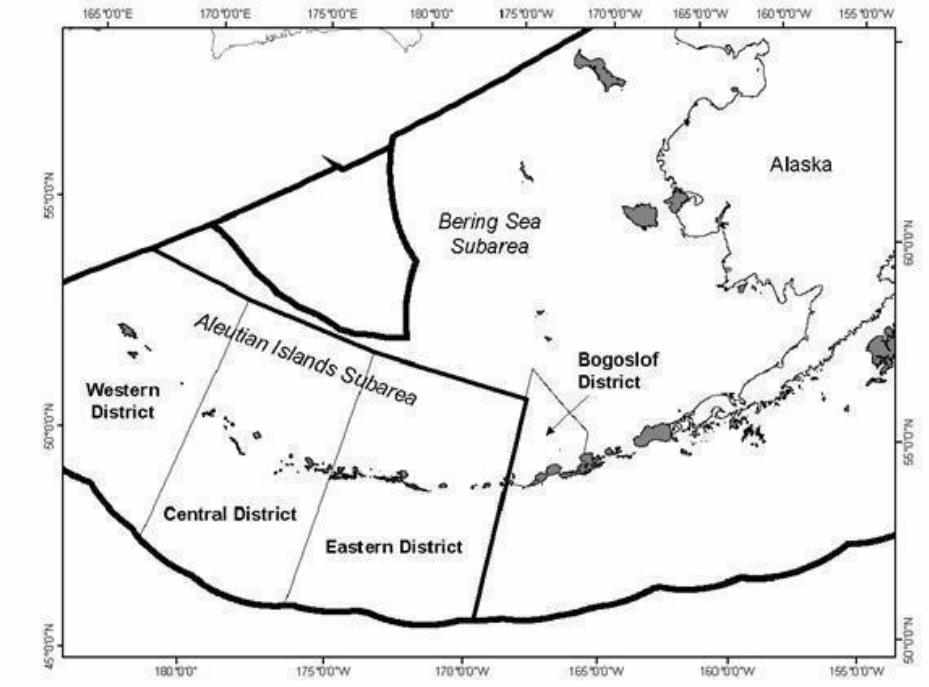
STOCK ASSESSMENT AND FISHERY EVALUATION REPORT

FOR THE GROUNDFISH RESOURCES

OF THE BERING SEA/ALEUTIAN ISLANDS REGIONS

Compiled by:

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



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

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Summary

By

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

Introduction

The Stock Assessment and Fishery Evaluation (SAFE) report summarizes the best available scientific information concerning the past, present, and possible future condition of the stocks, marine ecosystems, and fisheries that are managed under Federal regulation. It provides information to the Councils for determining annual harvest levels from each stock, documenting significant trends or changes in the resource, marine ecosystems, and fishery over time, and assessing the relative success of existing state and Federal fishery management programs. For the FMP for the Groundfish Fishery of the Bering Sea and Aleutian Islands (BSAI) Area, the SAFE report is published in three reports: a "Stock Assessment" report, the "Economic Status of Groundfish Fisheries off Alaska" (i.e., the "Economic SAFE report") and the "Ecosystem Status Report" (by Area between the Eastern Bering Sea (EBS) and Aleutian Islands (AI)).

The BSAI Groundfish FMP requires that a draft of the SAFE report be produced each year in time for the December meeting of the North Pacific Fishery Management Council. Each stock or stock complex is represented in the SAFE report by a chapter containing the latest stock assessment. New or revised stock assessment models are usually previewed at the September Plan Team meeting and considered again by the Team at its November meeting for recommending final specifications for the following two fishing years. This process is repeated annually.

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

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

The BSAI Groundfish Plan Team met in Seattle on November 12-15, 2024 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 BSAI Groundfish Plan Team who compiled this SAFE report were: Steve Barbeaux (Co-chair), Kalei Shotwell (Co-Chair), Cindy Tribuzio (Vice Chair), Diana Stram (BSAI Groundfish PT coordinator), Steve Whitney, Allan Hicks, Kirstin Holsman, Andy Kingham, Andrew Seitz, Beth Matta, Jane Sullivan, and Lukas DeFillipo.

Background Information

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

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

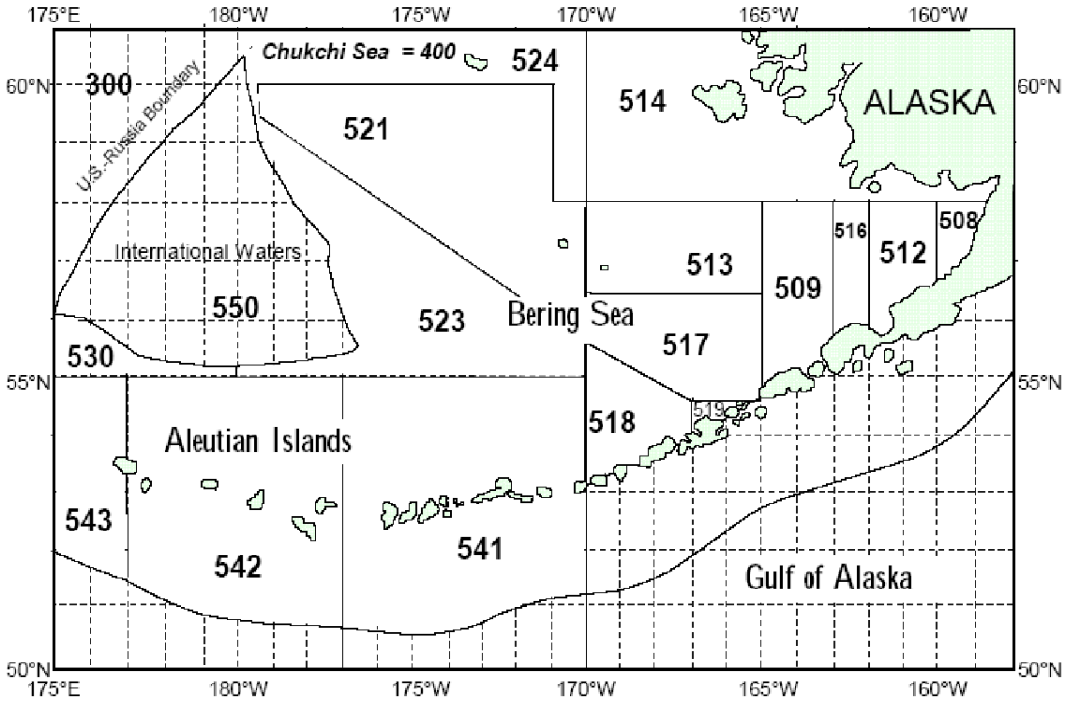


Figure 1. Bering Sea/Aleutian Islands statistical and reporting areas.

In the Fishery:

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

Ecosystem Component:

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

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

In the fishery	Ecosystem component	
Target species[1]	**Prohibited species**[2]	**Forage fish species**[3]
Walleye Pollock	Pacific halibut	Osmeridae family (eulachon, capelin,and other smelts)
Pacific cod	Pacific herring	Myctophidae family (laternfishes)
Sablefish	Pacific salmon	Bathylagidae (deep-sea smelts)
Yellowfin sole	Steelhead trout	Ammodytidae family (Pacific sandlance)
Greenland turbot	King crab	Trichodontidae family (Pacific sand fish)
Arrowtooth flounder	Tanner crab	Pholidae family (gunnels)
Kamchatka flounder		Stichaeidae family (pricklebacks warbonnets, eelblennys, cockscombs, shannys)
Northern rock sole		Gonostomatidae family (bristlemouths, lightfishes and anglemouths)
Flathead sole		Other euphausiacea (krill)
Alaska plaice		Squid
Other flatfish		Sculpins
Pacific Ocean perch		
Northern rockfish		
Blackspotted/Rougheye		
Shortraker rockfish		
Other rockfish		
Atka mackerel		
Skates		
Sharks		
Octopus		

[1] TAC for each listing. Species and species groups may or may not be targets of directed fisheries.
[2] Must be immediately returned to the sea, except when retention is required or authorized.
[3] Management measures for forage fish are established in regulations implementing the FMP.

In 2019, the NPFMC took final action to amend the FMPs for the BSAI (Amendment 121) and GOA (Amendment 110) and moved the sculpin stock complex into the ecosystem component category and establish an MRA of 20% for sculpins for all basis species in both the BSAI and GOA. Amendments 121/110 and their implementing regulations were approved by the Secretary of Commerce in August 2020 (85 FR 133,41427). Sculpins are, therefore, categorized as an ecosystem component species and information on sculpins will be contained in a report produced every four years.

Historical Catch Statistics

Catch statistics since 1954 are shown for the Eastern Bering Sea (EBS) subarea in Table 3. The initial target species in the BSAI commercial fisheries was yellowfin sole. During this period, total catches of groundfish peaked at 674,000 t in 1961. Following a decline in abundance of yellowfin sole, other species (principally walleye pollock) were targeted, and total catches peaked at 2.2 million t in 1972. Pollock is now the principal fishery, with catches peaking at approximately 1.4-1.5 million t due to years of high recruitment. After the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was adopted in 1976, catch restrictions and other management measures were placed on the fishery and total groundfish catches have since varied from one to two million t. In 2005, Congress implemented a statutory cap on TACs for BSAI groundfish of 2 million t, which had previously been a policy adopted by the Council. Total groundfish catches in the BSAI in 2023 totaled 1,776,469 (89% of OY). Catches in 2024 through November 11, 2024, totaled 1,724,804 t (86% of OY).

Recent Total Allowable Catches

Amendment 1 to the BSAI Groundfish FMP provided the framework to manage the groundfish resources as a complex. Maximum sustainable yield (MSY) for the BSAI groundfish complex was estimated at 1.8 to 2.4 million t. The OY range was set at 85% of the MSY range, or 1.4 to 2.0 million t. The sum of the TACs equals OY for the groundfish complex, which is constrained by the 2.0 million t cap on OY. Recent total TACs have been set equal to the OY cap.

Establishment of the Western Alaska Community Development Quota (CDQ) Program annual groundfish reserves is concurrent with the annual BSAI groundfish harvest specifications. Once annual BSAI groundfish TACs are established, the CDQ Program is allocated set portions of the TACs for certain species and species assemblages. This includes 10% of the BS and AI pollock TACs, 20% of the fixed gear sablefish TAC, and 7.5% of the sablefish trawl gear allocation. It also receives 10.7% of the TACs

for Pacific cod, yellowfin sole, rock sole, flathead sole, Atka mackerel, AI Pacific ocean perch, arrowtooth flounder, and BS Greenland turbot. The program also receives allocations of PSC limits.

The TAC specifications for the primary allocated species, and PSC limit specifications, are recommended by the Council at its December meetings. The State of Alaska (State) manages separate Pacific cod guideline harvest level (GHL) fisheries in the Bering Sea subarea (starting in 2006) and Aleutian Islands subarea (starting in 2014). The State's Pacific cod GHL fisheries are conducted independently of the Federal groundfish fisheries under direct regulation of the State. The GHL amounts for 2024 for each subarea are derived as 13% of the Bering Sea ABC (and an additional 45 t to the State jig fishery) and 39% of the Aleutian Islands subarea ABC to a maximum of 15 million pounds (6804 t). The Council is expected to set the TAC for each subarea to account for the two State GHL fisheries. This is necessary to prevent harvest levels, GHL plus TAC, from exceeding the ABCs.

For the BSAI reserves, 15% of the TAC for each target species, except for pollock, the hook-and-line and pot gear allocation of sablefish, and the Amendment 80 species (Pacific cod, Atka mackerel, flathead sole, rock sole, yellowfin sole, and Aleutian Islands Pacific ocean perch), are automatically apportioned to a non-specified reserve. Apportionments to the non-specified reserve range from 4.3% to 15% of the TAC for each species or species group. The non-specified reserve is used to (1) correct operational problems in the fishing fleets, (2) promote full and efficient use of groundfish resources, (3) adjust species TACs according to changing conditions of stocks during the fishing year, and (4) make apportionments and Community Development Quota allocations. The initial TAC (ITAC) for each species is the remainder of the TAC after the subtraction of the reserve.

Definition of Acceptable Biological Catch and the Overfishing Level

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

Acceptable Biological Catch is a preliminary description of the acceptable harvest (or range of harvests) for a given stock or complex. Its derivation focuses on the status and dynamics of the stock, environmental conditions, other ecological factors, and prevailing technological characteristics of the fishery. The fishing mortality rate used to calculate ABC is capped as described as shown in the text box 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 determination, a pdf refers to a probability density function. For Tiers (1-2), if a reliable pdf of B_{MSY} is available, the preferred point estimate of B_{MSY} is the geometric mean of its pdf. For Tiers (1-5), if a reliable pdf of B is available, the preferred point estimate is the geometric mean of its pdf. For Tiers (1-3), the coefficient 'α' is set at a default value of 0.05, with the understanding that the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific information. For Tiers (2-4), a designation of the form "$F_{X\%}$" refers to the F associated with an equilibrium level of spawning per recruit (SPR) equal to X percent of the equilibrium level of spawning per recruit in the absence of any fishing. If reliable information sufficient to characterize the entire maturity schedule of a species is not available, the SSC may choose to view SPR calculations based on a knife-edge maturity assumption as reliable. For Tier (3), the term $B_{40\%}$ refers to the long-term average biomass that would be expected under average recruitment and $F=F_{40\%}$.

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: $B/B_{MSY} < \alpha$
     - $F_{OFL} = 0$
     - $F_{ABC} = 0$
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: $\alpha < B/B_{40\%} < 1$*
     - $F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
     - $F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$
   - *3c) Stock status: $B/B_{40\%} < \alpha$*
     - $F_{OFL} = 0$
     - $F_{ABC} = 0$
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.*
   - $F_{OFL} = M$
   - $F_{ABC} < 0.75 \times M$
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*
   - $ABC \leq 0.75 \times OFL$

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

Standard Harvest and Recruitment Scenarios and Projection Methodology

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

For each scenario, authors have the option of making projections using either Stock Synthesis or the standard AFSC projection model. For the AFSC projection model the projections begin with an estimated vector of 2019 numbers at age. In each subsequent year, the fishing mortality rate is prescribed on the basis of the spawning biomass in that year and the respective harvest scenario.

For assessments using the standard AFSC projection model, recruitment in each year is drawn from an inverse Gaussian distribution whose parameters consist of maximum likelihood estimates determined from recruitments estimated in the assessment. Spawning biomass is computed in each year based on the time of peak spawning and the maturity and weight schedules described in the assessment. Total catch is assumed to equal the catch associated with the respective harvest scenario in all years, except that in the first two years of the projection, a lower catch may be specified for stocks where catch is typically below ABC. This projection scheme is run 1000 times to obtain distributions of possible future stock sizes, fishing mortality rates, and catches.

Five of the seven standard scenarios are designed to provide a range of harvest alternatives that are likely to bracket the final TACs for 2024 and 2025, are as follows ("*max* F_{ABC}" refers to the maximum permissible value of F_{ABC} under Amendment 56):

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

Scenario 2: In all future years, *F* is set equal to a constant fraction of *max* F_{ABC}, where this fraction is equal to the ratio of the F_{ABC} value for 2025 recommended in the assessment to the *max* F_{ABC} for 2024, and where catches for 2024 and 2025 are estimated at their most likely values given the 2024 and 2025 maximum permissible ABCs under this scenario. (Rationale: When F_{ABC} is set at a value below *max* F_{ABC}, it is often set at the value recommended in the stock assessment.)

