

Draft SSC Report December 2020



**Joint Plan Team Report and BSAI Harvest
Specifications**

General SSC Comments

- The SSC recognizes the outstanding service of Dr. Gordon Kruse and Dr. Kate Reedy. We are grateful for their service and wish them well for the future.
- The SSC recognized the passing of Dr. Richard Marasco in August 2020. The SSC extends our sympathy to his family and gratitude for Dr. Marasco's service on the SSC.
- The SSC wishes to express appreciation to agency and Council staff, and members of the public in support of the annual harvest specifications process in an extremely challenging year.

C3 & C4 General Stock Assessment Comments

Spatial Management

- In accordance with the Council's Spatial Management Policy, the SSC recognizes its role in highlighting species with potential conservation concerns from a spatial management perspective
- The SSC discussed this policy with respect to
 - 1) BSAI blackspotted/roughey rockfish
 - 2) sablefish
- For BSAI blackspotted/roughey rockfish, the SSC **believes** a biological conservation concern exists
- The SSC **recommends** that a reconstituted spatial management working group develop a white paper to address how the Spatial Management Policy can be used to address these concerns

C3 & C4 General Stock Assessment Comments

Spatial Management

- For sablefish, the SSC **notes** the scientific information indicating that there is considerable movement of sablefish among management areas
- Thus, the SSC **suggests** that there are no expected biological concerns so long as the ABC apportionment does not differ radically from the survey distribution
- At this time, the SSC is **not asking** for specific action for sablefish under the Spatial Management Policy

C3 & C4 General Stock Assessment Comments

VAST

- The SSC had a number of recommendations for the continued implementation of VAST
 - Standardized documentation would be helpful for review, including parameterization, diagnostics and model fits
 - The SSC **cautions** against standardized model fitting except as a starting point, and **prioritizes** a species-specific approach to VAST model selection
 - Exploration of the use of VAST in apportionment for those species where a geospatial model is preferred for biomass estimates

C3 & C4 Groundfish Harvest Specifications

Joint Groundfish Plan Team Report

Risk Table and Assessment Discussion

- The SSC appreciates the work done by authors and GPT in developing and applying the Risk assessment method and discussion
- SSC believes the discussion associated with the risk scoring has improved transparency
- A maturing process will require addressing methodology and issues, which have been highlighted by the SSC, GPT, and authors. e.g., assessing complexes, difficulty addressing scoring consistency across risk levels and stocks.
- SSC **recommends** reviewing risk table process and consistency in a February 2021 workshop, if schedule allows. Also supports GPT recommendation to ensure adequate time for discussion in Sept. 2021

C3 & C4 Groundfish Harvest Specifications

Joint Groundfish Plan Team Report

ESP Discussion

- GPT request for "*the SSC to clarify how the community information should be presented in a stock-specific manner in the ESPs, or if it could be better placed in the broader context of changes being experienced in by communities*"
- SSC provided specific comments under the BSAI and GOA agenda items
- Generally, SSC **recommends** continued inclusion of community engagement and dependency indices, at appropriate levels, in the ESPs, ESRs, and SAFEs

C3 & C4 Groundfish Harvest Specifications

Grenadier

- Grenadier are in ecosystem component of BSAI and GOA FMPs
- The SSC reviewed abbreviated SAFE prepared to monitor catch and abundance.
- Updated data indicate catch and biomass have decreased (GOA biomass lowest since 1998).
- Catches are well below unofficial ABC.
- The SSC ***supports*** the unofficial OFL and ABC values recommended by the author and the Plan Team, which are not for management, but monitoring purposes only.

C3 & C4 Groundfish Harvest Specifications

Sablefish

- The full assessment for 2020 indicates continued increases in spawning biomass, and corroborates strong year classes in 2014, 2016, and some evidence for 2017.
- The 2020 longline survey showed a 32% increase from 2019 and fishery catch-rates were up 20% from 2018-2019
- Despite these increasing trends, the assessment remains highly uncertain due to:
 - Lack of fit to the trend data (overestimation) and poor retrospective patterns for the recent large recruitments and spawning biomass
 - Recent year-classes may be maturing more slowly than expected and showing reduced condition
- The authors assigned elevated risk (values of 2-3) to all categories

C3 & C4 Groundfish Harvest Specifications

Sablefish

- The SSC supported the authors' and JPT recommendation to use Model 16.5.
- This model places the stock in Tier 3a, based on a 2021 stock status of $SB_{42\%}$.
- The SSC **recommends** using a 25% stairstep from the 2020 ABC toward the maximum permissible value for 2021. Balancing:
 - The positive trends and additional year of data on the 2014 and 2016 year classes.
 - The increased uncertainty and high level of risk assigned by the authors.
- This stairstep corresponds to a 2021 ABC of 29,588 t (corrected for whale depredation (a 44% buffer from the maximum permissible ABC), with an OFL of 60,426 t.

