified Tier 6 recommendation.
13/ OFL for octopus is equal to F=M x the average estimate of biomass from the 2007, 2009, and 2011 surveys. This is a modified Tier 6 recommendation.
14/ F_{ABC} = 0.073 for spiny dogfish (Tier 6). While spiny dogfish are a Tier 6 species, a Tier 5 approach is used. They are not a Tier 5 because the trawl survey biomass is not considered reliable for the species. ABC for other sharks is equal to 0.75 x average catch from 1997-2007 (Tier 6). This time frame differs from the standard Tier 6 time frame of 1978-1995.
15/ F=M for spiny dogfish (Tier 6). While spiny dogfish are a Tier 6 species, a Tier 5 approach is used. They are not a Tier 5 because the trawl survey biomass is not considered reliable for the species. OFL for other sharks is equal to the average catch from 1997-2007 (which differs from the standard Tier 6 time frame of 1978-1995).

Table 4. Maximum permissible fishing mortality rates and ABCs as defined in Amendment 56 to the GOA and BSAI Groundfish FMPs, and the Plan Team's 2014 recommended fishing mortality rates and ABCs, for those species whose recommendations were below the maximum.

Species	Tier	2014 *Max* F_{ABC}	*Max* ABC	F_{ABC}	2014 ABC
Pollock[1]	3a	0.22	183,943	0.20	162,351
Demersal shelf rockfish	4	0.026	356	0.02	274

1/ The Plan Team recommended 2014 W/C pollock ABC of 162,351 t was derived by first incorporating the anticipated EFP pollock catches in the model projection resulting in an ABC value of 166,514 t, which is then reduced by 4,163 t to accommodate the Prince William Sound (PWS) GHL. The PWS GHL value is 2.5% of the W/C pollock ABC (2.5 x 166,514). For comparisons in this table, the maximum permissible ABC of 183,943 t should be compared with the full author recommended ABC 167,657 t.

Table5. Groundfish landings (metric tons) in the Gulf of Alaska,1956-2012.

Year	Pollock	Pacific cod	sablefish	Flatfish	Arrowtooth Flounder	Slope rockfish[a]
1956			1,391			
1957			2,759			
1958			797			
1959			1,101			
1960			2,142			
1961			897			16,000
1962			731			65,000
1963			2,809			136,300
1964	1,126	196	2,457	1,028		243,385
1965	2,749	599	3,458	4,727		348,598
1966	8,932	1,376	5,178	4,937		200,749
1967	6,276	2,225	6,143	4,552		120,010
1968	6,164	1,046	15,049	3,393		100,170
1969	17,553	1,335	19,376	2,630		72,439
1970	9,343	1,805	25,145	3,772		44,918
1971	9,458	523	25,630	2,370		77,777
1972	34,081	3,513	37,502	8,954		74,718
1973	36,836	5,963	28,693	20,013		52,973
1974	61,880	5,182	28,335	9,766		47,980
1975	59,512	6,745	26,095	5,532		44,131
1976	86,527	6,764	27,733	6,089		46,968
1977	112,089	2,267	17,140	16,722		23,453
1978	90,822	12,190	8,866	15,198		8,176
1979	98,508	14,904	10,350	13,928		9,921
1980	110,100	35,345	8,543	15,846		12,471
1981	139,168	36,131	9,917	14,864		12,184
1982	168,693	29,465	8,556	9,278		7,991
1983	215,567	36,540	9,002	12,662		7,405
1984	307,400	23,896	10,230	6,914		4,452
1985	284,823	14,428	12,479	3,078		1,087
1986	93,567	25,012	21,614	2,551		2,981
1987	69,536	32,939	26,325	9,925		4,981
1988	65,625	33,802	29,903	10,275		13,779
1989	78,220	43,293	29,842	11,111		19,002
1990	90,490	72,517	25,701	15,411		21,114
1991	107,500	76,997	19,580	20,068		13,994
1992	93,904	80,100	20,451	28,009		16,910
1993	108,591	55,994	22,671	37,853		14,240
1994	110,891	47,985	21,338	29,958		11,266
1995	73,248	69,053	18,631	32,273		15,023
1996	50,206	67,966	15,826	19,838	22,183	14,288
1997	89,892	68,474	14,129	17,179	16,319	15,304
1998	123,751	62,101	12,758	11,263[I]	12,974	14,402
1999	95,637	68,613	13,918	8,821	16,209	18,057
2000	71,876	54,492	13,779	13,052	24,252	15,683
2001	70,485	41,614	12,127	11,817	19,964	16,479
2002	49,300[J]	52,270	12,246	12,520	21,230	17,128
2003	49,300	52,500	14,345	10,750	23,320	18,678
2004	62,826	43,104	15,630	7,634	15,304	18,194
2005	80,086	35,205	13,997	9,890	19,770	17,306
2006	70b,522	37,792	13,367	14,474	27,653	20,492
2007	51,842	39,473	12,265	15,077	25,364	18,718
2008	51,721	43,481	12,326	16,393	29,293	18,459
2009	42,389	39,397	10,910	17,360	24,937	18,621
2010	75,167	58,003	10,086	13,556	24,334	21,368
2011	79,789	62,475	11,148	10,043	30,890	19,612
2012	101,356	56,520	11,914	8,909	20,714	22,334
2013[H]	93,246	46,642	11,825	11,650	19,956	19,789