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

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

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

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

Scenario 6: In all future years, *F* is set equal to F_{OFL}. (Rationale: This scenario determines whether a stock is overfished. If the stock is 1) above its MSY level in 2024 or 2) above 1/2 of its MSY level in 2024 and expected to be above its MSY level in 2033 under this scenario, then the stock is not overfished.)

Scenario 7: In 2025 and 2026, *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 1) above its MSY level in 2026 or 2) above 1/2 of its MSY level in 2026 and expected to be above its MSY level in 2036 under this scenario, then the stock is not approaching an overfished condition.)

Overview of "Stock Assessment" Section

The current status of individual groundfish stocks managed under the FMP is summarized in this section. Plan Team recommendations for 2025 and 2026 ABCs and OFLs are summarized in Tables 1.

The sum of the Plan Team's recommended ABCs for target species for 2024 and 2025 (including Alaska wide Sablefish ABC) are 3,590,907 t and 3,192,295 t, respectively. These compare with the 3,476,801 in 2023. The primary increase from the previous years is due to increases in EBS pollock and Atka mackerel. The Team recommended maximum permissible ABCs for all stocks, except for Greenland turbot and sharks (Table 2).

Risk Tables

A general description of guidance and the risk table template that applies to all risk tables in the assessment chapters, is provided here. The risk tables are intended to account for uncertainty not directly captured in the stock assessments. The risk tables can be used to justify recommendations of ABC below maximum permissible ABC.

Risk Table Levels of Concern

	Assessment-related considerations	*Population dynamics considerations*	*Ecosystem considerations*	*Fishery-informed stock considerations*
Level 1: Normal	Typical to moderately increased uncertainty/minor unresolved issues in assessment.	Stock population dynamics (e.g., recruitment, growth, natural mortality) are typical for the stock and recent trends are within normal range.	No apparent ecosystem concerns related to biological status (e.g., environment, prey, competition, predation), or minor concerns with uncertain impacts on the stock.	No apparent concerns related to biological status (e.g., stock abundance, distribution, fish condition), or few minor concerns with uncertain impacts on the stock.
Level 2: Increased concern	Substantially increased assessment uncertainty/ unresolved issues, such as residual patterns and substantial retrospective patterns, especially positive ones.	Stock population dynamics (e.g., recruitment, growth, natural mortality) are unusual; trends increasing or decreasing faster than has been seen recently, or patterns are atypical.	Indicator(s) with adverse signals related to biological status (e.g., environment, prey, competition, predation).	Several indicators with adverse signals related to biological status (e.g., stock abundance, distribution, fish condition).
Level 3: Extreme Concern	Severe assessment problems; very poor fits to important data; high level of uncertainty; very strong retrospective patterns, especially positive ones.	Stock population dynamics (e.g., recruitment, growth, natural mortality) are extremely unusual; very rapid changes in trends, or highly atypical patterns compared to previous patterns.	Indicator(s) showing a combined frequency (low/high) and magnitude(low/high) to cause severe adverse signals a) across the same trophic level as the stock, and/or b) up or down trophic levels (i.e., predators and prey of the stock) that are likely to impact the stock.	Multiple indicators with strong adverse signals related to biological status (e.g., stock abundance, distribution, fish condition), a) across different sectors, and/or b) different gear types.

The table is applied by evaluating the severity of four types of considerations that could be used to support a scientific recommendation to reduce the ABC from the maximum permissible. These considerations are stock assessment considerations, population dynamics considerations, ecosystem considerations, and fishery performance. Examples of the types of concerns that might be relevant include the following:

1. "Assessment-related considerations—data-inputs: biased ages, skipped surveys, lack of fishery-independent trend data; model fits: poor fits to fits to fishery or survey data, inability to simultaneously fit multiple data inputs; model performance: poor model convergence, multiple minima in the likelihood surface, parameters hitting bounds; estimation uncertainty: poorly-estimated but influential year classes; retrospective bias in biomass estimates.

2. "Population dynamics considerations—decreasing biomass trend, poor recent recruitment, inability of the stock to rebuild, abrupt increase or decrease in stock abundance.

3. "Ecosystem considerations—adverse trends in environmental/ecosystem indicators, ecosystem model results, decreases in ecosystem productivity, decreases in prey abundance or availability, increases or increases in predator abundance or productivity.

4. "Fishery-informed stock considerations—fishery CPUE is showing a contrasting pattern from the stock biomass trend, unusual spatial pattern of fishing, changes in the percent of TAC taken, changes in the duration of fishery openings."

Overall, the status of the stocks continues to appear favorable. All stocks are above B_{MSY} or the B_{MSY} proxy of $B_{35\%}$ (Figure 2).

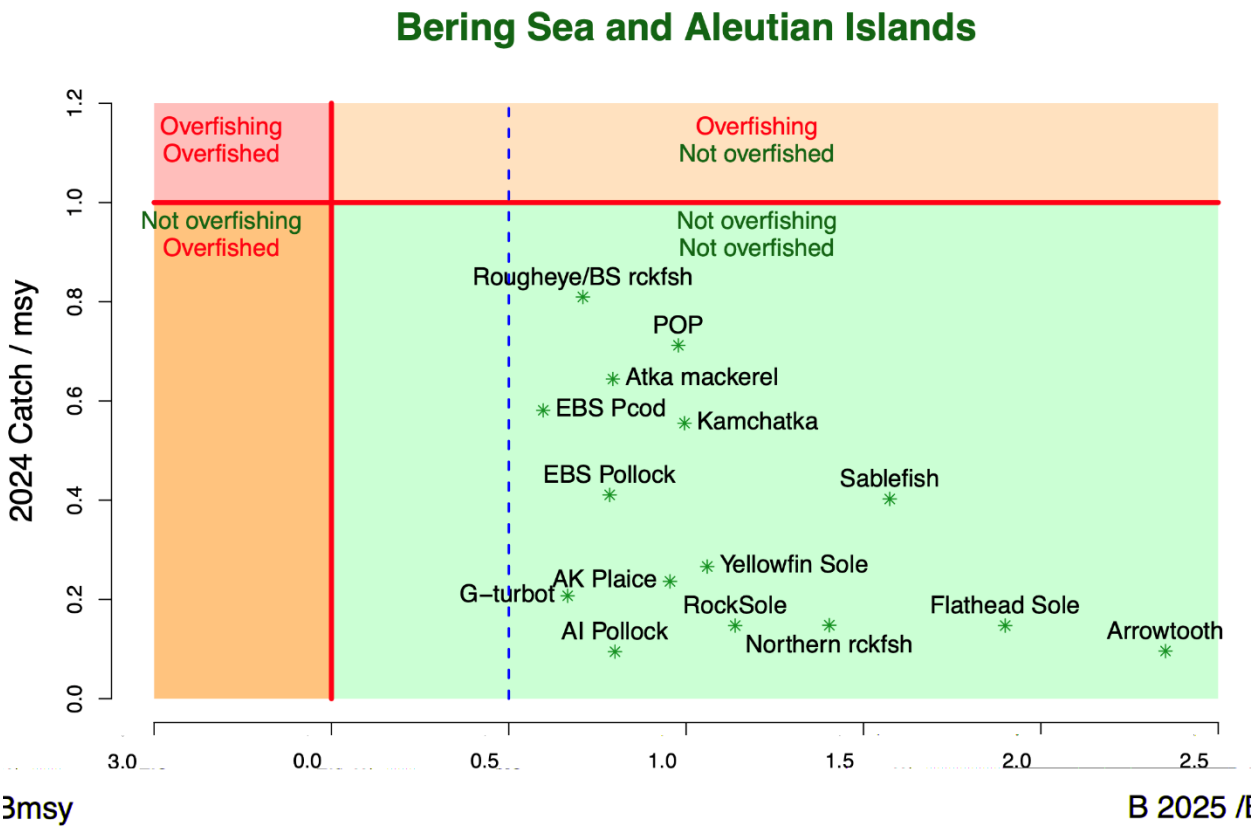


Figure 2. Summary of Bering Sea stock status next year (spawning biomass relative to B_{msy}; horizontal axis) and current year catch relative to fishing at F_{msy} (vertical axis) where F_{OFL} is taken to equal F_{msy}.. Note due to model changes in 2024 Aleutian Island cod is not included in this figure.

Summary and Use of Terms

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

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

"Projected age+ biomass" refers to the total biomass of all cohorts of ages greater than or equal to some minimum age, as projected for January 1 of the coming year. The minimum age varies from species to species. When possible, the minimum age corresponds to the age of recruitment listed in the respective stock assessment. Otherwise, the minimum age corresponds to the minimum age included in the assessment model, or to some other early age traditionally used for a particular species. When a biomass estimate from the trawl survey is used as a proxy for projected age+ biomass, the minimum age

is assumed to correspond with the age of recruitment, even though the survey may not select that age fully and undoubtedly selects fish of younger ages to some extent.

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

Reported catches are as of November 11, 2024.

Two-Year OFL and ABC Projections

Proposed and final harvest specifications are adopted annually for a two-year period. This requires the Team to provide OFLs and ABCs for the next two years in this cycle (Table 1). The 2025 harvest specifications (from Council recommendations in December 2023) are in place to start the fishery on January 1, 2025, but these will be replaced by final harvest specifications that will be recommended by the Council in December 2024. The final 2025 and 2026 harvest specifications will become effective when final rulemaking occurs in February or March 2025. This process allows the Council to use the most current survey and fishery data in stock assessment models for setting quotas for the next two years, while having no gap in harvest specifications.

The 2026 ABC and OFL values recommended in next year's SAFE report are likely to differ from this year's projections for 2025 because of new information (e.g., survey) that is incorporated into the assessments. In the case of stocks managed under Tier 3, ABC and OFL projections for the second year in the cycle are typically based on the output for Scenario 2 from the standard projection model using assumed (best estimates) of actual catch levels. For stocks managed under Tiers 4-6, projections for the second year in the cycle are set equal to the Plan Team's recommended values for the first year in the cycle.

Stock Assessment Frequency

Based on consideration of stock prioritization including assessment methods and data availability, some stocks are assessed on an annual basis while others are assessed less frequently. The following table provides an overview of the level of assessment presented in this year's SAFE report, the Tier level and the Alaska Fisheries Science Center's stock assessment frequency schedule for 2023-2026. Here the type of assessment is indicated by year with OP indicating operational full or update, HP indicating harvest projection, CR indicating catch report, and NA indicating no assessment.

Stock	Tier	Frequency	Last Full	2024	2025	2026	2027
EBS Pollock	1	1	2023	OP	OP	OP	OP
Yellowfin sole	1	1	2023	OP	OP	OP	OP
AI Pacific cod	3	1	2023	OP	OP	OP	OP
EBS Pacific cod	3	1	2023	OP	OP	OP	OP
Sablefish	3	1	2023	OP	OP	OP	OP
Northern rock sole	1	2	2022	OP	HP	OP	HP
AI Pollock	3	2	2022	OP	HP	OP	HP
Atka mackerel	3	2	2022	OP	HP	OP	HP
Greenland turbot	3	2	2022	OP	HP	OP	HP
Kamchatka flounder	3	2	2022	OP	HP	OP	HP
Northern rockfish	3	2	2023	HP	OP	HP	OP
Pacific ocean perch	3	2	2022	OP	HP	OP	HP
Rougheye & blackspotted rockfish	3	2	2022	OP	HP	OP	HP
Bogoslof Pollock	5	2	2022	OP	CR	OP	CR
Other rockfish	5	2	2022	OP	CR	OP	CR
Shortraker rockfish	5	2	2022	OP	CR	OP	CR
Skates	3, 5	2	2023	HP	OP	HP	OP
Forage Species (including Squid)	ecosystem report	2	2023	OP	NA	OP	NA
Alaska plaice	3	4	2021	OP	HP	HP	HP
Arrowtooth flounder	3	4	2022	HP	HP	OP	HP
Flathead sole	3	4	2020	OP	HP	HP	HP
Other flatfish	5	4	2020	OP	CR	CR	CR
Octopus	6	4	2023	CR	CR	CR	OP
Sharks	6	4	2022	CR	CR	OP	CR
Grenadiers	ecosystem report	4	2020	OP	NA	NA	NA
Sculpins	ecosystem report	4	2020	OP	NA	NA	NA

Economic Summary of the BSAI commercial groundfish fisheries in 2022-2023

The Economic SAFE report contains detailed information about economic aspects of the groundfish fisheries, including figures and tables that report historical catch, finished production, and ex-vessel and wholesale value, for harvesting and processing sectors for a range of factors (gear, species, management area, product type), and a set of economic performance indices. The report includes a section summarizing in-season catch and ex-vessel revenue estimates for groundfish and halibut, and wholesale market profiles for the most commercially valuable species. Data tables in the Economic SAFE report are organized into four sections: (1) All Alaska, (2) BSAI, (3) GOA, and (4) Pacific halibut. 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; fishing effort; and, crew employment. The data behind the tables from this and past Economic SAFE reports are publicly available online at https://reports.psmfc.org/akfin.

Summary of ex-vessel, and first wholesale, changes in Alaska, and the BSAI

The ex-vessel value of all Alaska domestic fish and shellfish catch, which represents the amount paid to harvesters for fish caught, and the estimated value of pre-processed fish species that are caught by catcher/processors, decreased from $2,120 million in 2022 to $1,565 million in 2023 (real 2023$). The first wholesale value of 2023 groundfish catch after primary processing was $2,559 million, an increase from the 2022 value of $2,698 million. The 2023 total quantity of groundfish catch increased by 9%, because of increased pollock (*Gadus chalcogrammus*) harvest in the BSAI and GOA, and the total first wholesale value of groundfish catch decreased by 5%, relative to 2022. The fall in wholesale prices for pollock, cod, and sablefish, more than offset the increase in catch, explaining the decreased 2023 first wholesale value over 2022.

The groundfish fisheries collectively accounted for the largest share (55%) of the ex-vessel value of all commercial fisheries off Alaska in 2023, with $859 million in revenue, while the Pacific salmon (*Oncorhynchus spp.*) fishery was second with $434 million, or 28% of the total Alaska ex-vessel value. The ex-vessel value of the shellfish fishery amounted to $157 million, or 10% of the total for Alaska. The ex-vessel value of Pacific halibut (*Hippoglossus stenolepis*) was $94 million, or 6% of the total for Alaska in 2023.

According to data reported in the current Economic SAFE report, the total real (i.e., inflation-adjusted) ex-vessel value of Bering Sea and Aleutian Islands (BSAI) groundfish decreased by 9% from $794 million in 2022 to $725 million in 2023 (Figure 3), and real first-wholesale revenues from the processing and production of groundfish in the BSAI decreased by 2% between 2022 ($2,301million) and 2023 ($2,258 million) (Figure 4). The total quantity of groundfish products from the BSAI increased by 9% from 2022 (666 thousand metric tons) to 2023 (727 thousand metric tons).

Decomposition of the change in first-wholesale revenues from 2022-2023 in the BSAI

The following brief analysis summarizes the overall nominal revenue changes that occurred from 2022 to 2023, and the quantity produced, and revenue generated from BSAI groundfish and how revenues have been affected by changes in quantity or prices of each species and product group (Figure 5). Unlike the numbers cited above, these values are not adjusted for inflation, so enable a simple comparison of how changes in the price and quantity for each group contribute to the overall change in first-wholesale revenues for groundfish from 2022 to 2023 in the BSAI.

In results presented by species group, a large positive quantity effect was much stronger than a negative price effect, which resulted in a positive net effect of about $122 million for pollock (Figure 5, top panel). For Pacific cod, negative price and quantity effects contributed to a negative net effect of $67 million. Positive price and quantity effects for rockfish resulted in a net positive effect of $11.6 million. Flatfish exhibited a slightly negative price effect combined with a negative quantity effect that resulted in a net revenue decrease of $36 million. Atka mackerel exhibited positive price and quantity effects that combined for a net positive effect of $15 million. Negative price effects balanced positive quantity effects

for rockfish and sablefish. and net effects were minimal. The "Other" species group experienced small and positive price and quantity effects for a net revenue increase of $4 million.