C3 & C4 Groundfish Harvest Specifications

Sablefish

- The SSC recognized that sablefish show high rates of movement among all areas in Alaska, providing some flexibility in apportionment methods.
- Therefore, apportionment represents a combination of biological issues focused on long-term conservation of the resource and management considerations regarding how the catch is allocated.
- The SSC noted that recent average survey observations differ greatly from the fixed apportionment method, in place since 2013, (from 79% in the Aleutian Islands to -35% in East Yakutat Southeast).
- The SSC ***recommends*** a 25% staircase from the fixed method toward the 5-year survey average.

C3 & C4 Groundfish Harvest Specifications

Sablefish

- The SSC **suggests** that the council provide guidance to the analysts regarding any additional objectives for apportionment (e.g., socio-economic considerations, use of fishery information, etc.) such that alternatives for future specifications (2022+) can be evaluated against these objectives in addition to both survey distribution and overall exploitation rates under different apportionment methods.
- The SSC **cautions** against apportionment methods that differ appreciably from the surveyed distribution, as these may lead to future biological concerns.

C3 & C4 Groundfish Harvest Specifications

Sablefish

- The SSC ***recommends*** a suite of analyses for the next assessment, including:
 - Evaluation of whether the Tier 3 Harvest Control Rule is appropriate for the population dynamics of sablefish
 - Providing the yield associated with $F_{40\%}$ for a range of apportionment methods
 - Further genetic work on stock structure
 - Evaluation of field studies needed to better understand maturity, skip spawning and maternal effects
 - Inclusion of use by coastal communities in the ESP
 - A range of technical improvements to selectivity, natural mortality, data weighting and other aspects of the assessment model

C3 & C4 Groundfish Harvest Specifications

Sablefish

- The SSC also ***recommends*** continued support of the Pacific Sablefish Transboundary Assessment Team (PSTAT) to evaluate broad patterns in sablefish productivity and the implications of a shared resource spanning multiple assessment and management units.

C3 ESR – Ecosystem Status Report

General

1. The SSC appreciates the extraordinary efforts made to provide the ESRs given the circumstances.
2. The SSC ***supports*** continued coordination between the ESP and ESR teams.
3. The SSC ***encourages*** continued refinement of the MHW index.
4. The SSC ***supports*** continued development of the “In Brief” storymaps for efficiently and clearly communicating the main ecosystem patterns to stakeholders and the public.
5. The SSC ***requests*** that future discussions of time trends in ex-vessel value include time trends in price and landings as in the economic safe.

C3 Aleutian Islands – Ecosystem Status Report

Issues of Concern in 2020

- 1) A Harmful Algal Bloom (HAB) killed one person in Dutch Harbor/Unalaska
 - The SSC **encourages** an examination of vulnerability of the region to HABS to determine the risks to fish processing if the toxins become sufficiently concentrated.
- 2) The closing of the seafood processing plant on Adak removes a major source of employment and financial resources for that community.
 - The SSC **notes** that if the Adak community fails, not only will repair and refueling opportunities be lost, but also the availability of vessels that might respond to an emergency.

In addition, the SSC noted that Groundfish Condition continues to decline, especially in the Western Aleutian Is. The SSC **recommends** that information on why this continues should be sought.

C3 Eastern Bering Sea – Ecosystem Status Report

Four Issues of Concern in 2020

- 1) There was a high Prohibited Species Catch (PSC) of herring in the 2020 pollock A season.
 - ~ 1.5 x the PSC cap, resulted in the closure of Herring Savings Areas
 - It is not known why this unusual event occurred.
 - The SSC **supports** the authors recommendations for research, including genetic analyses, to determine stocks of origin
- 2) Increased amounts of marine debris, predominantly foreign, came ashore in the Bering Strait region, and Chukchi Sea coast (July through October). The SSC **suggests** that the NPFMC may want to collaborate with U.S. and international agencies to determine the origin of the debris, and work toward eliminating future debris discharges.

