Draft SSC Report
December 2021

C3 BSAI Groundfish Specifications

SSC General Comments

- The SSC *recognizes* the outstanding service of Dr. Anne Hollowed and Dr. Matt Reimer for their years of service on the SSC
- We are grateful for their service and wish them well in the future

- The SSC *appreciates* the dedication and contributions of Drs. Grant Thompson, Olav Ormseth and Martin Dorn to the NPFMC.
- We thank them for their service.

- With regards to the risk table, the SSC *highlights* that assessment authors should evaluate the risk of the ABC exceeding the true (but unknown) OFL and whether a reduction from maximum ABC is warranted
  - Even if past TACs or exploitation rates are low
  - See October 2021 SSC Risk Table workshop report

- For assessments that use periods of elevated natural mortality rates, such as the GOA Pacific cod assessment, the SSC *requests* authors provide a discussion of whether the period of elevated M should be included in the calculation of reference points and/or stock status

- The SSC *encourages* authors to consider whether changes in mortality (and potentially growth) represent anomalies or actual shifts in the underlying dynamics, with the goal of ensuring consistency across different calculations within an assessment

- As shown in some assessments, VAST model results could be sensitive to the number of knots used to structure the analysis
- The SSC *recommends* that all assessment authors consider whether the number of knots used is sufficient to provide a robust analysis and to compare models with alternative numbers of knots when possible

- The SSC *recommends* that **all assessment authors do not change recommendations in documents** between the Plan Team and the SSC meetings
- Changes in documents following the Plan Team meeting make it more difficult to understand the context of the Plan Team's rationale and seems counter to the public process without seeing a revision history of the document.
- The SSC *requests* deliberations or changes be documented in Plan Team minutes.
  - This is not intended to prevent authors from correcting typos, transcription errors, or other editorial issues

<u>General Comments</u>

1) The general summaries and integrated sections on the physical environment (GOA, EBS and AI) and seabirds (GOA, EBS, AI), and Regional Highlights (AI) were information-dense and provided excellent syntheses

2) The ESRs will be part of a holistic review of how economic and social science information is communicated and applied to Council decision-informing analytic products.

3) The SSC *encourages* that the holistic review be transparent and inclusive

General Comments (cont.)

4) Numerous ecosystem-related documents that are produced through the Council process and excellent infographics have been developed to indicate how and when each are used and how they differ. The SSC *suggests* including such a flow chart/infographic in the ESR to visualize the process.

5) "In Briefs" are planned for the EBS, GOA, and AI and a second outreach video is being developed -summarizing the ESR products and process. The SSC is *supportive* of these continued efforts to disseminate ESR information to stakeholders and communities and appreciates the efforts to provide hard-copy products to remote communities

6) Harmful Algal Blooms (HABs) were reported from all three regions (EBS, AI, GOA) as well as in the NBS and Chukchi Sea. Toxins were detected in shellfish (GOA, AI) and marine mammal flesh (NBS, Chukchi). No human fatalities were reported in 2021.

General Comments (cont.)

- Due to COVID-19 in 2020 there were cancellations of many NOAA Fisheries surveys in the eastern and northern Bering Sea. Some data gaps were partially filled by state/university partners, tribal governments, and coastal community members.

- The SSC *suggests* that going forward it will be important to build on lessons learned from these collaborations.

- As an example, the SSC suggests that Kawerak, Inc. could be approached to see if they might help to organize a local effort to monitor sea temperatures in the Norton Sound region.

- The SSC *suggests* that the editors and authors consider the development of a single, "all-purpose" map of the eastern and northern Bering Sea, combined, that would show an agreed upon set of zones, such as those used for the BSIERP map (Ortiz, I., Wiese, F., Greig, A., 2013, with whatever modifications seem appropriate.

- This map would be in addition to the maps of the eastern Bering Sea and Northern Bering Sea bottom trawl surveys and the slope survey. In the present EBS ESR, there were at least four different maps presented, each with a unique set of zones or divisions.

- These differences make integration of information across disciplines challenging.