In results presented by product group, a large positive quantity effect for surimi, and a modest negative price effect, resulted in a positive net effect of $46 million in the BSAI first-wholesale revenue decomposition for 2022 to 2023 (Figure 5, bottom panel). A negative price effect for whole fish and head & gut resulted in a negative net effect of $65 million. For fillets, a negative price effect partially offset a positive quantity effect for a net increase of $20 million. For roe, a negative price effect coupled with a positive quantity effect resulted in a negative net effect of $5 million. For 'other' products, a negative price effect offset a positive quantity effect and resulted in a positive net effect of $42 million.

In summary, the changes in first-wholesale revenues from the BSAI groundfish fisheries increased by $37 million from 2022 to 2023 due to positive quantity effects that combined were worth $222 million, which outweighed the overall negative price effects of $184 million that primarily affected pollock, and cod.

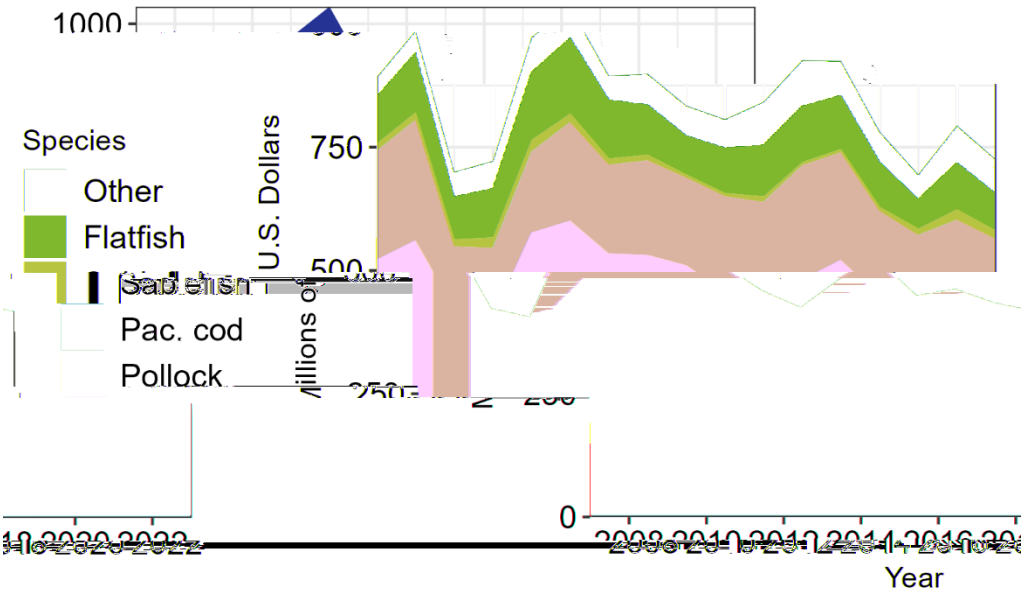


Figure 3. Real (2023 dollars) ex-vessel value of the groundfish catch in the domestic commercial fisheries in the BSAI area by species, 2007-2023.

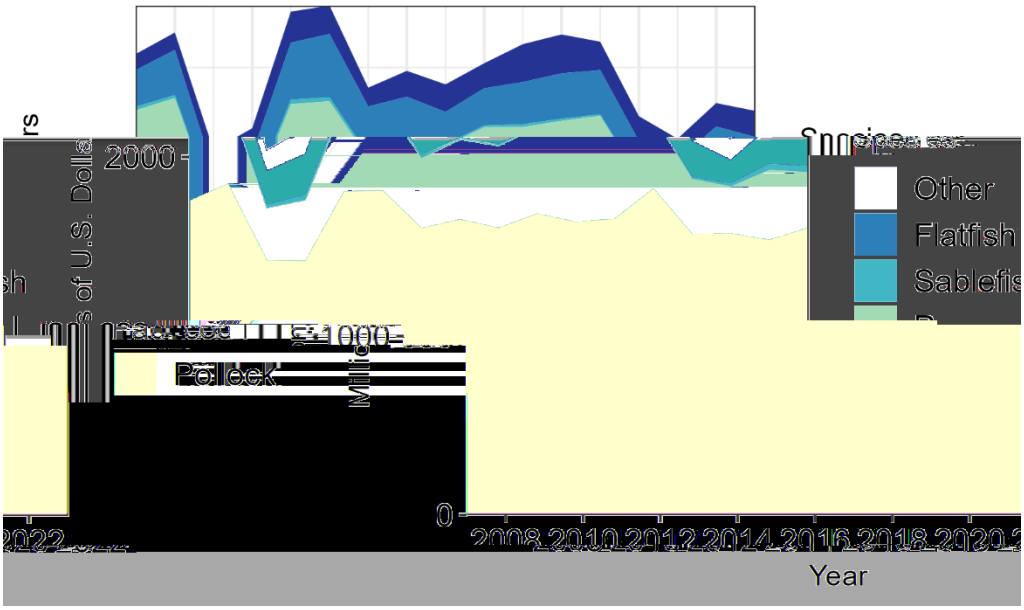
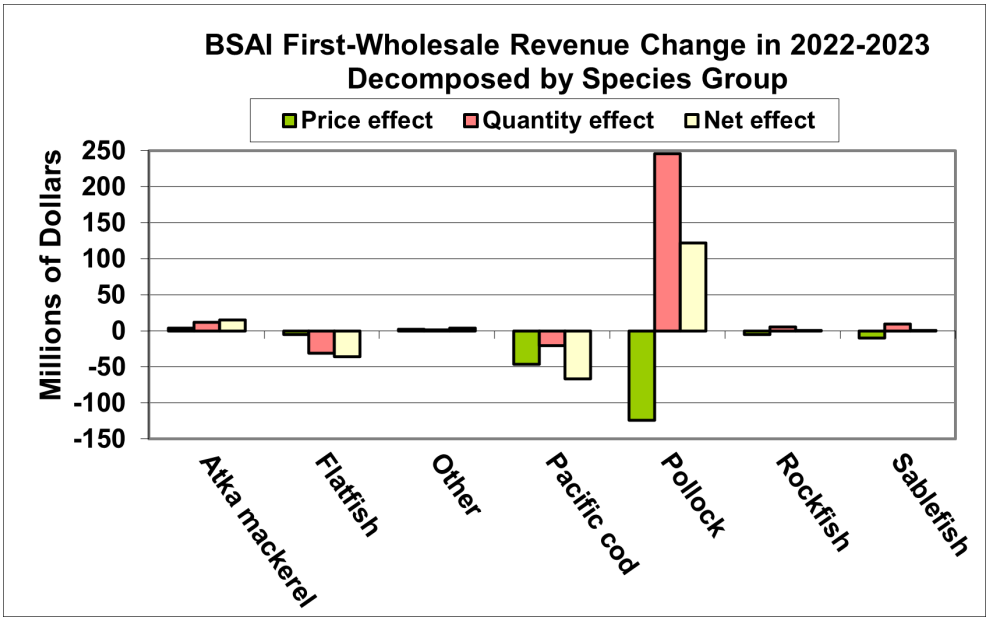


Figure 4. Real (2023 dollars) gross product value of the groundfish catch in the BSAI area by species, 2007-2023.



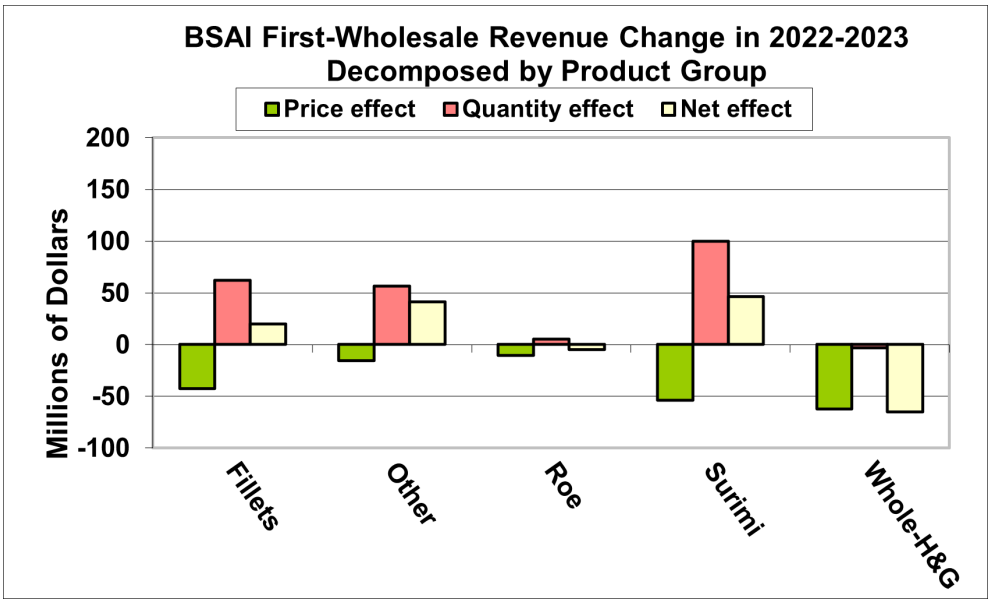


Figure 5. Decomposition of the change in first-wholesale revenues from 2022 to 2023 in the BSAI management area. The first decomposition is by the species groups used in the Economic SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to 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).

Ecosystem Status Reports for the EBS and AI (2024)

Bering Sea Conditions

Since 2021, the EBS has returned to average thermal conditions. The summer 2024 cool pool extent continued to be near historical averages, though the extent of the coldest bottom waters (≤-1°C and ≤0°C) was much smaller in 2024 than 2023 and similar to a 'warm' year. Over the southern shelf, the biomass of echinoderms (i.e., sea stars, brittle stars, and sea cucumbers) remained above-average while crab populations remained low. The biomass of small-mouthed flatfishes remained below average with some species, like yellowfin sole, increasing and other species, like Alaska plaice, decreasing. The Rapid Zooplankton Assessment was dominated by small copepods, with low abundance of large copepods and euphausiids, with some increased euphausiid abundance towards the north by fall. The condition of age-0 pollock has remained below average since 2014 and the condition of small (100-250 mm) and large (>250 mm) pollock has decreased and/or remained below average since ~2021. While individual fish condition has declined, the overall biomass of pollock increased 74% in the bottom trawl survey as the 2018 year class continues to grow. Adult pollock were distributed over the northwest outer domain where large 'oceanic' copepods occur, which was reflected in the diets in 2024. Additionally, rates of cannibalism have been low between 2021–2024. Seabird reproductive success was mixed for both plankton-eating and fish-eating species at the Pribilof Islands. No major seabird die-off events were observed in 2024.

The extent of sea ice has been steadily increasing in the northern Bering Sea (NBS) since 2018 and ice thickness increased dramatically to above-average in the Bering Strait region since 2021. Measures of pelagic productivity in the NBS (e.g., age-0 pollock, herring, capelin, and juvenile salmonids) have been mixed. For example, juvenile Chinook salmon condition increased from average to positive in 2024, yet the abundance estimate of juvenile Chinook salmon was at record low in 2024. Looking ahead, the expected transition to La Niña is projected to bring continued cooler conditions to the EBS shelf with SST anomalies within 0.25°C of normal. Relatively cool SSTs during the early ice season may contribute to earlier formation of sea ice. However, recent storms (e.g., October 20–22, 2024) in the NBS and Bering Strait region may now entrain relatively warmer water into the surface layer and delay sea ice formation.

Aleutian Islands

Since 2021, the EBS has returned to average thermal conditions. The summer 2024 cool pool extent continued to be near historical averages, though the extent of the coldest bottom waters (≤-1°C and ≤0°C) was much smaller in 2024 than 2023 and similar to a 'warm' year. Over the southern shelf, the biomass of echinoderms (i.e., sea stars, brittle stars, and sea cucumbers) remained above-average while crab populations remained low. The biomass of small-mouthed flatfishes remained below average with some species, like yellowfin sole, increasing and other species, like Alaska plaice, decreasing. The Rapid Zooplankton Assessment was dominated by small copepods, with low abundance of large copepods and euphausiids, with some increased euphausiid abundance towards the north by fall. The condition of age-0 pollock has remained below average since 2014 and the condition of small (100-250 mm) and large (>250 mm) pollock has decreased and/or remained below average since ~2021. While individual fish condition has declined, the overall biomass of pollock increased 74% in the bottom trawl survey as the 2018 year class continues to grow. Adult pollock were distributed over the northwest outer domain where large 'oceanic' copepods occur, which was reflected in the diets in 2024. Additionally, rates of cannibalism have been low between 2021–2024. Seabird reproductive success was mixed for both plankton-eating and fish-eating species at the Pribilof Islands. No major seabird die-off events were observed in 2024.

Multi-species model

The climate enhanced multispecies assessment for walleye pollock (*Gadus chalcogrammus*), Pacific cod (*Gadus macrocephalus*) and arrowtooth flounder (*Atheresthes stomias*), from the Eastern Bering Sea (EBS), Alaska is updated and included annually. Beginning in 2023 the multi-species model has been presented as a standalone document, where previously it was an appendix in the Pollock assessment. The assessment quantitatively incorporates climate effects on growth, mortality (via predation) and recruitment. Results are presented from catch at age stock assessment models estimated and projected with climate effects on recruitment and growth and with trophic interactions (multispecies mode, MSM) or without trophic interactions (single-species mode, SSM). Outputs of the assessment include, as a

reference (not for harvest recommendation), climate-informed single- and multispecies Tier-3 reference points, ABC, and OFL. There were no changes to the model structure this year. This year's assessment is based on updated survey, fishery, and climate information, the latter of which includes historical bottom temperature and future projected changes in temperature, oceanographic conditions, and lower trophic level productivity linked to recruitment, growth, and future ABC. Climate-specific risk assessments for near term (1-2 years), medium term (+10yr) and long-term (+30y) are provided for reference based on ABC harvest rates (and assuming no climate adaptation in the fish, fishery, or management system). Additional information presented includes estimates of predation pressure on key prey species of pollock, Pacific cod and arrowtooth flounder which provide context for historical or potential future ecological shifts in Bering Sea carrying capacity and biomass estimates of key prey species (e.g., "*Opilio*").

Stock Status Summaries

Except as otherwise noted, the Team's recommended ABCs are set at the maximum permissible levels under their respective tiers.

1. Walleye Pollock

Status and catch specifications (t) of walleye pollock in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The biomass is reported as age 3+ for eastern Bering Sea, age 1+ for the Aleutian Islands, and the survey biomass for Bogoslof, as reported in the respective assessments. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Biomass	OFL	ABC	TAC*	Catch
Eastern Bering Sea	2023	12,389,000	3,381,000	1,910,000	1,314,500	1,307,997
	2024	10,184,000	3,162,000	2,313,000	1,313,580	1,298,531
	2025	8,526,000	2,957,000	2,417,000		
	2026		2,496,000	2,036,000		
Aleutian Islands	2023	264,173	52,383	43,413	4,500	3,665
	2024	279,764	51,516	42,654	5,420	4,878
	2025	288,407	55,728	46,051		
	2026		56,231	46,437		
Bogoslof	2023	367,880	115,146	86,360	300	118
	2024	367,880	115,146	86,360	250	23
	2025	247,137	77,354	58,015		
	2026		77,354	58,015		

* In 2024, NMFS reallocated 13,580 t of pollock TAC from the Aleutian Islands to the Bering Sea

Eastern Bering Sea pollock

Changes from previous assessment

Relative to last year's BSAI SAFE report, the following substantive changes have been made in the EBS pollock stock assessment. These include the 2024 NMFS bottom-trawl survey (BTS), covering only the EBS. The NBS was not surveyed in 2024. As before, these data were treated with a spatio-temporal model for index standardization.