C3 Eastern Bering Sea – Ecosystem Status Report

Four Issues of Concern in 2020 (cont.)

- 3) Modeled ROMS hindcast output for summer 2020 indicates a more strongly corrosive outer shelf domain compared to the 2003–2019
 - Corrosive conditions likely resulted from bacterial respiration of organic carbon produced by phytoplankton that had sunk
 - Increased corrosivity of bottom waters is of concern, particularly for crab.

The SSC **encourages** continued use of the ROMS model projections of bottom temperature and corrosive conditions in future reports.

C3 Eastern Bering Sea – Ecosystem Status Report

Four Issues of Concern in 2020 (cont.)

2) North Pacific gray whales have died along the west coast of North America (2019-2020), resulting in the declaration of an Unusual Mortality Event (UMV).

- These deaths apparently occurred on the return migration of the whales to Alaska
- The 2019 mortality events may reflect 2018 feeding conditions in the Bering Sea
- The 2019 gray whale UME may also reflect a population approaching carrying capacity.

The SSC **noted** that a survey of the amphipod beds in the Northern Bering Sea and the southern Chukchi Sea could provide information on the current condition of this food resource compared to the 1970s and 1980s.

C3 BSAI Groundfish Harvest Specifications

BSAI Plan Team Report

- SSC highlights that the lack of BSAI trawl and slope surveys in 2020 has likely increased uncertainty in biomass estimates
- Stocks that rely on biennial survey data are more impacted by the loss of one survey than those on annual cycles - Bryan et al. (2020).
- SSC ***emphasizes*** the importance of these surveys, while recognizing the survey prioritization recommendations from the SSC's October 2020 meeting in the case of insufficient funding.

C3 BSAI Groundfish Harvest Specifications

- No BSAI stocks were subject to overfishing in 2020
- No BSAI stocks with reliable biomass reference points (all Tier 3 and above stocks) are not overfished or approaching an overfished condition
- The only stocks where the SSC recommended OFLs or ABCs that differed from the BSAI-GPT were:
 - EBS Pacific cod – 2021/2022 OFLs and ABCs from Model 19.12a

C3 BSAI Groundfish Harvest Specifications

EBS Walleye Pollock

- Full assessment in 2020 with new data (fishery catches through 2020, 2019 fishery catch and weight-at-age, EBS shelf acoustic survey)
 - The SSC **supports** inclusion of the USV-derived acoustic index in the 2020 assessment
- The projected 2021 Female Spawning Biomass is above B_{MSY} and $B_{40\%}$
- This stock is classified as Tier 1, but in recent years the maximum ABC has been based on the Tier 3 calculation

C3 BSAI Groundfish Harvest Specifications

EBS Walleye Pollock

- The SSC **recommends** Model 20.0a, in agreement with the author and PT recommendation
 - This model includes the 2020 USV acoustic biomass estimate as an addition to the ATS time-series, and excludes the anomalous 1978 year class from the stock-recruitment fit
- The SSC **recommends** a 30% reduction from maxABC under Tier 1,
 - OFL = 2.594 million t, ABC = 1.626 million t
 - This reduction from maxABC is consistent with the Tier 3 HCR

C3 BSAI Groundfish Harvest Specifications

EBS Walleye Pollock

- The SSC feels this reduction from maxABC is warranted given
 - Low fishery catch rates in the 2020 B-season, lower than average pollock condition in 2020 (standardized weight given length)
 - Concerns over the reliability of the stock-recruitment relationship
- The SSC appreciates the inclusion of an Appendix to the SAFE chapter with a clear description of the structure, specification, and fit of the VAST model to EBS and NBS BTS data

C3 BSAI Groundfish Harvest Specifications

EBS Walleye Pollock

- The SSC ***recommends***
 - Exploration of young-of-year pollock density and quality estimates from NMFS BASIS surveys to inform pollock recruitment.
 - Consideration of whether the observed sensitivity in the SRR to prior specification should constitute an increased risk level specification within the assessment or population dynamics-related considerations.
 - A retrospective comparison of the selectivity assumed in projections to that estimated with the addition of new data, given the large change in 2021 OFL between 2019 and 2020 assessments
 - Exploration of within-season spatial variation in fishery length composition