Issues of Concern

• There are multiple indications of warming:

1) St. Paul air temperatures show a strong positive trend over the past 40 years

2) SST drops below bottom temperature in March vs December (later freeze-up),

3) Sea-ice extent (Oct 15 - Dec 15) in 2021 was approximately 50% of long-term mean,

4) Reduction in cold pool area and the northwestward shift in its southern boundary,

5) Elevated bottom temperatures (in 2018 and 2019, ~ 2 °C above long-term mean, only 0.5 °C above in 2021).

- There are multiple indications of declining productivity

  1) declining chlorophyll concentrations over the shelf;

  2) negative diatom anomaly and reduced mesozooplankton biomass and size distribution of copepods in the 2020 Continuous Plankton Recorder;

  3) With the exception of Pacific herring, the 2021 index for all other species and functional groups in the pelagic forager guild were below long-term means;

  4) biomass of benthic foragers in the bottom trawl lowest over the time series;

Issues of Concern (cont.)

- There are multiple indications of declining productivity (cont.)

    5) biomass of crabs, including hermit, king, tanner and snow crab are all below long-term means;

    6) the CPUE of all fish combined and major invertebrate taxa decreased in both the NBS and the EBS;

    7) fish condition (length-weight or age-weight residuals) for multiple groundfish species declined between 2019 and 2021.

Issues of Concern (cont.)

- Returns of Yukon River Chinook and chum salmon remain extremely weak

- Continued seabird die-offs and reproductive problems in the NBS may indicate reduction of the abundance of large, lipid-rich zooplankton and forage fish.

- Hypotheses that may explain some of the changes seen in 2021:
  - Declining primary production
  - Reduced abundance of large, lipid-rich zooplankton in the NBS in recent years
  - Cumulative impacts of increased thermal exposure and metabolic demands
  - Vertical mismatch/stratification in prey distribution in the water column
  - The competition with, or predation by, high numbers of Asian pink salmon
- The SSC is *supportive* of continued research and monitoring efforts to explore the various hypotheses the ESR authors presented that may explain the observed changes in the EBS/NBS

<u>Issues of Concern</u>

1) **Mercury in AI Food Webs**: Relatively high total mercury concentrations have been found in Steller sea lion pups in the central and western Aleutian Islands. Exposure was in utero; mercury is known to have deleterious impacts on fetal development.

2) **Plastics in AI seabirds:** Phtalates, derived from plastics, were detected in 115 Aleutian Island seabirds that were tested, with concentrations varying from 3.64–539.64 ng/g. Bird species that feed on plankton by diving had significantly higher concentrations compared to piscivores and opportunistic feeders.

- In the Aleutian Islands, west to east winds suppressed flow through the passes

- During summer 2021, some of the warmest SSTs were recorded in the western and central Aleutians.

- All three Aleutian Islands regions experienced Marine Heatwaves (MHW).

- Throughout the Aleutian chain, eddy kinetic energy was near or below its long-term average in 2021.

- In 2021 both plankton and fish-eating seabird species in the Aleutian islands had good reproductive success

- There were no remarkable seabird die-offs reported.

- Recent status assessment of northern sea otters in the western Aleutians found the population to be low, but stable. In the eastern Aleutians, the northern sea otter population was larger and stable.

- Harbor seals in the Aleutians have declined in recent years (8-year population trend is -131 seals per year) and is now estimated at 5,588 ($\mp$SE: 274). The stock is not listed as Threatened or Endangered.

- The SSC *notes* that there has been no integrated ecosystem study for the AI in over a decade.

- The AI Fisheries Ecosystem Plan is past its review time, there is no Regional Plan specific to the AI, and there has been no survey since 2018.

- Other than the ESR, the most comprehensive study at the ecosystem level was a special issue in 2005, and the FEP in 2007. This creates significant challenges for interpreting the impacts of the various indicators presented in the ESR and for fisheries management in the region.

- The SSC *strongly highlights* the need for surveys in this region in 2021 and supports any efforts for taking a more integrative approach to studying this ecosystem.