a/Catchdefinedasfollows:(1)1961-78,Pacificoceanperch(*S.alutus*)only;(2)1979-1987,the5speciesofthePacificoceanperchcomplex;1988-90,the18speciesofthesloperockassemblage;1991-1995,the20speciesofthesloperockfishassemblage.
b/Catch from Southeast Outside District.
c/Thornyheads were included in the other species category, and are foreign catches only.
d/Afternumerouschanges,theotherspeciescategorywasstabilizedin1981toincludesharks,skates,sculpins,eulachon,capelin(andothersmelts inthefamilyOsmeridaeandoctopus.AtkamackerelandsquidwereaddedIn1989.CatchofAtkaMackerelisreportedseparatelyfor1990-1992;thereafterAtkamackerelwasassignedaseparatetargetspecies.

Table5. (cont'd) Groundfish landings (metric tons)in the Gulf of Alaska,1956-2012.

Year	Pelagic Shelf rockfish	Demersal shelf rockfish[b]	Thornyheads[c]	Atka mackerel[e]	Skates[k]	Other species[d]	Total
1956							1,391
1957							2,759
1958							797
1959							1,101
1960							2,142
1961							16,897
1962							65,731
1963							139,109
1964							248,192
1965							360,131
1966							221,172
1967							139,206
1968							125,822
1969							113,333
1970							84,983
1971							115,758
1972							158,768
1973							144,478
1974							153,143
1975							142,015
1976							174,081
1977			0	19,455		4,642	195,768
1978			0	19,588		5,990	160,830
1979			0	10,949		4,115	162,675
1980			1,351	13,166		5,604	202,426
1981			1,340	18,727		7,145	239,476
1982		120	788	6,760		2,350	234,001
1983		176	730	12,260		2,646	296,988
1984		563	207	1,153		1,844	356,659
1985		489	81	1,848		2,343	320,656
1986		491	862	4		401	147,483
1987		778	1,965	1		253	146,703
1988	1,086	508	2,786	-		647	158,411
1989	1,739	431	3,055	-		1,560	188,253
1990	1,647	360	1,646	1,416		6,289	236,591
1991	2,342	323	2,018	3,258		1,577	247,657
1992	3,440	511	2,020	13,834		2,515	261,694
1993	3,193	558	1,369	5,146		6,867	256,482
1994	2,990[f]	540	1,320	3,538		2,752	232,578
1995	2,891	219[g]	1,113	701		3,433	216,585
1996	2,302	401	1,100	1,580		4,302	199,992
1997	2,629	406	1,240	331		5,409	231,312
1998	3,111	552	1,136	317		3,748	246,113
1999	4,826	297	1,282	262		3,858	231,780
2000	3,730	406	1,307	170		5,649	204,396
2001	3,008	301	1,339	76		4,801	182,011
2002	3,318	292	1,125	85		4,040	173,554
2003	2,975	229	1,159	578		6,339	180,173
2004	2,674	260	818	819	2,912	1,559	171,734
2005	2,235	187	719	799	2,710	2,294	185,211
2006	2,446	166	779	876	3,501	3,526	195,594
2007	3,318	250	701	1,453	3,498	2,928	174,887
2008	3,634	149	741	2,109	3,606	2,776	184,149
2009	3,057	138	666	2,222	7,020	2,870	169,604
2010	3,111	128	565	2,417	5,056	2,042	215,833
2011	2,531	82	612	1,615	4,437	2,362	225,596
2012	4,012	178	746	1,187	4,107	1,940	233,927
2013[H]	2,886	217	1,136	1,244	5,590	4,153	218,334

e/Atka mackerel was added to the Other Species categoryin1988andseparatedoutin1994
f/PSRincludeslightdusky,yellowtail,widow,dark,dusky,black,andbluerockfish;blackandblueexcludedin1998,darkin2008,widowandyellowtailin2012(noteonlyduskyremainsinPSRin2012)
g/Does not include at-sea discards.
h/Catch data reported through November 9th,2013.
i/Includes all species except arrowtooth.
j/Does not include state fisheries
k/Includes all managed skates species