C3 BSAI Groundfish Harvest Specifications

Aleutian Islands pollock

- The SSC reviewed the 2020 full assessment, which included 2018 survey and fishery age data, and updated catches for 2019 and 2020, but no new bottom trawl survey.
- The SSC **supports** the author and PT recommendation to continue using model 15.1, which suggests that the spawning biomass may be increasing, but that the stock remains far below historical peaks.
- The SSC **supports** the use of the maximum ABC, based on the stock as classified in Tier 3a.
 - 2021 OFL = 61,856 t, ABC = 51,241 t
- The SSC **recommends** further investigation of ageing error, genetic analyses, recruitment variability and the time-period over which reference points should be calculated

C3 BSAI Groundfish Harvest Specifications

Bogoslof pollock

- The SSC reviewed the Tier 5 and age structured models for this stock, which included a new 2020 winter acoustic survey.
- This stock has been subject to a very low level of fishing mortality in 1992; however, the 2020 survey was down considerably, and model results were also down correspondingly.
- The SSC ***recommends*** the Tier 5 estimates of the ABCs and OFLs for 2021 and 2022 for this stock.
 - 2021 OFL = 113,479 t, ABC = 85,109 t

C3 BSAI Groundfish Harvest Specifications

EBS Pacific cod

- The authors continued exploring ensemble models
- No 2020 EBS/NBS surveys, but new age data from 2019 were added
- 3 ensembles presented
 - 4 models selected in October (Ensemble A)
 - 3 new models exploring fishery CPUE and selectivity plus the base model (Ensemble B)
 - The union of the two (7 models, Ensemble AB)
- Weighting criteria updated to reflect new model criteria

C3 BSAI Groundfish Harvest Specifications

EBS Pacific cod

- The authors recommended Ensemble AB
 - Fishery CPUE data showed continued increasing catch rates
 - The Plan Team disagreed with that choice because of the preliminary fishery CPUE indices
 - The Plan Team selected a new set of models (Ensemble C) and revised the weighting
- The SSC **disagreed** with author and PT recommendations and chose a single model
- The SSC **recommended** a new base model (19.12a) that was a simplification of the former base model (reduction of catchability parameters).
- 2021/22 ABC = 123,805/106,852 t, 2021/22 OFL = 147,949/128,340 t

C3 BSAI Groundfish Harvest Specifications

EBS Pacific cod

- The SSC appreciated the ensembles, but several models were not ready for adoption
- The SSC is still hesitant on adopting an ensemble right before a 2021 CIE review
- Authors rated all risk table categories 1, except ecosystem (2)
- Authors believed there were less overall concerns than last year
 - Spawning appears to be occurring in the NBS
 - Substantial 2018 year class in age compositions
- The SSC **agreed** with the authors and PT that a reduction from the maximum ABC was not warranted
- The SSC **recommended** that the PT recommendations for the CIE be forwarded

C3 BSAI Groundfish Harvest Specifications

Aleutian Islands Pacific Cod

- Full assessment
- AI surveys show a long-term decline, though the trend is generally positive since 2010
- Tier 5 assessment
- Authors and GPT recommended 2021 and 2022 ABC (20,600 t), and OFL (27,400 t). No change from last year. The SSC **agrees** with tier and OFL/ABC specifications
- No additional reduction in ABC was indicated by risk table
- This stock is scheduled for an ESP, and an age-structured model (Tier 3) will be proposed in fall 2021

C3 BSAI Groundfish Harvest Specifications

Yellowfin Sole

- Full assessment in 2020 with updated 2019 data. New model results in increased biomass and OFL / maxABC compared to last year.
- Projected 2021 Female Spawning Biomass at $1.86 * B_{MSY}$
- Stock is managed under Tier 1a
- The SSC **recommends** the authors' and BSAI GPT selected model (18.2)
 - The model now has sex-specific mortalities (fixed for females, model-estimated for males), consistent with other flatfish stocks
 - Clear improvement in model fit due to improved fits to fishery and survey age composition data.
- 2021 OFL = 341,571 t; 2021 ABC = 313,477 t

C3 BSAI Groundfish Harvest Specifications

Yellowfin Sole

- The SSC ***supports*** author and Plan Team determinations that the risk table does not warrant additional precaution at this time
 - However, the SSC ***recommends*** elevating assessment-related risk to level 2 due to strong retrospective bias, consistent with risk table criteria
- The SSC ***recommends*** additional model explorations with respect to sex-specific natural mortality and other features of the model
- The SSC ***recommends*** that the authors bring forward a model that includes the Northern Bering Sea biomass estimates for consideration by the Plan Team and SSC in the next assessment cycle.