Note that while there was no NBS survey in 2024, the spatio-temporal model allows estimates for the NBS in years without data based on adjacent SEBS observations. We note that this inflates the variance of this year's estimate. Age data from this survey effort were compiled and included (also with an extensive spatio-temporal model treatment). Preliminary estimates of the 2024 NMFS acoustic-trawl survey (ATS) age composition data was developed using the age-length key from the BTS survey. The BTS-chartered boats also collected acoustic data and the series was updated this year (AVO).

The following are changes in the data:

1. Observer data for catch-at-age and average weight-at-age from the 2023 fishery were finalized and included.
2. Total catch as reported by NMFS Alaska Regional office was updated and included through Nov 11 2024.
3. In summer 2024, the AFSC conducted the bottom trawl survey in the EBS. A VAST model evaluation (including the cold-pool extent) was used as the main index.

4. The author team updated estimates of weight-at-age data used to compute spawning biomass as presented to the Plan Team and SSC in September/October 2024 (see J. Ianelli (2024) for details) including estimates to 2024.
5. The author team added a 2024 estimate to the time series from the acoustic data collected from the bottom trawl survey covering 2006-2024 (except for 2020). This represents the updated "AVO" data (as presented in J. Ianelli (2023)).
6. The author team added a 2024 estimated biomass and preliminary age-composition from the 2024 ATS survey. The age-composition estimate was based on the BTS age-length key data.

The assessment method was the same as presented in December of 2023 (J. Ianelli et al. (2023)). Based on results shown in September 2024 (J. Ianelli and McGilliard (2024a)) some alternative consideration of Tier level was provided.

Spawning biomass and stock trends

Results from integrating the survey and fishery observer data indicate that in 2022 the stock reached about 92% of the all-time peak female spawning biomass estimated from 1987. The values for the recent years continue to remain above B_{MSY} due to the strength of the 2018 year-class. The results from the 2024 assessment were in agreement with the 2023 assessment: the 2018 year class appears to be one of the most abundant on record.

The time series of begin-year biomass estimates (ages 3 and older) suggests that the abundance of Eastern Bering Sea pollock remained at a high level from 1982–88, with estimates ranging from 8 to 13 million t. Historically, biomass levels increased from 1979 to the mid-1980s due to the strong 1978 and relatively strong 1982 and 1984 year-classes recruiting to the fishable population. The stock is characterized by peaks in the mid-1980s, the mid-1990s and again appears to be increasing to a peak of more than 10 million t in 2016 following the low in 2008 of 4.35 million t. The estimate for 2024 is trending downward at 9.42 million t and continues downward with 2025 estimated at 8.53 million t.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

This year the Team endorsed the authors' recommendation to manage this stock under Tier 3 as estimates of B_{MSY} and the probability density function for F_{MSY} were not considered reliable. This change in management was deemed appropriate as there remains considerable uncertainty in the spawner-recruit relationship. The stock is therefore managed with a proxy for B_{MSY} at $B_{35\%}$. The updated estimate of $B_{35\%}$ from the present assessment is 2.066 million t. Projected spawning biomass for 2025 is 2.967 million t, placing EBS walleye pollock in sub-tier "a" of Tier 3. The maximum permissible F_{ABC} is 0.394 resulting in a maximum permissible ABC for 2025 of 2.417 million t and for 2025 of 2.036 million t. The F_{OFL} is 0.513 resulting in an OFL for 2025 of 2.957 million t and for 2026 of 2.496 million tons. No reduction from the maximum ABC was recommended.

Status determination

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

Aleutian Islands pollock

Changes from previous assessment

There were no changes to the recommended model. Catches for 1978 to 2024 were updated to latest estimates from the catch accounting system (CAS). The 2024 Aleutian Islands survey index was added. Survey age data from 2022 and 2024 were not yet available.

There was no directed fishery catch of pollock in 2023, but there was a small, directed fishery in 2024 (5.7 t as of November 11, 2024). As of November 11, 2024, the total catch of pollock across the Aleutian Islands was 4,878 t.

Spawning biomass and stock trends

This year's assessment estimates that spawning biomass reached a minimum level of about $B_{26\%}$ in 2010 but has generally increased since; the estimates from the authors' preferred model showed a slight decline in female spawning stock biomass from 2021 (92,891 t) to 2024 (84,781 t), with another slight decline

(82,793) projected for 2025. The status of AI pollock in 2023 and 2024 was assessed to be well above $B_{40\%}$. Mean recruitment was high in the late 1970s and mid-1980s, with the 1978 year class having a strong influence on the model. Mean recruitment of age-1 pollock from 1978-1989 was almost six times higher than that from 1998-2022; only one year class since the 1989 year class has exceeded the overall 1978-2022 overall mean recruitment of 135 million age-1 recruits, that being the 2012 year class at 244.5 million age-1 fish. Lower year class strength since 1990 has led to lower abundance of pollock in the Aleutian Islands, despite the fact that exploitation rates have remained low since 1999.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The official total catch for 2023 was 3,744 t, which is a small fraction of the 2023 OFL of 52,383 t; therefore, the stock is not being subjected to overfishing. The projected spawning biomass for 2025 is 82,781 t and for 2026 is 80,639 t which are above the $B_{40\%}$ value of 63,709 t, placing the AI pollock stock in sub-tier "a" of Tier 3. The model estimated the values of $F_{40\%}$ as 0.325 and $F_{35\%}$ as 0.406. Under Tier 3a, the 2025 and 2026 maximum permissible ABCs 46,051 t and 46,437 t, respectively. The 2025 and 2026 OFLs are 55,728 t and 56,231 t, respectively. The Team recommended setting the 2025 and 2026 ABCs and OFLs at these values. Projections assumed catches of 5,106 t for 2024 and 5,156 t for 2025 based on the five-year average (2019-2023) F of 0.032.

Status determination

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

Bogoslof pollock

Changes from previous assessment

Estimated catches for 2023 and 2024 were updated and the 2024 acoustic-trawl survey biomass estimates were updated.

There were no changes to the assessment model.

Spawning biomass and stock trends

NMFS acoustic-trawl survey biomass estimates are the primary data source used in this assessment. Between 1997 and 2024, the values varied between a low of 67,063 t in 2012 and a high of 663,070 t in 2018. The most recent acoustic-trawl survey of the Bogoslof spawning stock was conducted in February 2024 and resulted in a biomass estimate of 244,800 t and the random-effects method of survey averaging resulted in a biomass estimate of 247,137 t.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has determined that this stock qualifies for management under Tier 5. The assessment authors and the Team recommend that the maximum permissible ABC and OFL continue to be based on the random-effects survey averaging approach, and the previously accepted estimate of M at 0.313 as estimated by the Tier 3 research model.

The maximum permissible ABC value for 2025 is 58,015 t (assuming M = 0.313 and F_{ABC} = 0.75 x M = 0.235 and the random effects survey estimate for biomass). The ABC for 2026 is the same. No elevated levels of risk were noted and therefore there is no recommended reduction from maximum permissible ABC.

The OFL for 2025 is 77,354 t (assuming M = 0.313 and $F_{OFL} = M$ and the random effects survey estimate for biomass). The OFL for 2026 is the same.

Status determination

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

2. Pacific cod

Status and catch specifications (t) of Pacific cod in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-0+ Biomass*	OFL	ABC	TAC	Catch
Eastern Bering Sea	2023	844,578	172,495	144,834	127,409	112,963
	2024	808,203	200,995	167,952	147,753	116,791
	2025	769,813	183,509	153,617		
	2026		169,243	141,520		
Aleutian Islands	2023	54,165	18,416	13,812	8,425	3,750
	2024	54,165	18,416	12,431	8,080	3,827
	2025	73,679	16,782	13,376		
	2026		16,273	12,973		

* Biomass shown for AI Pacific cod for 2023-2024 is survey biomass (Tier 5), and AI Pacific cod biomass for 2025 is age-1+ biomass based on the recommended Tier 3 model.

Eastern Bering Sea Pacific cod

Changes from previous assessment

The following changes to the input data have been made in the EBS Pacific cod assessment:

1. Catches for 1991-2024 were updated, and a preliminary total catch estimate for 2024 was incorporated. All fishery data used in the models were retrieved on October 3, 2024.
2. Commercial fishery size compositions for 1991-2024 were updated, and a preliminary size composition from the 2024 commercial fishery was incorporated.
3. The VAST approach for the AFSC Bering Sea (EBS+NBS) bottom trawl index was updated for 2024.
4. The size composition from the 2024 EBS+NBS survey was incorporated.
5. The VAST approach was used to estimate the age compositions from the combined EBS+NBS survey time series through 2023.
6. Ageing error matrix was updated using the AgeingError R library and 2000-2023 age data.
7. Ageing bias was updated for 2000-2007 using data from otoliths read first in 2004 and then again in 2018 using the new methodology.
8. Ages from otoliths read prior to 2000 were excluded from the model based on recommendations from the Age and Growth laboratory.

For this year the model presented and accepted for use in 2023 (Model 23.1.0.d) was re-run with the updated data as parameterized in last year's assessment, removal of ages from otoliths read from 1994-1999, inclusion of length composition data from 1994-1999, annually varying growth limited to 2000 through 2024, updated ageing error and ageing bias matrix, and retuned for sigmas and variance adjustment factors. In addition, four alternative models were developed from those described in September. The following additional model configurations are considered in this document:

1. Model 24.0
    a. Model 23.1.0.d with 5 cm length bins
2. Model 24.1
        i. Model 24.0 with splined ageing error, and growth with a random walk on K, instead of the Richard's ρ parameter
3. Model 24.2
    a. Model 24.1 with non-time varying survey selectivity
4. Model 24.3

a. Model 24.2 with all annually varying sigma values and variance adjustment factors retuned.

Model 24.1 and Model 24.3 have very similar diagnostics, with little discernable differences in overall fits. There are tradeoffs between Model 24.1 and 24.3 in model performance that makes it difficult to choose one over the other. Both models fit the survey index well, though Model 24.3 has a marginally better fit to that data component when considering likelihood. Both models fit the age and length composition data well, however Model 24.1 fits the survey length composition data better. Both models performed equally well with the fishery lengths and survey age composition data. Although the point estimate management advice (i.e. ABCs and OFLs) for the two models differ, the uncertainty around these estimates in both models show the confidence bounds overlapping making them statistically indistinguishable. In consideration of overall model performance and consistency in management advice with last year's assessment, the Team concurred with the authors recommendation of using Model 24.1 in setting management advice for 2025.

Spawning biomass and stock trends

Recruitment is estimated to have been below average for the 2014-2017 and 2019-2021 year-classes, and above average for 2013 and 2018. Estimated spawning biomass from Model 24.1 increased from 2010 through 2018 to 338,807 t and has been on a downward trajectory since that time with an estimated low of 215,747 t in 2025 or $B_{38\%}$. Spawning biomass is projected to continue to decrease to 206,498 t or $B_{37\%}$ in 2026.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

This stock is assigned to Tier 3b for the determination of 2025 and 2026 ABCs and OFLs. The 2025 maximum permissible ABC in this tier as calculated from Model 24.1 is t and the projected 2025 maxABC is 150,879 t. The 2024 OFL from Model 23.1.0.d is 200,995 t. The 2025 projected OFL is 180,798 t. Risk table scores were level 1 (no concerns), and the authors and Team did not recommend a reduction in the ABC.

Status determination

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

Aleutian Islands Pacific cod

Changes from previous assessment

The Aleutian Islands (AI) and eastern Bering Sea (EBS) Pacific cod stocks were first managed separately in 2014. Since 2014, age-structured models have been explored in assessments but harvest specifications for Aleutian Islands (AI) Pacific cod have been managed under Tier 5. A new age structured model was developed in Stock Synthesis for the Aleutian Islands Pacific cod stock. The author and Team preferred model was Model 24.1 which included a time block on natural mortality from 2016 - 2024. The breakpoint between 2015 and 2016 corresponds to a shift to warmer temperatures in the Aleutian Islands during the past decade and the continuation through 2024 represents ongoing lagged effects of the MHW on the stock.

The following substantive changes have been made to the Aleutian Islands Pacific cod age structured assessment relative to the November 2023 assessment.

1. Realized catches for 2023, as well as a preliminary catch estimate through September 22, 2024. The current year's catch was projected to the end of the year based on the proportion caught over the past 5 years after this period prior to September 22.
2. Commercial fishery size compositions for 2023, as well as preliminary size composition from the 2024 commercial fisheries through September 22.
3. The 2024 survey biomass index and error estimates are incorporated, as well as the 2024 length compositions and estimate of survey input sample size.
4. The maturity curve was updated through September 2024 with observer records of maturity at length.

5. The fishery length composition sample sizes were updated with the number of hauls per year, weighted such that the mean is equivalent to the mean survey input sample size.

Spawning biomass and stock trends

Total biomass declined from approximately 176,848 t in 1992 to a time series low of 74,386 t in 2024. The trawl survey estimate of biomass was 50,382 t in 2023, similar to but lower than the 2022 estimate, which was the previous lowest estimate in the timeseries. Female spawning biomass has followed a similar overall declining trend as total biomass in all models with the peak spawning biomass occurring by the early 1990s for all models. Spawning biomass reached its lowest point of 47,568 t in 2022.

An increase occurs in recruitment deviations during 2015 - 2020, corresponding with the natural mortality timeblock. There is little evidence that Pacific cod recruitment increases during heatwave conditions, although recent research indicates that warm conditions increase mortality in overwintering age-0 cod, which may be consistent with model results indicating that mortality occurs during later stages of development.

The stock appears to have declined to close to $B_{20\%}$, despite relatively light fishing. The preferred model indicates a period of high recruitment during the 1990s, followed by lower recruitment from 2001 - 2010. This lower recruitment during 2001 - 2010 may have resulted in declining stock sizes. For the preferred model, the mean age-0 recruitment during 2001 - 2010 was 42,836,000 and the mean used for forecasting was 61,854,000. A second reason for the low stock sizes despite low fishing mortality is climate-related mortality.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The Team has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, thereby qualifying AI Pacific cod for management under Tier 3. The Team appreciated the time and effort the authors put into developing the models presented in this stock assessment. Model 24.1 shows substantial improvement over previous models consisted

Status determination

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

3. Sablefish

Status and catch specifications (t) of sablefish in the Bering Sea and Aleutian Islands 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 2025 and 2026 are those recommended by the Teams. Beginning in the 2020 fishery year, the OFL was made Alaska-wide (i.e., for both BSAI and GOA FMPs combined). Catch data are current through November 11, 2024.

Area	Year	Age-4+ Biomass	OFL	ABC	TAC	Catch
Alaska (all areas)	2023	621,000	47,390			
	2024	701,300	55,084			
	2025	633,000	58,532			
	2026		57,797			
Bering Sea	2023	151,000		8,417	7,996	5,164
	2024	194,100		11,450	7,996	5,326
	2025	175,000		13,898		
	2026			13,723		
Aleutian Islands	2023	153,000		8,884	8,440	2,319
	2024	169,900		13,100	8,440	1,152
	2025	153,000		12,175		
	2026			12,022		

Changes from the previous assessment

New data included in the author recommended assessment model 23.5 were:

1. Length data from the fixed gear fishery for 2023.
2. Length data from the trawl fisheries for 2023.
3. Age data from the longline survey and fixed gear fishery for 2023.
4. Finalized catch for 2023.
5. Preliminary catch for 2024, including non-commercial catch of sablefish in federal waters, and projected catch for the portion of the fishing year not yet completed.
6. Estimates of killer and sperm whale depredation in the fishery for 2024 were held constant at 2022 values.