Figures

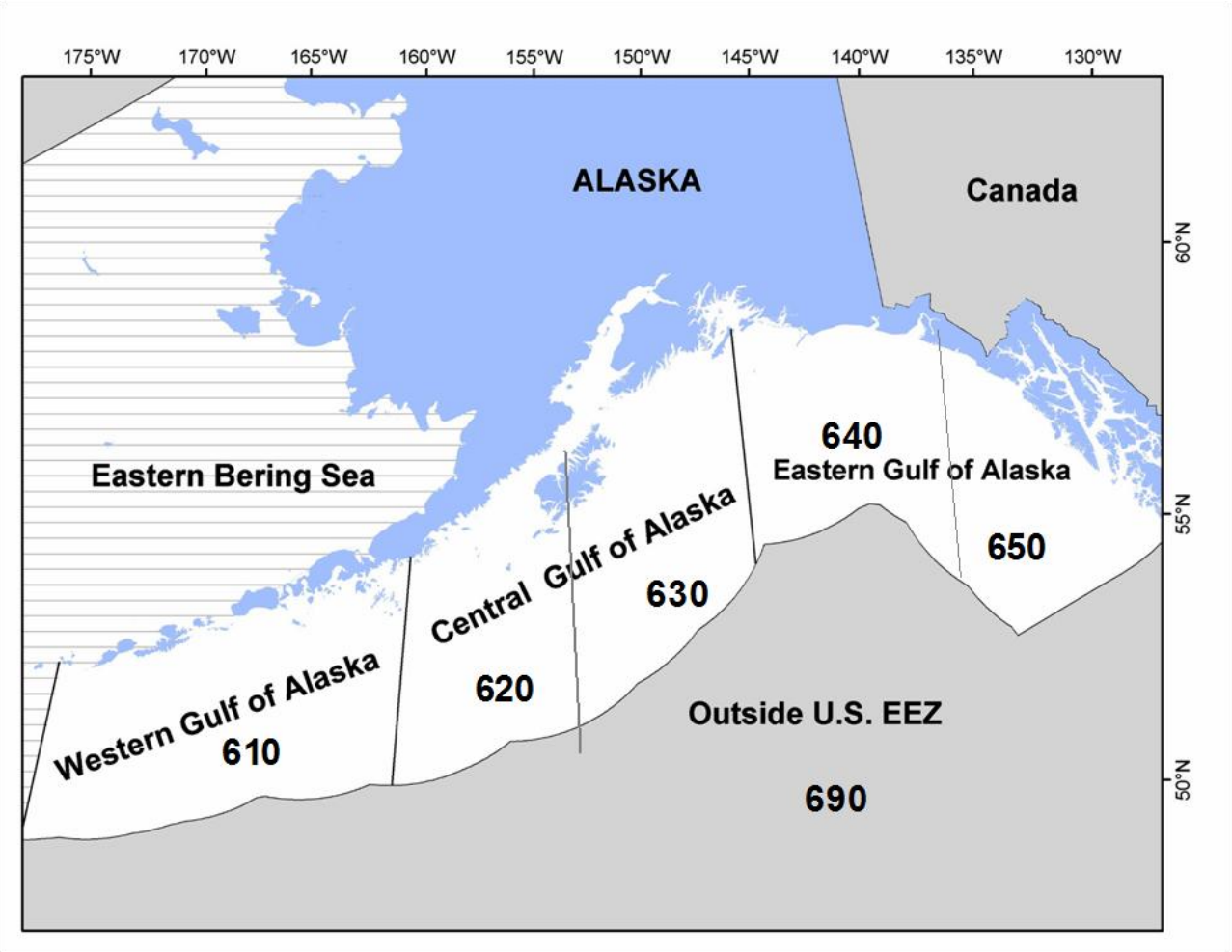

Figure 1. Gulf of Alaska statistical and reporting areas.