C3 BSAI Groundfish Harvest Specifications

Greenland turbot

- Full assessment; Age 1+ biomass has been trending down slightly following the full integration of the 2007 – 2009 year classes
- Female SSB projected to be above $B_{40\%}$ in 2021
- Managed under Tier 3a
- The SSC **recommends** Model 16.4a, in agreement with the authors and BSAI-GPT
 - Includes correction (RPW to RPN) to the AFSC longline survey units from previous base model
- 2021 OFL = 8,568 t, 2021 maxABC = 7,326 t
 - In agreement with the authors and the BSAI-GPT, the SSC does not recommend any reduction from the maximum ABC

C3 BSAI Groundfish Harvest Specifications

Greenland turbot

- The SSC ***recommends***:
 - A re-evaluation of the treatment of time-varying selectivity, including justification for the time-blocks used in assessment
 - Pooling available data to develop an updated maturity curve
 - Exploring the use of VAST for EBS slope and longline surveys

C-3 BSAI Groundfish Harvest Specifications

Arrowtooth Flounder

- Full assessment, increasing biomass since the 1980s, lightly exploited
- Projected 2021 spawning biomass is well above $B_{40\%}$
- The SSC ***recommends*** Model 18.9 in agreement with authors and BSAI GPT
 - No change in assessment methodology
 - Same model as approved in 2018 full assessment
- Tier 3a
- For 2021 OFL = 90,873 t, ABC = 77,349 t

C-3 BSAI Groundfish Harvest Specifications

Arrowtooth Flounder

- ABC is the maximum ABC, in agreement with authors and PT
- The SSC **commends** the authors on careful examination of species identification in survey data and species compositions of arrowtooth and Kamchatka flounders in past observer data.
- The SSC **supports** further data quality investigations related to sample size and speciation issues in the composition data.
- The SSC **recommends** examination of the parameterization for selectivity and requests authors bring forward historical information on the rationale used for the current selectivity parameterization.

C3 BSAI Groundfish Harvest Specifications

Kamchatka flounder

- Full assessment on a biennial cycle; total biomass has been increasing since 2013 following a series of strong cohorts (2008 – 2016)
- Female SSB projected to be above $B_{40\%}$ in 2021
- Managed under Tier 3a
- The SSC ***recommends*** Model 16.0b, in agreement with authors and BSAI-GPT
 - Age-length transition matrix updated with length-weight and growth relationships from aggregated AI, EBS shelf, EBS slope trawl surveys
 - Improved retrospective pattern

C3 BSAI Groundfish Harvest Specifications

Kamchatka flounder

- For 2021 OFL = 10,630 t and maximum ABC = 8,982 t
- The SSC appreciates the use of the risk table and agrees that no reduction from the maxABC is necessary, in agreement with the author and BSAI-GPT
- The SSC **supports** recommendations to:
 - Pursue a formal data weighting procedure
 - Explore the separation of EBS and AI age and length compositions
 - Incorporating aging error
 - Examining constant or varying CV in age-length matrices
 - Examining the relationship between temperature and catchability

C3 BSAI Groundfish Harvest Specifications

Northern rock sole

- Full assessment in 2020 with updated 2019 data. New model results in decreased biomass and OFL / maxABC compared to last year.
- Projected 2021 Female Spawning Biomass at $1.85 * B_{MSY}$
- Stock is managed under Tier 1a
- The SSC **recommends** authors' and PT selected model (18.3)
 - The model now has sex-specific mortalities (fixed for females, model-estimated for males), consistent with other flatfish stocks
 - Clear improvement in model fit due to improved fits to fishery and survey age composition data
- For 2021 OFL = 145,180 t and ABC = 140,306 t