There were no changes to the stock assessment model methodology in 2024.

Spawning biomass and stock trends

The model estimates that all year classes since 2014 have been at or well above the time series average, though the two most recent estimated year classes (2020 and 2021) are well below the recent (since 2014) mean. However, early indications from eastern Bering Sea (EBS) trawl fishery length data suggest that the 2022 year-class (not estimated in the 2024 assessment) could be large. Growth in total biomass has leveled off over the last year (1% increase), which follows a tripling of the population from a time series low of 234,000 t in 2015 to 705,000 t in 2024. Conversely, spawning stock biomass (SSB) grew by 20% in 2024, representing a more than doubling of the spawning population from the time series low of 83,000 t in 2018 to 191,000t in 2024. Thus, the sablefish population continues to grow rapidly, where total biomass is at the fifth highest level on record and SSB is nearing levels observed in the mid-1980s. Currently, the SSB in 2024 is at 63% of the unfished SSB (i.e., $B_{100\%}$). Additionally, the sablefish age structure continues to gradually expand as the recent large year classes (e.g.,2014) begin to enter ages that are nearing full maturity. For instance, the 2014 year-class is now 10 years old and around 90% mature, while the larger 2016 year class is 8 years of age and 67% mature. The abundance of the 2014—2019 cohorts remain high as they age, which is a positive sign for the sablefish population. However, there remains a lack of fully mature sablefish age classes (i.e., greater than 10 years of age), and these recent

year classes may need to support the population and fishery for a decade or more. The imbalance in the age structure is apparent given that the 2014 through 2021 cohorts comprise more than 81% of the projected 2025 SSB.

Fishery dynamics for sablefish are rapidly fluctuating due to changes in gear utilization (i.e., a transition from predominantly hook-and-line gear to pot gear), the influx of low value small fish, and market saturation leading to reduced value. Due to biological and socioeconomic drivers, catch has been well below acceptable biological catch (ABC) with the proportion of the quota utilized averaging ~71% over the last three years and projected to be <50% in 2024. Stakeholders have been pursuing changes to the full retention requirement for sablefish through the North Pacific Fisheries Management Council (NPFMC) to allow for discarding of small, low-value fish.

Although the sablefish assessment model does not demonstrate any strong diagnostic issues, a number of moderate concerns with data inputs and model performance are worth monitoring. Poor market conditions led to the 2024 NOAA domestic longline survey for sablefish being canceled, which has caused increased uncertainty in assessment estimates of recent population growth and year class strength. Moreover, projections have been recently hindered by increasing overestimation of ABC utilization in future years, but this leads to overly pessimistic projections and is not a major concern for management advice. Resolving trends in residual patterns is a priority for future assessments, primarily through improved modeling of sex specific sablefish dynamics. Generally, the population remains in a very healthy state, though continued expansion of the age structure is needed and should be monitored. Environmental and ecosystem conditions for sablefish remain generally favorable and near average conditions, while no fishery performance metrics indicate any biological concerns for the resource. Thus, there are no elevated risk table concerns for sablefish.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

Sablefish are managed under Tier 3 of the NPFMC harvest control rule, which aims to maintain the population at $B_{40\%}$. Since projected female spawning biomass (combined areas) for 2025 is equivalent to $B_{73\%}$, sablefish is in sub-tier "a" of Tier 3. Spawning biomass is projected to increase rapidly in the near term, and the maximum permissible value of FABC under Tier 3a is 0.087, which translates into a Tier 3a maximum permissible 2025 ABC (combined areas) of 50,283 t. After adjusting for whale depredation, the final author recommended ABCw is 50,111 t (representing a 6% increase in the author recommended ABC from 2024). The OFL fishing mortality rate is 0.102, which translates into a 2025 OFL (combined areas) of 58,731 t, and results in a whale depredation adjusted OFLw of 58,532 t. The Teams agree with these recommendations.

Status determination

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

Area apportionment

Based on biological rationale, the SSC adopted a five-year average survey apportionment method in 2020. A five-year moving average of the longline survey proportions of biomass in each region are used to apportion catch to management area. The apportionment values are updated yearly as new survey data is collected. There was no longline survey in 2024, so apportionment remains unchanged from 2023. This gives the following area-specific ABCs (including deductions for estimated whale depredation):

	2024			2025		2026	
Region	OFL_w	ABC_w	TAC	OFL_w	ABC_w	OFL_w	ABC_w
BS	--	11,450	7,996	--	13,898	--	13,723
AI	--	13,100	8,440	--	12,175	--	12,022
BSAI	--	24,550	16,436	--	26,073	--	25,745
GOA[1]	--	22,596	22,596	--	24,038	--	23,737
Alaska-wide	55,084	47,146		58,532	50,111	57,797	49,482

[1]GOA information included to show total breakdown. For details please see the GOA SAFE Intro document.

4. Yellowfin sole

Status and catch specifications (t) of yellowfin sole in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-6+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	3,321,640	404,882	378,499	230,000	105,682
	2024	2,512,810	305,298	265,913	195,000	81,307
	2025	2,308,550	299,247	262,557		
	2026		305,039	267,639		

Changes from previous assessment

Changes to the input data include:

1. The model-based survey age compositions were updated with data through 2023, and mean survey weight at age was added for 2023.
2. The estimate of the total catch made through the end of 2023 was updated, and the 2024 catch was extrapolated based on the catch through October 1, and the mean proportion caught for the remainder of the year over the past 5 years.
3. The 2024 model-based estimate of the combined EBS and NBS NMFS survey biomass and standard error (1982-2024) were used.

There has been no change in assessment model since 2023.

Spawning biomass and stock trends

The projected estimate of total biomass for 2025 was 12% lower than that of the 2023 assessment. The model projection of spawning biomass for 2025 was 13% lower than the projected 2025 spawning biomass from the 2023 assessment. The 2025 and 2026 ABCs using F_{ABC} from this assessment model were lower than last year's projected 2025 ABC.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The 2024 eastern Bering Sea (EBS) bottom trawl survey model-based biomass estimate for yellowfin sole was 7% higher than the 2023 estimate. Spawning biomass estimated by Model 23.0 was 1.56 * B_{MSY}. Therefore, yellowfin sole continues to qualify for management under Tier 1a. The 1978-2018 age-1 recruitments and the corresponding spawning biomass estimates were used to fit the stock recruitment curve and determine the Tier 1 harvest recommendations. Tier 3 estimates were also calculated, which is typical for this assessment. This assessment updates last year's model with total and spawning biomass estimates for 2025 that are lower than the 2023 estimates for 2025. This year's recommended ABC and OFL are lower than the 2023 assessment, coincident with a decrease in the overall model-based survey biomass estimates from last year's estimates.

Status determination

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

5. Greenland turbot

Status and catch specifications (t) of Greenland turbot in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and

ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-1+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	53,907	4,645	3,960	3,960	1,272
	2024	50,278	3,705	3,188	3,188	769
	2025	37,615	2,598	2,013		
	2026		2,059	1,594		
Eastern Bering Sea	2023			3,338	3,338	793
	2024			2,687	2,687	464
	2025			1,697		
	2026			1,344		
Aleutian Islands	2023			622	622	479
	2024			501	501	305
	2025			316		
	2026			250		

Changes from previous assessment

New data for the assessment included the 2023 and 2024 NMFS shelf bottom trawl survey biomass estimates and size compositions and the Alaska Fisheries Science Center (AFSC) longline survey relative population numbers and size compositions for 2023. Length at age data from the 2022 and 2023 NMFS shelf bottom trawl survey were also available and were used in this assessment. Fishery catch estimates were updated and include a preliminary estimate for 2024. Data on fishery size composition from 2023 and 2024 from the trawl fishery were also included in the model. The Team supported the authors' recommended Model 16.4c for management, which is the recommended and approved model used in the last full assessment; therefore, changes were not made to the model and this is considered an update operational assessment. Alternative models were explored and are discussed in the chapter. The authors did not recommend any of the alternative models because of concerns about model stability and an increase in the retrospective pattern.

Spawning biomass and stock trends

The projected 2025 female spawning biomass is 23,999 t, which is a 18% decrease from last year's 2025 projection of 29,439 t. This decrease is due to continued declining survey biomass in the EBS shelf. Exploitation rates are generally low (≤5% since 2013), and catches are generally well below TACs. Between 2018 and 2023, an average of 36% of the TAC and 24% of ABC was caught in the fishery. Female spawning biomass is projected to continue to decrease to 22,061 t in 2026. The 2007-2009 recruitment classes appear to be fully integrated into the fishery, and overall, the stock is continuing its downward trend from the last several years. The 2024 EBS shelf survey showed a 15% reduction in survey biomass from the 2023 survey.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The $B_{40\%}$ value, using the mean recruitment estimated for the period 1978-2022 is 23,525 t. Because the projected spawning biomass in year 2025 is above $B_{40\%}$, Greenland turbot ABC and OFL levels will be determined under Tier 3a of Amendment 56. Based on information presented in the risk table (Level 3 for assessment considerations and Level 2 for population dynamics and fishery performance considerations), the authors recommended reducing the ABC below the maximum permissible values for 2025 and 2026 by 10%.

Area apportionment

The authors and Team recommend that apportionment of ABC between the EBS and the Aleutian Islands be based on the assumption that 15.7% of the biomass is in the Aleutian Islands. This is documented in the 2018 and 2020 assessments, and as in previous assessments, is based on unweighted averages of EBS slope and AI survey biomass estimates from the three most recent years in which both areas were surveyed (2010, 2012, and 2016). As in previous years, area apportionment of the OFL is not recommended.

Status determination

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

6. Arrowtooth flounder

Arrowtooth flounder are assessed quadrennially according to the stock assessment prioritization schedule. A forward projecting age structured model is the primary assessment tool for arrowtooth flounder, which qualifies as a Tier 3 stock. The assessment model is not run during an off-cycle year. During odd years, a harvest projection is presented with recommendations of harvest levels for the next two years for this species, using updated catch information in the projection model. The most recent full assessment was conducted in 2022 (Shotwell et. al, 2022). A full stock assessment document with updated assessment and projection model results is scheduled for November, 2026

Status and catch specifications (t) of arrowtooth flounder in recent years are below. The grayed-out text below the following table summarizes the 2022 assessment and the status and catch specifications (t) of arrowtooth flounder in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-1+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	929,274	98,787	83,852	15,000	6,948
	2024	921,062	103,280	87,690	14,000	9,915
	2025	908,977	104,428	88,683		
	2026		102,472	87,035		

Changes from previous assessment

There were no changes in the assessment methodology. Changes in the input data include:

1. Estimates of catch through October 14, 2022, for Bering Sea Aleutian Islands (BSAI).
2. Fishery size compositions for 2020 and 2021.
3. Biomass point-estimates and standard errors from the 2021 and 2022 eastern Bering Sea (EBS) shelf bottom trawl survey (BTS) and 2022 Aleutian Islands (AI) BTS.
4. Age data from the 2021 eastern Bering Sea shelf.
5. The recommended model did not include fishery size compositions prior to the start of the Observer Program (pre-1991), or fishery size compositions with fewer than 300 samples, or Aleutian Islands survey data prior to the standardization of the survey (pre-1991).

Spawning biomass and stock trends

The projected age 1+ total biomass for 2023 is 929,274 t, which is a slight decrease from the 914,915 t projected for 2023 in last year's assessment. The projected female spawning biomass for 2023 is 514,577 t, which is a slight decrease from last year's 2023 estimate of 528,725 t. Overall, this stock increased steadily from 1985 to 2009, dipped slightly until 2017 and then increased to current levels that are similar to the 2009 time series peak.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock. Arrowtooth flounder therefore qualifies for management under Tier 3. The point estimates of $B_{40\%}$ and $F_{40\%}$ from this year's assessment are 224,487 t and 0.146. The projected 2023 spawning biomass is well above $B_{40\%}$, so ABC and OFL recommendations for 2023 were calculated under sub-tier "a" of Tier 3. The authors recommend setting F_{ABC} at the $F_{40\%}$ level, which is the maximum permissible level under Tier 3a, resulting in 2023 and 2024 ABCs of 83,852 t and 87,511 t, respectively. Projected harvesting at $F_{35\%}$ (0.174) gives 2023 and 2024 OFLs of 98,787 t and 103,070 t respectively.

Status determination

Arrowtooth flounder is a lightly exploited stock in the BSAI. Arrowtooth flounder is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

7. Kamchatka flounder

Status and catch specifications (t) of Kamchatka flounder in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-2+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	121,977	8,946	7,579	7,579	6,926
	2024	119,565	8,850	7,498	7,498	4,913
	2025	106,850	8,019	6,800		
	2026		7,790	6,606		

Changes from previous assessment

Changes to the input data include:

1. Estimates of catch were updated for all years.
2. The 2024 catch was estimated using an expansion factor of 1.03 that was derived from the 5-yr average proportion of Kamchatka flounder caught as of September 23rd.
3. The 2023 fishery length composition data were added to the assessment.
4. The 2023 and 2024 EBS shelf bottom trawl survey biomass and length composition estimates were added to the assessment.
5. The 2024 Aleutian Island bottom trawl survey biomass and length composition estimated were added to the assessment.

No changes were made to the assessment model methodology.

Spawning biomass and stock trends

The projected 2025 female spawning biomass is 44,883 t, above the $B_{40\%}$ level of 34,300 t, and spawning biomass is projected to remain above $B_{40\%}$ for the foreseeable future. The decreasing biomass and biomass trend scaling lower than the 2022 assessment correspond to fitting a lower survey biomass. The addition of the new survey data does result in an overall decrease in the spawning stock biomass, total biomass, numbers, and age-2 recruits trends through time, particularly after 2010.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

This stock was managed under Tier 3 for the first time in 2014. As noted above, projected spawning biomass for 2025 is above $B_{40\%}$, placing Kamchatka flounder in sub-tier "a" of Tier 3. For the 2025 fishery, the authors and Team recommend setting 2025 ABC at the maximum permissible value of 6,800 t from the projection model. This value is a decrease of 8% from the 2025 ABC currently specified (7,360 t). The recommended 2025 OFL is 8,019 t, a 8% decrease from the 8,687 t currently specified for 2025. The author listed the assessment-related considerations as a Level-2 area of concern due to degrading model

fit to the survey biomass and higher retrospective pattern from the previous model. However, the Team did not recommend any reductions from the maximum permissible ABC.

Status Determination

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

8. Northern rock sole

Status and catch specifications (t) of northern rock sole in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-6+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	941,359	166,034	121,719	66,400	26,907
	2024	1,121,670	197,828	122,091	66,000	29,137
	2025	881,154	165,444	157,487		
	2026		166,220	158,225		

Under the flatfish exchange the northern rock sole TAC was increased by 400 t in 2023.

Changes from previous assessment

This stock assessment is on a two-year cycle, thus any data that became available after the 2022 full stock assessment was added to the models for consideration this September. New data include:

1. Catch biomass through October 1, 2024
2. 2023 catch biomass was updated to reflect October – December 2023 catches
3. 2022 and 2023 fishery age composition data
4. 2022 and 2023 survey age composition data
5. 2022 and 2023 survey weight-at-age estimates
6. 2023 and 2023 fishery weight-at-age estimates
7. 2023 and 2024 Eastern Bering Sea (EBS) shelf survey biomass

A new model (Model 24.2) was proposed that is a substantial change from the previously accepted model (Model 18.3). Model 24.2 is a minor modification of Model 22.2, which was brought forward in November 2022 and therefore, not available for review for harvest specifications. Model 22.2 was used for determining the reduction from maximum permissible ABC for the 2023 harvest specifications. Model 24.2 is similar to Model 22.2 except it uses input sample sizes for survey age compositions derived using the bootstrap approach, and subsequently applies Francis data weighting.