C3 & C4 Joint Plan Team Report

EBS/ NBS Survey (1 of 1)

- EBS and NBS surveys were successfully conducted with no effect on methodology <u>despite the effects of the pandemic</u>

- Several special projects were highlighted including:

  ○ NBS Pacific cod PSAT (tagging) project

  ○ Comparison of 15- and 30-minute trawl hauls

  ○ Examination of fish condition using a FatMeter and physiological stress using blood chemistry and mucus

  ○ Effects of reallocating corner stations from the EBS survey grid

- The SSC *concurs* with JPT support of these efforts and the recommendation that Crab Plan Team input be incorporated before further consideration of survey station changes

C3 & C4 Joint Plan Team Report

Essential Fish Habitat (1 of 1)

- Update on the 2022 EFH 5-Yr Review of Components 1 (EFH maps and descriptions) and 7 (prey species lists and locations).

- Next steps:

  - EFH presentations to CPT and Ecosystem Cmt in Jan 2022

  - EFH presentations to SSC in Feb 2022

- SSC and JGPT appreciate EFH team's responsiveness to assessment author reviews.

C3 & C4 Joint Plan Team Report

- Truncated time between the receipt of new survey information and stock assessment due dates for plan team review

- Pandemic and extended telework orders limiting author interactions

- Difficulty distinguishing management changes from biological changes in some of the ESP indicators

- SSC *supports* JGPT suggestions to improve assessment efficiency and consistency via informal out of cycle reviews, and development of shared tools.

- SSC concurs with JGPT recommendation to use grey traffic light color code for ambiguous ESP indicators but retain scoring.

- The SSC *recommends* a workgroup of to explore options for altering timing of select crab and groundfish assessments

C3 & C4 Joint Plan Team Report

Economic SAFE (1 of 1)

- Economic SAFE chapter information provided is complete through 2020. More current report will be available early next year, including further detail about tariff and COVID-19 impacts

- SSC *supports* JGPT recommendation that a comprehensive review of how socioeconomic information is incorporated in a range of evolving Council decision-informing products be done in careful consideration of existing workload and that a broad discussion with NOAA, SSPT, and Council staff be undertaken in this planning process.

C3 &C4 Groundfish Harvest Specifications

- The 2021 sablefish assessment was a full analysis including an ESP report card made extensive improvements in response to JGPT and SSC recommendations.

- Improvements included: treatment of weight, growth, and maturity as well as removal of catchability priors, data weighting and allowing a selectivity/catchability time-block for the fishery and survey

- The stock is estimated to be increasing rapidly, and currently in Tier 3a at the beginning of 2022

- The SSC *recommends* Model 21.12 and associated OFL and ABC projections, in agreement with the JGPT and author's recommendation

  - 2022 OFL = 40,432 t, maxABC = 34,521t

C3 & C4 Groundfish Harvest Specifications

Sablefish (2 of 3)

- The SSC *agreed* that no additional reduction from the maximum permissible ABC was needed, as model improvements have largely addressed major uncertainties in recent assessments.

- The SSC *supports* the author's recommended 50% stairstep from the 2021 area-apportionment toward the most recent survey-based estimates, extending the approach used in 2021.

- The SSC *continues* to suggest that the Council provide guidance to the authors if it wishes to include other factors (in addition to biological distribution) in the apportionment approach.

C3 & C4 Groundfish Harvest Specifications

Sablefish (3 of 3)

- The SSC *recommends* further investigation of methods for allowing time-varying selectivity and to account for the recent and rapid shift from longline to pot gear.

- The SSC also provided a series or recommendations to continue data and model development

C3 BSAI & C4 GOA Groundfish Harvest Specifications

<u>Overview</u>

- BSAI - 8 full assessments, 9 partial assessments
- GOA - 15 full assessments, 4 partial assessments
- No assessments for:
  - BSAI Bogoslof pollock, BSAI other flatfish, BSAI shortraker rockfish, BSAI other rockfish, BSAI sharks, BSAI octopus, GOA thornyhead rockfish and GOA sharks
- **No stocks in the BSAI or GOA were subject to overfishing, overfished, or approaching an overfished state.**

SSC General Groundfish Stock Assessment Comments (1 of 2)