C3 BSAI Groundfish Harvest Specifications

Northern rock sole

- The SSC ***supports*** author and Plan Team determinations that the risk table does not warrant additional precaution at this time
- The SSC ***notes*** the model expectation of high survey biomass estimates in the last 2 years despite decrease
 - The SSC ***recommends*** examining whether current poor fit to survey biomass because of incoming recruitment happens when you run the model in the last instance of large recruitments in the 2000s
 - The SSC ***recommends*** experimenting with forcing high M values or dome-shaped selectivity
- The SSC ***recommends*** that the authors bring continue to examine temperature and catchability, and recruitment correlates detailed in the appendix

C3 BSAI Groundfish Harvest Specifications

Flathead sole

- Full assessment, catch declining, biomass stable, recent larger than average cohorts still to mature.
- SSB above target for entire time series
- Tier 3a
- The SSC ***recommends*** Model 18.2c in agreement with authors and BSAI GPT
 - Accepted model from last full assessment, stable
- $ABC = \max ABC$
- For 2021 OFL = 75,863 t and $ABC = 62,567$ t

C3 Groundfish Harvest Specifications

Flathead sole

- The SSC ***recommends*** the authors explore whether estimating separate male and female survey selectivity is necessary.
- The SSC ***recommends*** the authors explore the influence of large residuals in fisheries lengths.
- The SSC ***requests*** authors provide a rationale for selecting length-based selectivity for the fishery in the assessment model.

C3 BSAI Groundfish Harvest Specifications

Alaska plaice

- A partial assessment was prepared for the BSAI Alaska plaice stock. Alaska plaice is a non-target species, but retention is high and biomass is slowly declining.
- Catch is well below maxABC and while exploitation rate is trending upward it remains low, between 3-5% in recent years.
- The stock is managed under Tier 3
- No risk table analysis was presented as this is a partial assessment.
- **The SSC concurs with the author and team recommended OFL and maxABC**
- For 2021 OFL = 37,924 t and ABC = 31,657 t

C3 BSAI Groundfish Harvest Specifications

Other Flatfish

- Other flatfish stock complex full assessment. There are no directed fisheries for the 15 species in this complex.
- Managed under Tier 5, no changes to the assessment methods.
- Exploitation rates are generally less than 5% and not increasing, and the total catch is substantially lower than the ABC.
- The risk table was added to this assessment for the first time this year but had not elevated concerns.
- The SSC **concur**s with author and BSAI GPT recommended OFL (22,919 mt) and maxABC (17,189 mt) for 2021 and 2022.
- The SSC **support**s PT recommendation that the author consider adding a secondary table, by species, to the risk table. This breakdown will highlight species specific concerns that can be tracked over time.

C3 BSAI Groundfish Harvest Specifications

Pacific ocean perch

- Full assessment, increase in SSB since 1980s but decrease since 2018
- 2021 spawning biomass projected to exceed $B_{40\%}$
- Tier 3a
- The SSC ***recommends*** Model 16.3a in agreement with authors and BSAI GPT
 - No changes to the stock assessment model from 2018 full assessment
- For 2021 OFL = 44,376 t and ABC = 37,173 t
- Area apportionments same as 2018 due to lack of 2020 survey

C3 BSAI Groundfish Harvest Specifications

Pacific ocean perch

- Recommended ABC is maxABC in agreement with author and PT
- Continues to be a conflict between composition data and the AI survey data
- Decrease in biomass since last assessment is primarily due to the lack of AI trawl survey in 2020 and the composition data having more influence
- The SSC **suggests** poor fit to AI index should be a focus of future work
- The SSC **recommends** continued evaluation of M and investigating Francis weighting of the composition datasets

C3 BSAI Groundfish Harvest Specifications

BSAI Northern rockfish

- Partial assessment on biennial schedule, exploitation rates dropped overall with large decrease in EAI and slight increases in CAI and WAI
- 2021 Spawning biomass projected to exceed $B_{40\%}$
- Managed under Tier 3a
- For 2021 OFL = 18,917 t and ABC = 15,557 t
- Maximum ABC is recommended

C3 BSAI Groundfish Harvest Specifications

Blackspotted/Rougheye Rockfish Complex

- This was a full assessment. Total biomass and spawner biomass have been increasing since 2012.
- EBS slope survey increasing trend since 2012 and is assessed with a Tier 5 RE Model.
- AI projected 2021 spawning biomass is 38% of $B_{100\%}$ and is in Tier 3b.
- The SSC ***recommends*** Model 20 in agreement with authors and the BSAI GPT
 - Model 20 showed decreased retrospective bias, decreased recruitment variability, improved fit to AI survey index, recent biomass trend more consistent with recent AI survey index, and greater stability in inter-assessment ABC advice.