Spawning biomass and stock trends

Spawning biomass has an increasing trend from the model start in 1975 through 2003 when it peaked at 650,900 t and then dropped to a low of 399,977 in 2008 before increasing again to 619,715 t in 2015. The stock has been steadily decreasing from 2015 to 2023 down to 254,160 t, but shows a slight uptick to 271,988 t in 2024. Recruitment was maintained at near historic lows for several consecutive years from 2008 to 2014. More recently a pulse of recruits has begun to appear in the surveys including strong year classes from 2014 to 2020; however there is a lot of uncertainty regarding the true strength of these year classes. The stock assessment model projects a 2025 female spawning biomass of 301,051 t, an 13.4% decrease from the previous 2025 female spawning biomass estimate of 347,811t. The projected spawning biomass for 2026 is 330,774 t. Exploitation rates are relatively low and recent catches have typically been well below TACs.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has determined that northern rock sole qualifies for management under Tier 1. Spawning biomass for 2025 is projected to be well above the B_{MSY} estimate of 183,756 t, placing northern rock sole in sub-tier "a" of Tier 1. The Tier 1 2025 and 2026 maxABCs are 157,487 t and 158,225 t respectively.

Status determination

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

9. Flathead sole

Status and catch specifications (t) of flathead sole in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-3+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	606,522	79,256	65,344	35,100	8,759
	2024	609,488	81,605	67,289	35,500	12,017
	2025	801,418	101,621	83,807		
	2026		106,283	87,700		

Under the flatfish exchange the flathead sole TAC was reduced by 400 t in 2023

Changes from previous assessment

The following changes were made in the input data:

1. bottom trawl survey biomass for years 2021-2024;
2. survey length composition data for years 2021-2024;
3. conditional age-at-length data from the bottom trawl survey for years 2021-2023;
4. marginal fishery length compositions from 2020-2023 (though only 2022 and 2023 are included in the likelihood);
5. marginal fishery age compositions from 2020 and 2021. The Age and Growth program was not able to provide marginal fishery age compositions for more recent years due to staffing shortages;
6. replacement of the input sample sizes for survey compositional data with values obtained from the surveyISS package version 1.0.0 (previously, the number of hauls or the nominal sample size [number of otoliths] were used for marginal lengths and conditional age-at-length data respectively).

The proposed assessment methodology was the same as the most recent full assessment conducted in 2020 (Monnahan and Haehn 2020), with the small change that the projection model was updated to the latest version of spm and the recruitment time series passed to the projections now begins in 1977 for consistency with other assessment workflows (previously the entire time series from 1964 onwards had been used). The Team concurred with the authors' recommendation.

Spawning biomass and stock trends

Spawning biomass and Age 3+ biomass have followed decadal-scale fluctuations as they decreased from the beginning of the estimates in the the 1960s to the early 1980s, increased from the the early 1980s to the late 1990s, decreased from the late 1990s to the late 2010s, and have been increasing since then. Spawning biomass and age 3+ biomass are projected to increase slightly in 2025. Recruitment has been more variable than biomass with more frequent periods of increases and decreases, and is projected to increase slightly in 2025.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, thereby qualifying flathead sole for management under Tier 3. The current values of these reference points are $B_{40\%}$=97,315 t, $F_{40\%}$=0.40, and $F_{35\%}$=0.49. Because projected spawning biomass for 2025 (204,323 t) is above $B_{40\%}$, flathead sole is in Tier 3a. The authors and Team recommend setting ABCs for 2025 and 2026 at the maximum permissible values under Tier 3a, which are 83,807 t and 87,700 t, respectively. The 2025 and 2026 OFLs under Tier 3a are 101,621 t and 106,283 t, respectively.

Status determination

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

10. Alaska plaice

Status and catch specifications (t) of Alaska plaice in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-3+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	461,992	40,823	33,946	17,875	15,018
	2024	473,125	42,695	35,494	21,752	10,091
	2025	406,051	34,576	28,745		
	2026		33,965	28,230		

The Alaska Plaice TAC was increased in NMFS in-season management by 375 t to 17,875 in 2023

Changes from previous assessment

In accordance with the approved schedule, a full assessment was conducted for Alaska plaice this year. Changes in the input data include:

1. Updated catch estimates from 2022-2024 (2024 catch data as of November 11, 2024, the remaining catch in 2024 is estimated by assuming the weekly catch in the remaining 12 weeks equals the average catch from the three weeks prior to November 11)
2. Included new biomass index estimates from the 2024 EBS shelf bottom trawl survey.
3. Included new length-composition data from 2022-2024 from the EBS shelf bottom trawl survey.
4. Updated length-composition data from 2000, 2002-2007 and 2021-2024 from the fishery.

Changes in the assessment methodology include:

1. Assessment model transitioned to Stock Synthesis versions 3.30.22.
2. Updated each year's input sample size for the survey age- and length- composition data using a general bootstrap framework implemented in the "surveyISS" Rpackage.
3. Included age-1 and age-2 fish in the fishery and survey age-composition data.
4. Adjusted the maximum age for linear growth from age-1 to age-3 and estimated all growth parameters except the coefficients of variances (CVs).
5. Updated the growth CVs for both males and females with new values determined through likelihood profiles.
6. Updated the length-weight relationship parameter values by estimating them externally using the fishery and survey length-weight data available to 2024.
7. Calculated weight-at-age relationship within SS3.
8. Tuned the variance for the recruitment deviations through SS3.

The survey biomass estimate for 2024 (338,621 t) was 5% lower than the 2023 estimate and is the second lowest value in the survey time series next to 2021 (327,810 t). Similarly, model estimates of female spawning biomass (147,511 t in 2024) continued their decline since 2013. In contrast, model estimates of total biomass (392,468 t in 2024) show an increasing trend since 2021. These results are likely due to estimates of relatively strong recruitment since 2014, a pattern which began to emerge in the 2019 assessment. The Alaska plaice stock is projected to remain above the $B_{35\%}$ level of female spawning biomass while declining over the next several years. Alaska plaice continue to be found in high abundance in the northern Bering Sea (NBS) and the 2021 NBS estimate (344,578 t) exceeded the EBS estimate for the first time. Note that there was no NBS survey in 2024.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

Reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, therefore qualifying it for management under Tier 3. The current estimates are $B_{40\%}$ = 118,563 t, $F_{40\%}$ = 0.140, and $F_{35\%}$ = 0.170. Given that the

projected 2025 spawning biomass of 150,892 t exceeds $B_{40\%}$, the ABC and OFL recommendations for 2025 were calculated under sub-tier "a" of Tier 3. Projected harvesting at the $F_{40\%}$ level gives a 2025 ABC of 28,745 t and a 2026 ABC of 28,230 t. The recommended Tier 3a OFLs are 34,576 t and 33,965 t for 2025 and 2026, respectively.

Status determination

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

11. Other Flatfish Complex

The Bering Sea/Aleutian Islands other flatfish complex has typically included those flatfish besides northern rock sole, yellowfin sole, arrowtooth flounder, Kamchatka flounder, Greenland turbot, flathead sole, and Alaska plaice. The complex includes over a dozen species of flatfish. Status and catch specifications (t) of other flatfish complex in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Biomass	OFL	ABC	TAC	Catch
BSAI	2023	146,679	22,919	17,189	4,500	2,994
	2024	141,325	22,919	17,189	4,500	3,071
	2025	164,955	26,083	19,562		
	2026		26,083	19,562		

Changes from previous assessment

The following changes were made to the input data:

1. The 2020 catch was updated, catches for 2021, 2022, and 2023 included, and 2024 catch which was pulled on 21 October 2024 was included in the assessment.
2. The 2021, 2022, 2023 and 2024 Eastern Bering Sea shelf survey and 2022 and 2024 Aleutian Islands survey biomass estimates for other flatfish species were added to the assessment.

The REMA modeling framework was adopted in 2024, which extends usage from the previous RE model in ADMB.

Spawning biomass and stock trends

EBS shelf survey biomass estimates for this complex are highly variable but were all below 100,000 t from 1983-2003, and ranged widely between 2004 to 2024 between 69,911 t in 2015 to a high of 212,920 t in 2017. The 2024 survey estimated the biomass to be at 135,788 t. Exploitation rates based on the REMA model estimates of biomass for the most abundant species in the other flatfish complex are generally low, between 0.2 and 7.5% Exploitation rates for Dover sole have increased in the last few years, but remain within historical bounds, while rates for rex sole and starry flounder have remained steady. The estimated exploitation rates for butter sole are higher, due to very low and variable survey biomass estimates. However, the biomass estimates for butter sole have large sampling variances, with coefficients of variation ranging from 0.26 to 0.83 in recent EBS trawl surveys, and large swings in estimates of biomass and thus exploitation rates. For instance, estimated biomass went from 283.2 t in 2016 to 19,507.5 t in 2019, and the corresponding exploitation rates were 25% and 1%. The actual amount of estimated butter sole caught is relatively consistent and averages 210 t from 2014-2024.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has classified other flatfish as a Tier 5 species complex with harvest recommendations calculated from estimates of biomass and natural mortality. Natural mortality rates for rex (0.17) and Dover sole (0.09) borrowed from the Gulf of Alaska are used, along with a value of 0.15 for all other

species in the complex. The resultant 2025 and 2026 OFLs and ABCs are 26,083 t and 19,562 t respectively. The Team concurred with the Authors' recommended methods and use of the REMA model.

Status determination

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

12. Pacific ocean perch

Status and catch specifications (t) of Pacific ocean perch in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-3+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	888,722	50,133	42,038	37,703	34,720
	2024	871,892	49,010	41,096	37,626	34,894
	2025	847,803	44,594	37,375		
	2026		43,084	36,578		
Eastern Bering Sea	2023			11,903	11,903	10,196
	2024			11,636	11,636	9,742
	2025			10,121		
	2026			9,905		
Eastern Aleutian Islands	2023			8,152	8,152	7,255
	2024			7,969	7,969	7,594
	2025			6,278		
	2026			6,144		
Central Aleutian Islands	2023			5,648	5,648	5,461
	2024			5,521	5,521	5,250
	2025			5,559		
	2026			5,441		
Western Aleutian Islands	2023			16,335	12,000	11,807
	2024			15,970	12,500	12,308
	2025			15,417		
	2026			16,058		

Changes from previous assessment

This chapter was presented as an operational full assessment.

The following changes were made in the input data:

1. Catch data was updated through 2023, and total catch for 2024 was projected.
2. The 2024 Aleutian Islands (AI) survey biomass estimate and length composition, and 2022 AI survey age composition, were included in the assessment.
3. The 2023 fishery age composition and 2022 fishery length composition were included in the assessment.

4. The input multinomial sample sizes for the age and length composition data were reweighted using the McAllister-Ianelli iterative reweighting procedure.

The following changes were made in the assessment methodology:

1. A prior distribution is used for AI trawl survey catchability (lognormal distribution, mean =1, CV = 0.15). This restores a catchability prior distribution used in earlier BSAI POP assessments.
2. The penalty parameter for dome-shapedness in the bicubic spline for fishery selectivity was increased from 10 to 30.

Spawning biomass and stock trends

The high survey biomass estimates over the past fourteen years have contributed to a substantial increase in estimated stock size in recent years; however, there remains a poor residual pattern in the fit to the AI survey index. The 2024 AI survey biomass estimate is a 7% decrease from the 2022 AI survey biomass estimate. Spawning biomass is projected to be 352,503 t in 2025 and decline to 344,463 t in 2026. The recent year classes of 2011-2012, 2014, and 2016 appear to be relatively strong, but the retrospective analysis suggests that recruitment estimates for these year classes may not have stabilized.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, thereby qualifying POP for management under Tier 3. The updated point estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ are 272,552 t, 0.060, and 0.072, respectively. Spawning biomass for 2025 (352,503 t) is projected to exceed $B_{40\%}$, thereby placing Pacific ocean perch in sub-tier "a" of Tier 3. The maximum permissible value of F_{ABC} under Tier 3a is 0.060, which results in the author and Team recommended 2025 ABC of 37,375 t and 2026 ABC of 36,578 t. The OFL fishing mortality rate is 0.072 which results in a 2025 OFL of 44,594 t and 2026 OFL of 43,084 t. There is no recommended reduction from maximum permissible ABC. The author noted an elevated risk in Assessment Considerations (Level 2) due to the strong retrospective pattern, however the author did not recommend a reduction to the ABC due to the current high abundance estimates.

Area apportionment

The Team agreed with the author's recommendation that ABCs be set regionally based on a random effects model to smooth the time series of subarea survey biomass to obtain the proportions as follows (values are for 2025): EBS = 10,121 t, Eastern Aleutians (Area 541) = 6,278 t, Central Aleutians (Area 542) = 5,559 t, and Western Aleutians (Area 543) = 15,417 t. The recommended OFLs are not regionally apportioned.

Status determination

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

13. Northern rockfish

Northern rockfish are assessed biannually according to the stock assessment prioritization schedule. A forward projecting age structured model is the primary assessment tool for northern rockfish, which qualifies as a Tier 3 stock. The assessment model is not run during an off-cycle year. During even years, a harvest projection is presented with recommendations of harvest levels for the next two years for this species, using updated catch information in the projection model. The most recent full assessment was conducted in 2023 (Spencer and Laman 2023). A full stock assessment document with updated assessment and projection model results is scheduled for November, 2026.

Status and catch specifications (t) of northern rockfish in recent years are below. The grayed-out text below the following table summarizes the 2023 assessment and the status and catch specifications (t) of northern rockfish in recent years. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-3+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	277,133	22,776	18,687	11,000	10,433
	2024	297,189	23,556	19,274	16,752	8,775
	2025	292,807	22,848	18,694		
	2026		22,284	18,232		

Changes from previous assessment

Changes in the input data:

1. Catch data was updated through 2022, and total catch for 2023 was projected.
2. The 2022 Aleutian Island survey age composition, the 2021 fishery age composition data, and the 2022 fishery length composition data were included in the assessment.
3. The 2022 Aleutian Island survey biomass estimate was included in the assessment.
4. The ageing error matrix was updated.

Changes in the Assessment Methodology:

1. There were no changes to the assessment methodology.

Spawning biomass and stock trends

The estimated survey biomass for Northern rockfish shows an increasing trend, starting at 91,159 t in 1977 and increasing to a peak of 256,819 t in 2014, and declining to 236,604 t in 2023. The estimated total biomass shows a similar trend, increasing to a peak value of 343,230 t in 2014, and the estimated spawning biomass increases from 55,180 in 1977 to its highest value of 151,130 in 2015.

A relatively high fishing mortality rate in 1977 is estimated to account for the relatively high catch in this year, followed by very low levels of fishing mortality during the 1980s when catch was small. Fishing mortality rates began to increase during the early 1990s, and declined from the late 1990s to 2014. Fishing mortality rates have increased since 2014, and the 2023 estimate of 0.034 is the largest F in the estimated time series beginning in 1977. The stock is currently below F35% and above B40%.