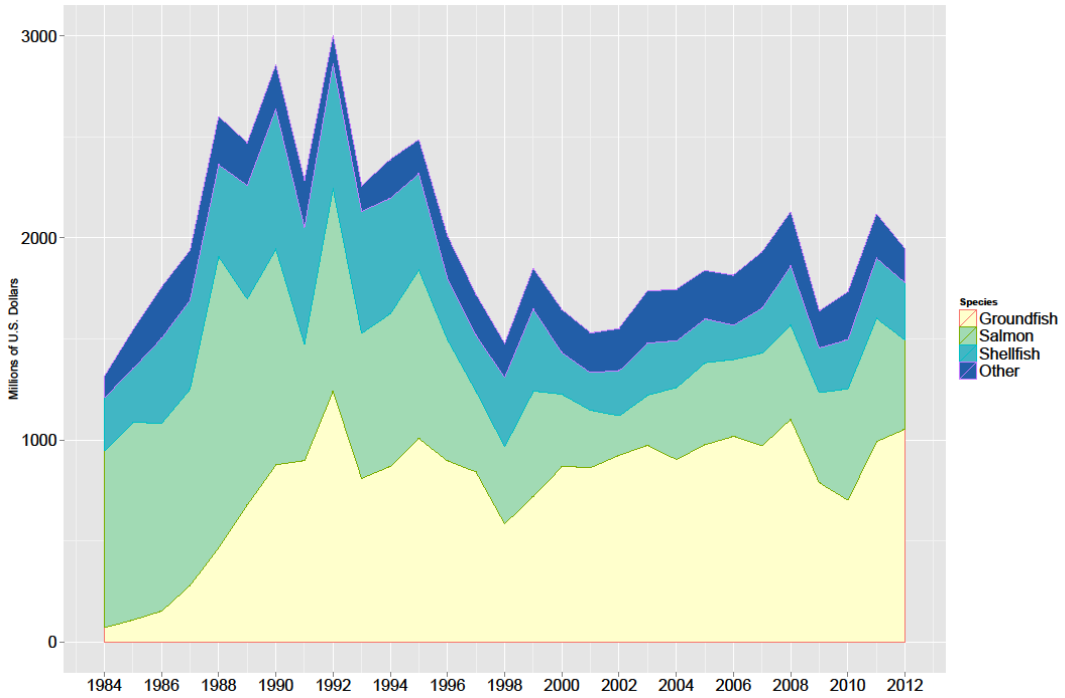

Figure 2. Real ex-vessel value of the domestic fish and shellfish catch off Alaska (GOA and BSAI) by species group, 1984-2012 (base year = 2012).