C3 BSAI Groundfish Harvest Specifications

Blackspotted/Rougheye Rockfish Complex

- SSC **accepts** the author and team recommended OFLs and ABCs.
 - For 2021 OFL = 576 t and ABC = 482 t
 - The SSC shares the authors' and Plan Teams' concerns about the elevated risk scores but agrees with their recommendation to use maxABC because the incidental nature of BS/RE catch and the ongoing fishing fleet avoidance efforts reduction in maxABC is unlikely to result in reduced catch.
 - Further, the SSC notes that the new AI model does appear to be more appropriate in terms of tracking the substantial reduction in the scale of the stock shown in the survey data and improvements in fit and retrospective behavior.

C3 BSAI Groundfish Harvest Specifications

Blackspotted/Rougheye Rockfish Complex

- The SSC continues to be concerned about the disproportionate spatial harvest including catch in excess of the WAI/CAI subarea ABC in 2019 and 2020, and notes that despite the limited information on stock structure this rockfish complex may be vulnerable to localized depletion.
- The SSC **recommends** that the MSSCs continue to be used as a means to monitor and give industry a target maximum catch.
- The SSC **supports** the Plan Team recommendation to explore the distribution of the survey samples to evaluate trends by depth, to help determine risk considerations and potentially help inform the industry on how to reduce incidental catch.

C3 BSAI Groundfish Harvest Specifications

Blackspotted/Rougheye Rockfish Complex

- The SSC **recommends** an exploration of the spatial footprint of the AI survey and incidental catch fisheries with an eye towards potential mismatches due to untrawlable habitat that might provide context for interpreting conflicting survey abundance and fishery size/ age composition.
- The SSC **supports** the Plan Team suggestion to explore other survey data (e.g. NMFS and IPHC long-line or AK state survey data) to augment abundance and size/ age composition information.
- The SSC **requests** that the authors fully explore the ranges and interactions of Q and M in the AI assessment model.

C3 BSAI Groundfish Harvest Specifications

Blackspotted/Rougheye Rockfish Complex

- The SSC **recommends** an update on work (e.g. genetics) to define BS/RE stock structure.
- The SSC **requests** that the authors investigate the effects of fleet behavior on apparent size/ age compositions, and to what extent this may be influencing fishery selectivity.
- The SSC **concurrs** with the Joint Plan Team's note that area apportionment approach currently used for the BSAI BS/RE complex should be included in the Spatial Management Workshop proposed for 2021.

C3 BSAI Groundfish Harvest Specifications

Shortraker Rockfish

- A full assessment was conducted.
 - No change in methodology
 - Catch data updated through October 25, 2020
 - No new survey updates this year
 - Biomass has been relatively stable since 2002 with a slight increase from 20,932 t in 2006 to 24,055 t in 2018
- Catches exceeded TAC in 2017, 2018, and 2019 but were below ABC's and OFL's. Catches are currently below 2020 TAC and ABC.
- Tier 5 stock
- The SSC **concur**s with author's and Plan Team's recommended 2021 and 2022 OFL (722 t), ABC (541 t), and area apportionment.

C3 BSAI Groundfish Harvest Specifications

Other Rockfish

- A full assessment was conducted.
 - No change in methodology
 - Catch and survey data updated
- Since 2011 Catches in the AI area exceeded area-specific TAC's in most years, and in some years exceeded area specific ABC's. Catches in BS area has been below area-specific TAC's, except in 2014 and 2019.
- Tier 5 stock
- The SSC **concur**s with authors' and Plan Team's recommended OFL, ABC, and area apportionment. For 2021 & 2022 OFL = 1,751 t and ABC = 1,313 t
- The SSC **agrees** with the Plan Team not to move non-SST to Tier 6 at this time.