For recruitment, relatively strong year classes are observed in 1984-1985, 1989, 1993, 1995-1998, and 2005, reflecting several of the strong year classes observed in the age composition input data. Most of these estimated strong year classes are larger than their estimates in the 2021 assessment, and years adjacent to the strong year classes are often smaller than estimated in the 2021 assessment (for example, the 1985, 1989, and 2005 year classes). This reflects the influence of the updated ageing error matrix; the greater uncertainty in the observed ages allows stronger recruitments which will be distributed to a greater degree to adjacent observed ages. There is substantial variability in the relationship between recruitment and spawning stock size.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, thereby qualifying northern rockfish for management under Tier 3. The author recommended Model 21 with no reductions from maximum permissible ABC and the Team agreed with the author's recommendation.

Status determination

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

14. Blackspotted and rougheye rockfish

Status and catch specifications (t) of blackspotted and rougheye rockfish in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	age-3+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	25,400	703	525	525	523
	2024	25,859	761	569	569	616
	2025	29,758	838	706		
	2026		902	766		
Western/Central Aleutian Islands	2023			166	166	316
	2024			181	181	439
	2025			298		
	2026			325		
Eastern AI/Eastern Bering Sea	2023			359	359	207
	2024			388	388	177
	2025			408		
	2026			441		

*The total biomass is from an AI age-structured model and survey biomass estimates from the EBS.

Changes from previous assessment

Fish previously referred to as rougheye rockfish are now recognized as consisting of two species, rougheye rockfish (*Sebastes aleutianus*) and blackspotted rockfish (*Sebastes melanostictus*) (Orr and Hawkins 2008). Bering Sea/Aleutian Islands blackspotted/rougheye rockfish is assessed with an age-structured model for the Aleutian Islands portion of the stock, and a non-age-structured model for the eastern Bering Sea portion of the stock. The last full assessment for BSAI blackspotted/rougheye rockfish was presented to the Plan Team in 2022.

The following changes were made to blackspotted/rougheye assessment relative to the November 2022 SAFE:

Changes in the input data:

1. Catch data was updated through 2023, and total catch for 2024 was projected.
2. The 2024 AI survey biomass estimate and length composition were included in the assessment.
3. The 2022 AI survey length composition was replaced by the 2022 AI survey age composition.
4. The 2023 fishery age compositions and 2022 fishery length compositions were included in the model.
5. The input multinomial sample sizes for the age and length composition data were reweighted using the Francis iterative reweighting procedure.

There were no changes in the methodology for the recommended model except that unlike the 2022 assessment the very large 2011 year class, not the 2010 year class as in the 2022 assessment, was reduced by setting it to the next largest year class to reduce large changes in the reference points (e.g. $B_{40\%}$).

Spawning biomass and stock trends

Since 2005, spawning biomass has increased from 2,704 t to 3,554 t in 2024, and the total biomass has increased from 10,533 t to 27,665 t over this period. The more rapid recent increase of total biomass relative to spawning biomass reveals that much of this increase can be attributed to relatively recent year classes that have not fully matured, particularly the 2011 year-class that is just beginning to mature.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The stock assessment is separated into AI and EBS. For the AI, this stock qualifies for management under Tier 3 due to the availability of estimates for $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ and qualifies as Tier 3a. The EBS stock is managed under Tier 5 with a projected biomass of 1,444 t applied to both 2025 and 2026.

A risk table was completed for this stock with Level 2 ratings for assessment-related considerations, population dynamics considerations, and fishery performance considerations, and Level 1 for ecosystem considerations. No adjustment to maximum permissible ABC was proposed.

The authors and Team recommend an overall 2025 and 2026 ABCs of 706 t and 766 t and 2025 and 2026 OFLs of 838 t and 902 t. The apportionment of the 2025 ABC to subareas is 298 t for the Western and Central Aleutian Islands and 408 t for the eastern Aleutian Islands and eastern Bering Sea.

Area apportionment

Ongoing concerns about fishing pressure relative to biomass in the Western Aleutians have been noted by the Team. This concern has been heightened by the fact that the overall BSAI ABC was exceeded in 2023 and local ABCs exceeded in the Western and Central Aleutian Islands every year since 2019, including 2024. The maximum subarea species catch (MSSC) levels within the WAI/CAI, based on the random effects model, are as follows:

	WAI	CAI
2025 MSSCs	100	198
2026 MSSCs	109	216

Status determination

The BSAI blackspotted and rougheye stock complex is not being subjected to overfishing. For the AI region, the blackspotted and rougheye rockfish complex is not overfished, and is not approaching an overfished condition. It is not possible to determine whether the complex in the EBS region is overfished or whether it is approaching an overfished condition because it is managed under Tier 5.

15. Shortraker rockfish

Status and catch specifications (t) of shortraker rockfish in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Biomass	OFL	ABC	TAC	Catch
BSAI	2023	23,547	706	530	530	224
	2024	23,547	706	530	530	149
	2025	21,018	631	473		
	2026		631	473		

Changes from previous assessment

The following changes were made in the input data:

1. Catch data have been revised and updated through October 22, 2024.
2. 2024 AI bottom trawl survey biomass estimate (BTS).
3. 2023 AFSC longline survey (LLS) relative population weights (RPWs) on the eastern Bering Sea (EBS) slope. The EBS slope is sampled by the LLS in odd years.
4. Length compositions from the 2023 fishery.
5. Length compositions from the 2023 and 2024 AI bottom trawl survey and the 2023 longline survey.

This is an update operational stock assessment, there are no changes to assessment methodology.

Spawning biomass and stock trends

Estimated shortraker rockfish biomass in the BSAI slowly decreased from 1994 to 2014 and remained relatively stable to 2024. Survey biomass estimates decreased in all three regions of the AI in 2024 compared to 2022. Relative population weights have been variable over time in the EBS slope portion of the longline survey (LLS) with an increase in 2019 followed by decreases in 2021 and 2023. Exploitation rates have generally been well below the ABC levels, however the ABC was exceeded in 2013 and had been close to ABC in 2021.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has previously determined that reliable estimates of only biomass and natural mortality exist for shortraker rockfish, qualifying the species for management under Tier 5. The Team recommends basing the biomass estimate on the random effects model. The Team recommended setting F_{ABC} at the maximum permissible level under Tier 5, which is 75 percent of M. The accepted value of M for this stock is 0.03 for shortraker rockfish, resulting in a $maxF_{ABC}$ value of 0.0225. The ABC is 473 t for 2025 and 2026 and the OFL is 631 t for 2025 and 2026.

Status determination

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

16. Other rockfish complex

Status and catch specifications (t) of the other rockfish complex in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through -November 11, 2024.

Area	Year	Survey biomass	OFL	ABC	TAC	Catch
BSAI	2023	52,733	1,680	1,260	1,260	1,179
	2024	52,733	1,680	1,260	1,260	1,337
	2025	40,559	1,406	1,054		
	2026		1,406	1,054		
Eastern Bering Sea	2023			880	880	618
	2024			880	880	770
	2025			639		
	2026			639		
Aleutian Islands	2023			380	380	560
	2024			380	380	568
	2025			415		
	2026			415		

Changes from previous assessment

The following are changes in the input data for this assessment:

1. Catch updated through September 28, 2024 (accessed October 1, 2024).
2. The 2024 AI bottom trawl survey (BTS) biomass estimates for both SST and non-SST species.
3. The 2023 and 2024 Eastern Bering Sea (EBS) shelf BTS biomass for non-SST species.
4. The 2023 NMFS longline survey (LLS) relative population weights (RPWs) for SST on the EBS slope.

5. Database updates resulted in new survey biomass and error estimates for the following non-SST species/species groups in the AI BTS: black rockfish, broadfin thornyhead, redstripe rockfish, silvergray rockfish, rockfish unid., and thornyhead unid.
6. Database updates resulted in new survey biomass and error estimates for the followingnon-SST species/species groups in the EBS shelf BTS: darkblotched rockfish and rockfish unid.

This is an update assessment, and therefore there are no changes to the assessment methods. The recommended model is Model 22 (Sullivan et al. 2022a).

Spawning biomass and stock trends

This is a Tier 5 complex, thus trends in spawning biomass are unknown. The random effects survey biomass estimates for shortspine thornyhead (SST) in the Aleutian Islands and EBS slope have been variable. The non-SST portion of the complex varies dramatically among surveys. Biomass estimates are frequently zero or very small for the non-SST portion of the complex in both the eastern Bering Sea slope and shelf surveys.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The Team agrees with the approach recommended by the author of setting F_{ABC} at the maximum allowable under Tier 5 ($F_{ABC} = 0.75M$). The accepted values of M for species in this complex are 0.03 for SST and 0.09 for all other species. Multiplying these rates by the best biomass estimates of shortspine thornyhead and the non-SST portion of the complex yields 2025 and 2026 ABCs of 639 t in the eastern Bering Sea and 415 t in the Aleutian Islands. The Team recommends that OFL be set for the entire BSAI area, which under Tier 5 is calculated by multiplying the best estimates of total biomass for the area by the separate natural mortality values and adding the results, yielding an OFL of 1,406 t for 2025 and 2026. The assessment defined increased assessment, population, and fishery considerations risk levels in the risk table but did not recommend a reduction from the maxABC.

Status determination

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

17. Atka mackerel

Status and catch specifications (t) for Atka mackerel in recent years are shown below. Biomass for each year corresponds to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age 1+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	615,027	118,787	98,588	69,282	65,527
	2024	625,578	111,684	95,358	72,987	71,937
	2025	627,115	122,622	103,247		
	2026		107,889	92,361		
E Aleutian Islands/EBS	2023			43,281	27,260	23,776
	2024			41,723	32,260	31,530
	2025			46,650		
	2026			41,731		
Central Aleutian Islands	2023			17,351	17,351	17,210
	2024			16,754	16,754	16,616
	2025			26,511		
	2026			23,716		
Western Aleutian Islands	2023			37,956	24,671	24,541
	2024			36,882	23,973	23,791
	2025			30,087		
	2026			26,914		

Changes from previous assessment

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

1. Catches have been updated through 2023 and estimated total catch for 2024 was set equal to the TAC of 72,987 t.
2. The 2024 AI bottom trawl survey biomass estimate was added.
3. The 2022 AI bottom trawl survey age composition data were added.
4. The 2022 and 2023 fishery age composition data were added.
5. The estimated average selectivity for 2019-2023 was used for projections.
6. Projected catches for 2025 and 2026 are 87,760 t and 78,507 t, respectively. It was assumed that approximately 85% of the BSAI-wide ABC is likely to be taken under the revised Steller Sea Lion Reasonable and Prudent Alternatives (SSL RPAs) implemented in 2015. This percentage was applied to the 2025 and 2026 maximum permissible ABCs, and those reduced amounts were assumed to be caught in order to estimate the 2025 and 2026 ABCs and OFL values.

There were no changes in the model configuration.

Spawning biomass and stock trends

Spawning biomass in 2005 was at the highest level since 1983, after which it decreased through 2013, increased through 2017, and subsequently decreased through 2022 although with a slight uptick in 2023 and 2024. Continued decline is projected for 2025 and 2026 (the estimated spawning biomass in 2025 is projected to be roughly 46% of what it was in 2005). Age 1+ biomass is variable in recent years with a 4.0% increase from 2023 to 2024. Some strong recruitment in the early 2000s was followed by above average recruitment in 2006, 2007, 2012, and 2017. The projected female spawning biomass for 2025

(119,853 t) is projected to be above $B_{40\%}$ (105,894 t), and the stock is projected to drop slightly below $B_{40\%}$ through 2027.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The projected female spawning biomass under the recommended harvest strategy is estimated to be above $B_{40\%}$, thereby placing BSAI Atka mackerel in Tier 3a. The projected 2025 yield (ABC) at F_{ABC} = 0.53 is 103,247 t, up 8.3% from the 2024 ABC and substantially greater than last year's projected ABC for 2025. The projected 2025 overfishing level at F_{OFL} = 0.64 is 122,622 t, up 9.8% from the 2024 OFL and up substantially from last year's projected OFL for 2025.

A risk table was completed for this stock with Level 1 ratings for assessment-related considerations, population dynamics considerations, and fishery performance considerations, and Level 2 for ecosystem considerations. No adjustment to maximum permissible ABC was proposed.

Area apportionment

A random effects model method was used to apportion ABC among areas. The recommended ABC apportionments by subarea for 2025 are 46,650 t for Area 541 and the EBS region (a 11.8% increase from 2024), 26,511 t for Area 542 (a 58.2% increase from 2024), and 30,087 t for Area 543 (a 18.4% decrease from 2024).

Status determination

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

18. Skates

The Bering Sea and Aleutian Islands (BSAI) skate stock complex is managed in aggregate, with a single set of harvest specifications applied to the entire complex. However, to generate the harvest recommendations the stock is divided into two units. Harvest recommendations for Alaska skate *Bathyraja parmifera*, the most abundant skate species in the BSAI, are made using the results of an age-structured model and are managed under Tier 3. The remaining species (Other skates) are managed under Tier 5 due to a lack of data. The Tier 3 and Tier 5 recommendations are combined to generate recommendations for the complex as a whole.

BSAI skates are assessed on a biennial stock assessment schedule. An operational assessment is conducted in even years, and in odd years a harvest projection is produced.

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 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Age-0+ Biomass	OFL	ABC	TAC	Catch
BSAI	2023	580,701	46,220	38,605	27,441	24,605
	2024	584,499	45,574	37,808	30,519	24,934
	2025	567,684	44,086	36,523		
	2026		43,285	35,833		

Changes from previous assessment

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

1. Catch data have been updated through October 1, 2023. Total catch for 2023 was estimated by the mean proportion of catch occurring after October 1 over the last 5 years.
2. The time series of eastern Bering Sea (EBS) shelf bottom trawl survey biomass estimates from 2000 – 2019 were updated to reflect updates to the design-based estimator.
3. 2022 Aleutian Islands (AI) and 2021 – 2023 EBS bottom trawl survey data were included.
4. Survey length compositions from the 2021-2023 EBS shelf bottom trawl survey were included.

5.

There were no substantive changes to the assessment methodology. For the Tier 5 Other Skate component, the total biomass was estimated using the *rema* framework, but since the previous assessment also used a random effects model to estimate biomass, this is not considered a change to the methodology, as only the framework changed. For the Tier 3 Alaska Skate, there were 2 minor changes introduced in addition to the new data. However, as noted these were not considered a change to the methodology:

1. Modeling framework was updated to SS3 v3.
2. Updated historical data including changes to EBS shelf survey biomass (2000 – 2019), and minor changes to catch time series.

Spawning biomass and stock trends

Other skates (Tier 5 component): Biomass estimates in the EBS shelf have been trending upward since 2013 and are at a historic high for 2024, mostly driven by Big skates. In the AI, biomass has trended down since at least 2010. There is concern for the population of Leopard skates in the AI, as this rare, endemic species appears to be in decline. Biomass estimates in the EBS slope appear stable but are uncertain due to the lack of a slope survey in recent years.

Alaska skates (Tier 3 component): Spawning biomass of Alaska skate increased continuously from 2006 (198,418 t) through 2020 (284,268 t), and in 2020 was at an all-time high for the post-1976 environmental regime. The accepted model (14.2d) indicates a change to a decreasing trend since 2021, but estimates are still well above the long-term average. With lower recruitment in recent years as indicated in the assessment, spawning biomass is expected to decrease in the future. However, there is some indication that another new cohort may be beginning to recruit into the population.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The biomass estimates of the Tier 5 "other skates" component of the stock are based on a natural mortality rate of 0.10 and derived using the random effects model. The Team discussed the possibility of deriving different values of *M* for the various species within this component of the stock in the future but accepted the Tier 5 harvest specifications as presented noting this is an area for future work. The resulting ABCs for this portion of the stock is 9,858 t for both 2024 and 2025, and the resulting OFLs for this portion of the stock is 13,145 t for both 2024 and 2025.