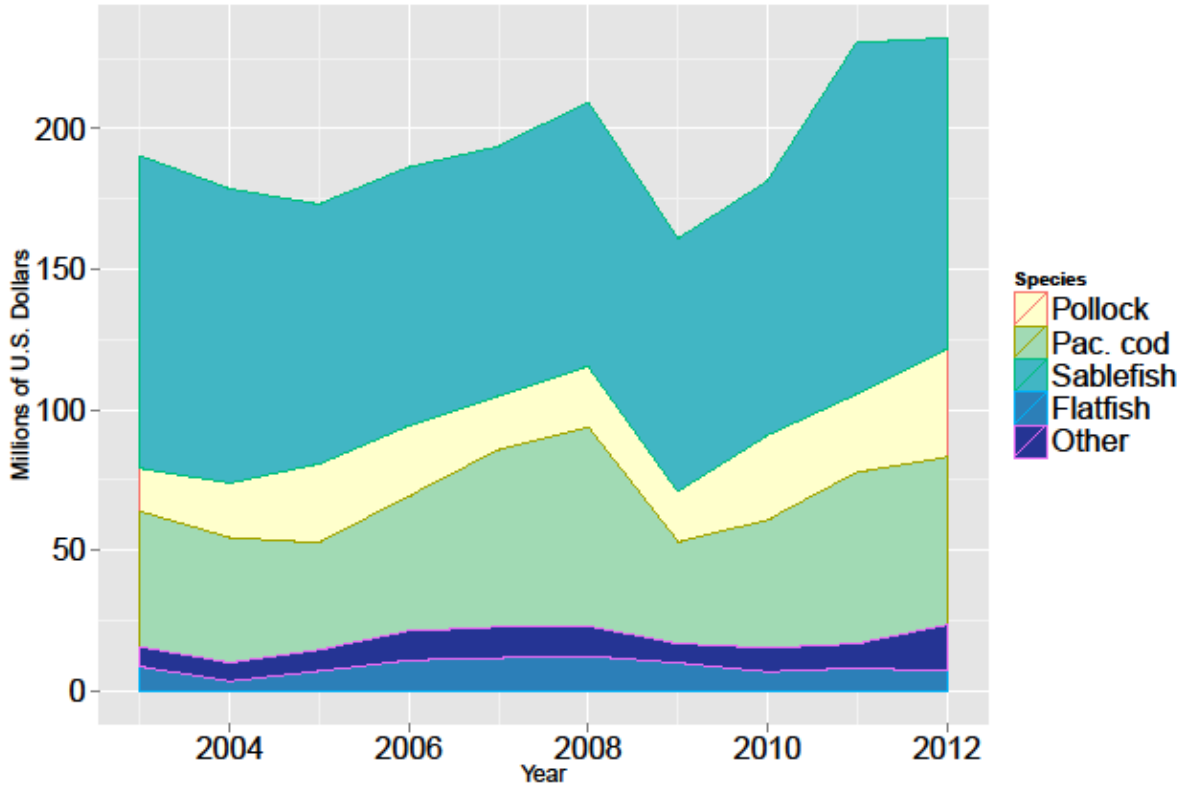

Figure 3. Real ex-vessel value of the groundfish catch in the domestic commercial fisheries in the GOA area by species, 2003-2012 (base year = 2012).

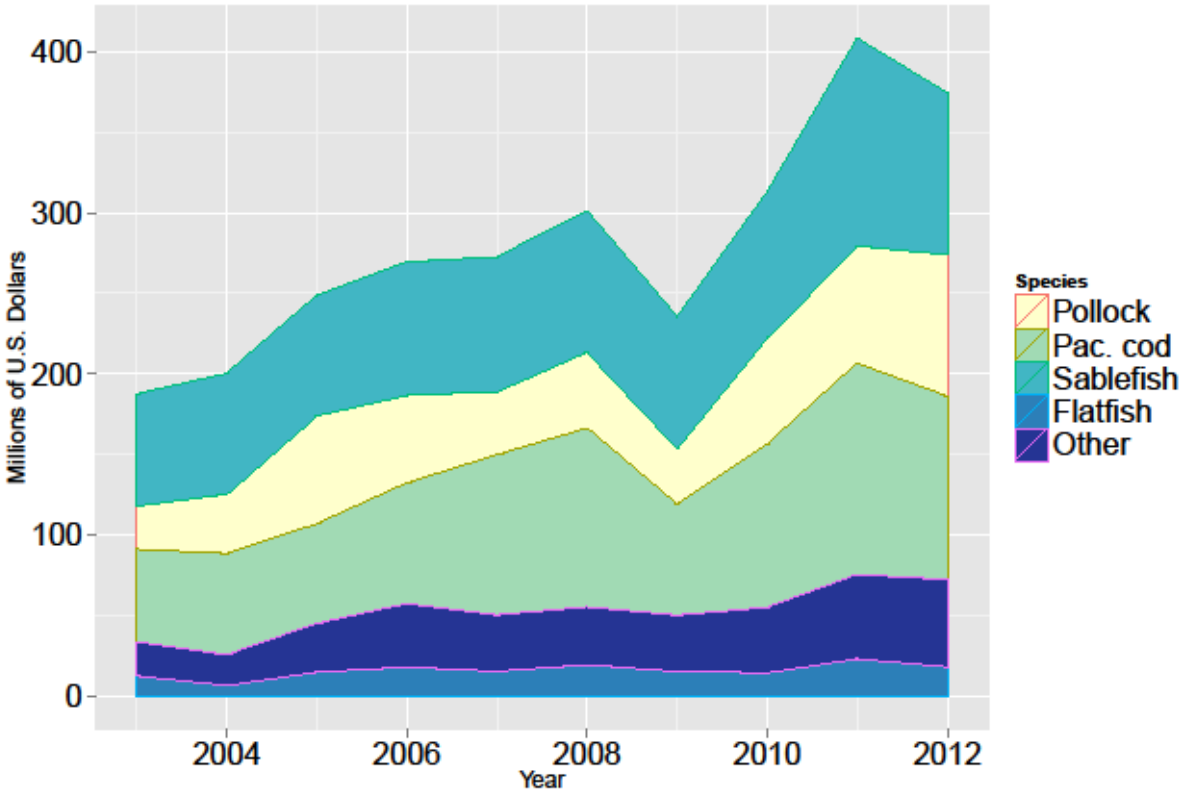

Figure 4. Real gross product value of the groundfish catch in the GOA area by species, 2003-2012 (base year = 2012).