C3 BSAI Groundfish Harvest Specifications

Atka Mackerel

- Full assessment
- All surveys show long-term decline over 2004-2018; no survey was conducted in 2020 owing to Covid-19
- This year's assessment is a straightforward update using the latest catch and age data. The base model fits data well
- Authors and GPT propose Model 16.0b (status quo) for Tier 3b specifications for 2021 and 2022. No additional adjustment to ABC was indicated by the risk table (all risk level 1). The SSC **agrees** with Tier, model and OFL/ABC specifications
 - 2021: OFL = 85,580 t, ABC = 73,590 t
 - 2022: OFL = 79,660 t, ABC = 68,220 t

C3 BSAI Groundfish Harvest Specifications

Skate complex

- Full assessment with two components to the complex:
 - Tier 3 age-structured assessment for Alaska skate
 - Multiple Tier 5 random-effects models for Other skates
- For Alaska skate,
 - 2020 total biomass is down slightly from recent years, but spawning biomass continues to increase; limited indication of incoming large year-classes from 2016 -2018
 - The 2021 estimate of SBB is estimated to be above $B_{40\%}$
 - Tier 3a for Alaska skate
 - The SSC **recommends** Model 14.2, in agreement with author and PT
 - Performs similarly to 2018 model

C3 BSAI Groundfish Harvest Specifications

Skate complex

- For Tier 5 Other skates
 - Presented a new series of region-specific RE models for individual species (species with inconsistent or extreme variability were grouped into minor skate model)
 - Biomass trends differed by area and species, but in general,
 - Increasing the EBS shelf
 - Decreasing or flat in the EBS slope and AI
 - The SSC notes that this is a marked improvement for delineating species-specific trends within a complex
 - The SSC **concur**s with the recommended OFL and ABC for the combined Tier 5 species

C3 BSAI Groundfish Harvest Specifications

Skate complex

- The SSC ***recommends*** the combined complex-level harvest specifications, in agreement with the author and BSAI-GPT.
 - No reduction in the maxABC
 - 2021 OFL = 49,297 t, 2021 maximum ABC = 41,257 t

C3 BSAI Groundfish Harvest Specifications

BSAI Sharks

- Full assessment, conducted biennially
- Total shark catch was 150 t in 2019, and 198 t through Oct. 13, 2020. Both are well below OFL (689 t) and ABC (517 t).
- Tier 6 stock
- Base model: OFL = max. catch over 2003 – 2015; ABC = 0.75 OFL.
- Alternative models:
 - median of catch over 2003 – 2015
 - 5th percentile of catch over 2003 – 2015
 - 99th percentile of catch over 2003 – 2015

C3 BSAI Groundfish Harvest Specifications

BSAI Sharks

- The authors and PT recommend the status quo model. An evaluation of alternative data-limited assessment methods is underway.
- The SSC *agrees* and *recommends* the status quo:
- OFL = 689 t, ABC = 517 t
- The authors and PT assigned **risk level of 2 for assessment**, given that no life history or biological information is used in the assessment; **level 2 for population dynamics**, given that IPHC longline survey RPNs for sleeper sharks have remained low since 2004; **level 1 for environment/ecosystem**; and **level 1 for fishery performance**
- The authors and PT do not recommend additional reductions in ABC owing to risk. The SSC *agrees*, noting that pending research should help better identify the current levels of risk to BSAI sharks

C3 Groundfish Harvest Specifications

BSAI Sharks

- Pending and ongoing research:
 - Study of genome of Pacific sleeper shark (one genetic stock?)
 - Stock structure template to be applied pending genetics
 - Examination of role of temperature on shark catches
 - Proposed study to develop ageing method for sleeper shark using bomb-radiocarbon in the eye lens core
 - Exploration of alternative data-limited assessment methods

C3 BSAI Groundfish Harvest Specifications

BSAI Octopus complex

- Full assessment; complex comprised of at least 9 species
- No estimate of total complex biomass
- OFL set equal to predation-based estimate of total natural mortality
- Alternative Tier 6, overfishing did not occur
- The SSC ***supports*** the use of this Tier 6 method in agreement with authors and BSAI GPT
- 2021 & 2022 OFL = 4,769 t and ABC = 3,576 t (same as recent years)
- Recommend using maximum ABC

C3 BSAI Groundfish Harvest Specifications

BSAI Octopus complex

- Catches have increased with 2020 having the highest catch in the time series, but catches are still nearly and order of magnitude below ABC
- Discard rate this year was also high, compared to previous years
- SSC ***recommends*** continued monitoring of catches