For the Alaska skate portion, projected spawning biomass for 2024 (106,549 t) exceeds $B_{40\%}$ (69,152 t), so Alaska skates are managed in sub-tier "a" of Tier 3. The Alaska skate portions of the 2024 and 2025 ABCs are 27,950 t and 26,767 t, respectively, and the Alaska skate portions of the 2024 and 2025 OFLs are 32,429 t and 31,058 t. Other reference points for Alaska skates are $\max F_{ABC} = F_{40\%} = 0.080$ and $F_{OFL} = F_{35\%} = 0.093$.

In aggregate, the harvest recommendations for the BSAI skate stock complex are ABCs of 37,808 t and 36,625 t for 2024 and 2025, and OFLs of 45,574 t and 44,203 t for 2024 and 2025 respectively.

Status determination

Alaska skate, which may be viewed as an indicator stock for the complex, is not overfished and is not approaching an overfished condition. The skate complex is not being subjected to overfishing.

19. Sharks

In accordance with the approved schedule, a catch report was provided for the BSAI shark complex this year. However, a full stock assessment will be conducted in 2026. Until then, the values generated from the previous stock assessment (below) will be used for 2025-2026 specifications. Please refer to the previous stock assessment for details regarding the assessment model and trends. The grayed-out text below the following table summarizes the 2023 assessment and the status and catch specifications (t) of the BSAI shark complex in recent years. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Biomass	OFL	ABC	TAC	Catch
BSAI	2023	n/a	689	450	333	320
	2024	n/a	689	450	400	173
	2025	n/a	689	450		
	2026		689	450		

The Sharks TAC was increased by 83 t to 333 t by NMFS in-season management in 2023

Changes from previous assessment

This assessment was changed to a biennial cycle beginning with the 2014 assessment; this is a full assessment.

Changes to the input data in this analysis include:

1. Total catch for BSAI sharks is updated for 2003-2022 (as of Oct 8, 2022)

The authors presented alternative models for Pacific sleeper shark, other/unidentified sharks and spiny dogfish this year. However, these models were not accepted for management by the Team. Therefore, no changes were made to the methodology used for recommending harvest specifications.

Spawning biomass and stock trends

The main shark species taken in the BSAI fisheries (mainly pollock and Pacific cod) are Pacific sleeper sharks and salmon sharks. Beginning around 2000, catch rates of sleeper sharks in both the IPHC longline survey and the bycatch fisheries declined steeply for several years, causing possible concern about depletion. All sleeper sharks taken in the survey and fisheries are likely juveniles, so it is impossible to know what effect those catches have on spawning stock biomass. Bycatch of salmon sharks has generally increased since 2010. Recent catch levels have been well below the ABC.

Tier determination/Plan Team discussion and resulting ABCs and OFLs

The SSC has placed sharks in Tier 6, where OFL and ABC are typically based on historical catches. The OFL is fixed at the maximum catch during 2003–2015 (689 t) and ABC at 75% of OFL, 517 t. The author and PT recommended a reduction from the maximum ABC due to concerns regarding the Pacific sleeper shark stock as highlighted in the risk table. The recommended ABC is 450 t.

Status determination

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

20. Octopus

Through 2010, octopuses were managed as part of the Bering Sea/Aleutian Islands (BSAI) “other species” complex, along with sharks, skates, and sculpins. Historically, catches of the other species complexes were well below TAC. Due to increasing market values, retention of species within the other species complex increased. Beginning in 2011, an amendment to the BSAI fisheries management plan provided separate management for sharks, skates, sculpins, and octopus and set catch limits for each species group. Initially, catch limits for octopus were set using Tier 6 methods based on the maximum historical incidental catch rate. Since 2012, a methodology based on consumption of octopus by Pacific cod (*Gadus macrocephalus*) has been used to set catch limits (see Conners et al. (2016) for methodological details).

This year’s assessment is aa roll-over from last year’s assessment. At least eight species of octopus are found in the BSAI though in this update assessment, all octopus species are grouped into a single assemblage. The species composition of the octopus community is not well documented, but data indicate that the giant Pacific octopus (*Enteroctopus dofleini*) is the most common. Octopuses are taken as incidental catch in trawl, longline, and pot fisheries with a portion retained and sold for human consumption or bait. The BSAI trawl surveys produce highly variable biomass estimates for octopus

Status and catch specifications (t) of the octopus complex in recent years. The octopus stock complex is made up of at least nine distinct species and is assessed on even years. Biomass for each year corresponds

to the projection given in the SAFE report issued in the preceding year. The OFL and ABC for 2025 and 2026 are those recommended by the Team. Catch data are current through November 11, 2024.

Area	Year	Biomass	OFL	ABC	TAC	Catch
BSAI	2023		4,769	3,576	400	151
	2024		6,080	4,560	400	240
	2025		6,080	4,560		
	2026		6,080	4,560		

Changes from previous assessment
Changes in data input:

1. The calculation of annual and long-term average consumption rates has been updated using 13,614 additional Pacific cod stomach samples collected from 2012-2013 and 2016-2023.

Changes in Assessment Methodology:

There have been no changes to the assessment methodology

Spawning biomass and stock trends
Species composition and size frequencies from the surveys were similar to previous years. Survey biomass estimates decreased substantially from 2019 through 2023 (-54%) for the EBS shelf survey. A similar decline from 2018 to 2022 was observed in the AI survey (-32%). However, trawl surveys sample octopus poorly, and biomass estimates from trawl surveys are not considered reliable as they are highly variable between years.

At least eight species of octopus are found in the BSAI though in this update assessment, all octopus species are grouped into a single assemblage. The species composition of the octopus community is not well documented, but data indicate that the giant Pacific octopus (*Enteroctopus dofleini*) is the most common. Octopuses are taken as incidental catch in trawl, longline, and pot fisheries with a portion retained and sold for human consumption or bait. The highest catch occuring in the Pacific cod fishery.

Tier determination/Plan Team discussion and resulting ABCs and OFLs
The ABC and OFL values were determined under Tier 6. Usually, Tier 6 specifications are based on average catch, but starting in 2011, the assessment authors recommended setting harvest specifications using an alternative mortality estimate based on species composition of Bering Sea Pacific cod diet from 1984-2008 survey data and weight-at-age data. This method was also recommended for 2017 and 2018 with additional years from 1984-2015 of Pacific cod diet data based on the requested five-year review of Pacific cod diet estimates. This year's assessment is an operational update, meaning new consumption data was provided through 2023 to determine catch limits using the previous assessment's model/methodology.

A risk table was completed for this stock with Level 1 ratings for all four categories and no adjustment to maxABC was proposed.

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

Appendix 1. Forage Fish

The forage species ecosystem report for the Gulf of Alaska (GOA) and Bering Sea/Aleutian Islands (BSAI) regions is prepared jointly. This joint report is presented to the Plan Teams and Council in even years. The report is not a formal stock assessment; it is a presentation of the available data on trends in abundance and distribution of forage populations and a description of their interactions with federal fisheries through bycatch. Forage species are a fundamental component of the BSAI ecosystem, so there

is overlap between the information presented here and in the Ecosystem Considerations report (Eastern Bering Sea or Aleutian Islands).

The forage report primarily displays data from the BSAI bottom trawl surveys and two pelagic surveys in the northern and southeastern Bering Sea (NBS and SEBS, respectively). Primary fish caught in these surveys include age-0 Pacific cod, saffron cod, age-0 pollock, capelin , Pacific herring, and juvenile salmon. Estimated capelin abundance and biomass from the NMFS bottom trawl surveys appear to be decadal but recent densities were at or near all-time lows which is in agreement with low densities in the SEBS but contrasts with the 2nd highest density for the time series in the NBS. Eulachon are sampled more effectively in the benthic surveys and also have a decadal signal. Recent densities of eulachon were at or near all-time lows. Spatial distribution of herring between benthic and pelagic surveys differ possibly resulting from seasonal herring movement. Herring density has less of a decadal pattern and was above the long-term mean in the benthic surveys but among the lowest in the pelagic surveys. Magistrate armhook squid, most abundant in the Aleutian Islands bottom trawl survey near the slope with recent densities up slightly from those observed in the 2000s. Densities of all shrimp combined have trended upwards since the 1980s and peaked in the late-2000s. Pelagic forage fish CPUE remained low in the NBS, slightly decreasing from 2023 and CPUE in the SEBS has declined by 70% since 2022.

Osmerids regularly make up the vast majority of FMP forage fish group catches and eulachon are the most abundant osmerid catch. Osmerid and shrimp accounted for nearly all the incidental catch in 2024 and catches have been low relative to historical levels. Squid catches since 2019 have been twice the historical maximums. Prohibited species catch of herring is generally low declined in 2024 compared to 2023 to be slightly above the long-term mean. Most of the herring incidental catch occurs in the midwater trawls for pollock.

Appendix 2. Grenadiers

Grenadiers are managed as non-target species in the GOA and are taken only as bycatch when directed fishing for other species. In 2015, a final rule was issued adding the grenadier stock complex as an Ecosystem Component to the GOA and BSAI Fishery Management Plans (FMPs) under Amendments 100/91. No ABCs or OFLs are adopted in the annual groundfish harvest specifications. However, the abbreviated SAFE report for the BSAI was presented for tracking trends in abundance and catch. The new data for the BSAI grenadier report include 1) updated catch data through October 7, 2024, 2) survey biomass estimates from the 2022 and 2024 AI trawl survey, 3) survey index estimates from the 2022 AI longline survey, and 4) survey index estimates from the 2021 and 2023 EBS longline survey. Since the last grenadier complex assessment in 2020, there have been downward trends in the EBS and AI bottom trawl and longline surveys. In the EBS, a REMA model was used to estimate exploitable biomass from the slope bottom trawl survey and the longline survey. Biomass predicted for 2025 was the lowest in the time series. Catch levels in recent years were quite small relative to this biomass and do not cause any concern.

Tables

Table 1. BSAI Groundfish Plan Team Recommended OFLs and ABCs for 2025 and 2026 (metric tons); OFL, ABC, TAC and catch through November 11, 2024.

Species	Area	2024 OFL	2024 ABC	2024 TAC	Catch as of 11/11/2024	2025 OFL	2025 ABC	2026 OFL	2026 ABC
Pollock	BS	3,162,000	2,313,000	1,313,580	1,298,531	2,957,000	2,417,000	2,496,000	2,036,000
	AI	51,516	42,654	5,420	4,878	55,728	46,051	56,231	46,437
	Bogoslof	115,146	86,360	250	23	77,354	58,015	77,354	58,015
Pacific cod	BS	200,995	167,952	147,753	116,791	183,509	153,617	169,243	141,520
	AI	18,416	12,431	8,080	3,827	16,782	13,376	16,273	12,973
	BSAI/GOA	55,084	47,146	n/a		58,532	50,111	57,797	49,482
Sablefish	BS	n/a	11,450	7,996	5,326	n/a	13,898	n/a	13,723
	AI	n/a	13,100	8,440	1,152	n/a	12,175	n/a	12,022
Yellowfin sole	BSAI	305,298	265,913	195,000	81,307	299,247	262,557	305,039	267,639
Greenland turbot	BSAI	3,705	3,188	3,188	769	2,598	2,013	2,059	1,594
	BS	n/a	2,687	2,687	464	n/a	1,697	n/a	1,344
	AI	n/a	501	501	305	n/a	316	n/a	250
Arrowtooth flounder	BSAI	103,280	87,690	14,000	9,915	104,428	88,683	102,472	87,035
Kamchatka flounder	BSAI	8,850	7,498	7,498	4,913	8,019	6,800	7,790	6,606
Northern rock sole	BSAI	197,828	122,091	66,000	29,137	165,444	157,487	166,220	158,225
Flathead sole	BSAI	81,605	67,289	35,500	12,017	101,621	83,807	106,283	87,700
Alaska plaice	BSAI	42,695	35,494	21,752	10,091	34,576	28,745	33,965	28,230
Other flatfish	BSAI	22,919	17,189	4,500	3,071	26,083	19,562	26,083	19,562
Pacific Ocean perch	BSAI	49,010	41,096	37,626	34,894	44,594	37,375	43,084	36,578
	BS	n/a	11,636	11,636	9,742	n/a	10,121	n/a	9,905
	EAI	n/a	7,969	7,969	7,594	n/a	6,278	n/a	6,144
	CAI	n/a	5,521	5,521	5,250	n/a	5,559	n/a	5,441
	WAI	n/a	15,970	12,500	12,308	n/a	15,417	n/a	16,058
Northern rockfish	BSAI	23,556	19,274	16,752	8,775	22,848	18,694	22,284	18,232
Blackspotted/Rougheye Rockfish	BSAI	761	569	569	616	838	706	902	766
	BS/EAI	n/a	388	388	177	n/a	408	n/a	441
	CAI/WAI	n/a	181	181	439	n/a	298	n/a	325
Shortraker rockfish	BSAI	706	530	530	149	631	473	631	473
Other rockfish	BSAI	1,680	1,260	1,260	1,337	1,406	1,054	1,406	1,054
	BS	n/a	880	880	770	n/a	639	n/a	639
	AI	n/a	380	380	568	n/a	415	n/a	415
Atka mackerel	BSAI	111,684	95,358	72,987	71,937	122,622	103,247	107,889	92,361
	BS/EAI	n/a	41,723	32,260	31,530	n/a	46,650	n/a	41,731
	CAI	n/a	16,754	16,754	16,616	n/a	26,511	n/a	23,716
	WAI	n/a	36,882	23,973	23,791	n/a	30,087	n/a	26,914
Skates	BSAI	45,574	37,808	30,519	24,934	44,086	36,523	43,285	35,833
Sharks	BSAI	689	450	400	173	689	450	689	450
Octopuses	BSAI	6,080	4,560	400	240	6,080	4,560	6,080	4,560
Total	BSAI	4,609,077	3,476,801	2,000,000	1,724,804	4,334,715	3,590,907	3,849,059	3,192,295

Sources: 2024 OFLs, ABCs, and TACs are from harvest specifications adopted by the Council in December 2023 as well as in season actions; 2024 catches through November 11, 2024 from AKR Catch Accounting.

Table 2. Summary of groundfish tier designations under Amendment 56, maximum permissible ABC fishing mortality rate (max F_{ABC}), the Plan Team's recommended tier designation, ABC fishing mortality rate (F_{ABC}), the maximum permissible value of ABC (max ABC), the Plan Team's recommended ABC, and the percentage reduction (% Red.) between max ABC and the Plan Team's recommended ABC for 2025-2026. Stock-specific max ABC and ABC are in metric tons, reported to three significant digits (four significant digits are used when a stock-specific ABC is apportioned among areas on a percentage basis). Fishing mortality rates are reported to two significant digits.

Species or Complex	Area	2025					
		Tier	maxF_{ABC}	F_{ABC}	max ABC	ABC	% Red.
Greenland turbot	BSAI	3a	0.17	0.150	2,237	2,013	10%
Sharks	BSAI	6	n/a	n/a	517	450	13%
		2026					
		Tier	maxF_{ABC}	F_{ABC}	max ABC	ABC	% Red.
Greenland turbot	BSAI	3a	0.17	0.150	1,771	1,594	10%
Sharks	BSAI	6	n/a	n/a	517	450	13%

Table 3. Final 2025 and 2026 Pacific halibut Discard Mortality Rates (DMR) for the BSAI

Gear	Sector	Halibut discard mortality rate (percent)
Pelagic trawl	All	100
Non-pelagic trawl	Mothership and catcher/processor	86
Non-pelagic trawl	Catcher vessel	67
Hook-and-line	Catcher vessel	9
Hook-and-line	Catcher/processor	9
Pot	All	21