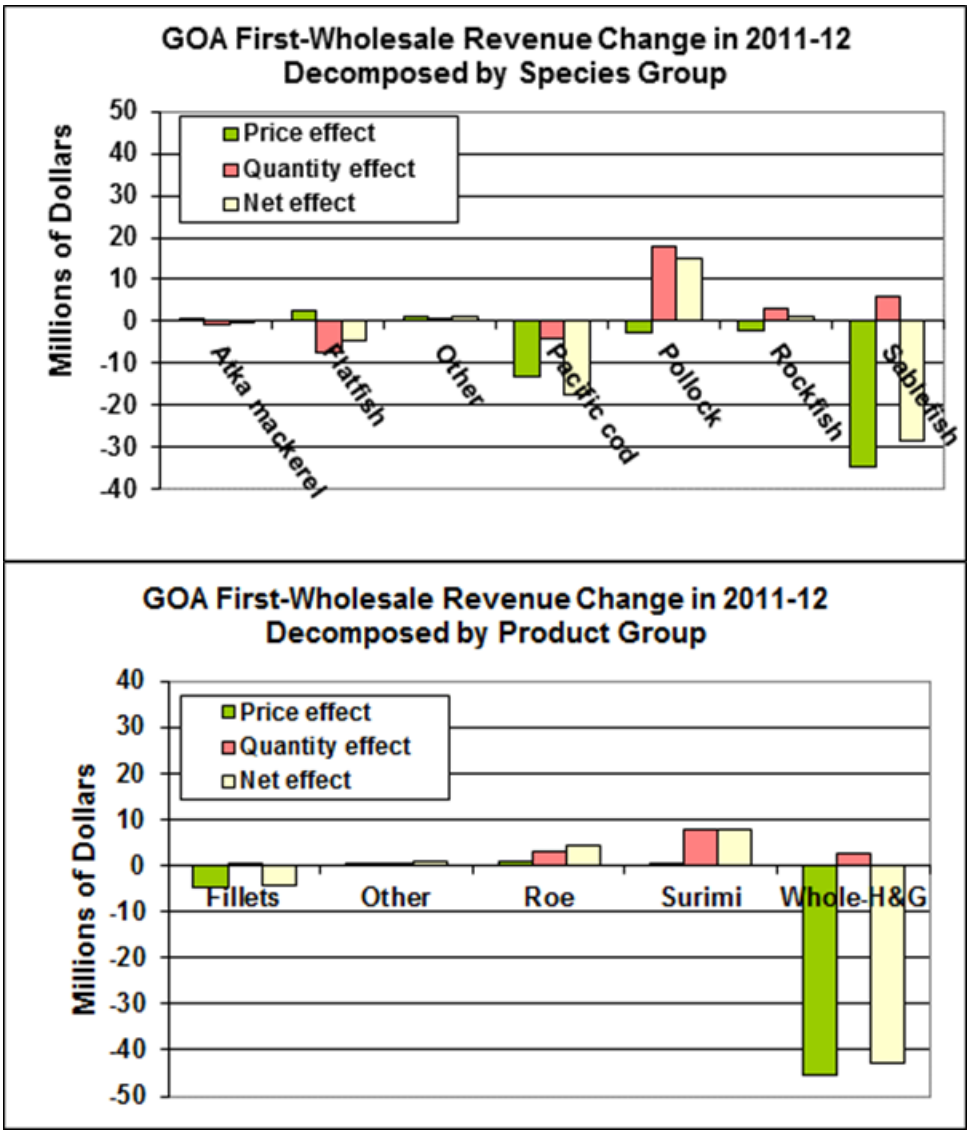

Figure 5 Decomposition of the change in first-wholesale revenues from 2011-12 in the GOA area. The first decomposition is by the species groups used in the Economic SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the change in the first-wholesale price index (current dollars per metric ton) for each group. The quantity effect refers to the change in revenues due to the change in production (in metric tons) for each group. The net effect is the sum of price and quantity effects. Year to year changes in the total quantity of first-wholesale groundfish products include changes in total catch and the mix of product types (e.g., fillet vs. surimi).

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