- The SSC *encourages* the GPTs to review methods for projecting catch in partial assessments and to develop clear guidelines for a standardized approach
  - However, this approach should allow authors to deviate from a standard approach with appropriate justification

- The choice of selectivity to use in projections when time-varying selectivity is estimated, is an issue for several Tier 1-3 assessments.
- The SSC *supports* the GPT's recommendation to prioritize research on best practices for specifying selectivity schedules used in projections of Tier 1-3 stocks and *encourages* the GPT to develop guidance based on this research.
  - BSAI Atka mackerel might be a good case study

C3 BSAI Groundfish Harvest Specifications

<u>EBS walleye pollock (1 of 4)</u>

- Full assessment in 2021 with new data (fishery catches through 2021, 2020 fishery catch and weight-at-age, 2021 BTS biomass and age composition, 2021 AVO index)

  - Large drop in bottom trawl survey biomass, increase in AVO index from 2019 to 2021

- The projected 2022 Female Spawning Biomass is below B_{MSY}

- This stock is classified as Tier 1 and is currently in Tier 1b, but in recent years the ABC has been based on Tier 3 calculations, resulting in a large implied buffer

C3 BSAI Groundfish Harvest Specifications

EBS walleye pollock (2 of 4)

- The SSC *recommends* Model 20.0c, in agreement with author & PT recommendations
  - This model is based on the previously accepted model but includes 2021 length compositions and preliminary ages derived from an age-length key to address anomalous size compositions in the B season fishery and survey
  - The SSC accepts the author and Plan Team recommendation for OFLs (2022 OFL = 1,469,000t)

C3 BSAI Groundfish Harvest Specifications

EBS walleye pollock (3 of 4)

- The SSC *recommends* an 11% reduction from maxABC (2022 ABC = 1,111,000t) using a Tier 2 calculation, in agreement with authors and PT recommendations, which is a substantial reduction in the size of the buffer from last year (30%).

  - Based on risk table considerations, the SSC concludes that the retrospective bias, considerable uncertainty in the spawner-recruitment relationship, and environmentally-driven variability in recruitment still warrant additional precaution.

  - Under 'population dynamics considerations', the SSC recommends a change in the risk score from level 2 to level 1, noting that the stock being below B_{MSY} is not is not a reason for an increased level of concern as the harvest control rule accounts for the low spawning stock biomass.

C3 BSAI Groundfish Harvest Specifications

<u>EBS walleye pollock (4 of 4)</u>

- The SSC *highlights* concerns over low recruitments associated with generally warmer conditions in the Bering Sea relative to the current reference period (1977-2019) used in projections.

- The SSC *supports* Plan Team recommendations to obtain Russian samples of pollock for genetic analyses

- The SSC *recommends* that the Plan Teams develop general guidance to assessment authors for determining appropriate selectivity functions for use in projections based on retrospective analyses of their performance.

BSAI Groundfish Harvest Specifications

Aleutian Islands pollock (1 of 1)

- Partial assessment, updated with new catch data for projections
- The stock is managed under Tier 3 and remains in Tier 3a as the female spawning biomass is above B40%.
- The SSC *supports* the author and PT maximum ABCs and OFLs.
  - No reduction from maxABC
  - 2022 OFL = 61,264t, maxABC = 50,752t

C3 BSAI Groundfish Harvest Specifications

EBS Pacific cod (1 of 6)

- Full assessment in 2021 with new data
  - Updated fishery catch data and size compositions through 2021
  - EBS+NBS NMFS bottom trawl survey VAST abundance index
  - EBS + NBS survey size compositions through 2021
  - EBS+NBS survey age composition through 2019
  - VAST fishery CPUE index (used in Model 21.2)

C3 BSAI Groundfish Harvest Specifications

EBS Pacific cod (2 of 6)

- SSB has declined since 2018
  - Projected 2022 SSB below $B_{40\%}$ but above $B_{35\%}$, placing this stock in Tier 3b
- Data bridging exercise for 2020 base model (19.12a)
  - Majority of increase in projected 2022 maxABC, relative to 2020 assessment, due to 2021 EBS+NBS BTS index and compositions

C3 BSAI Groundfish Harvest Specifications

- The SSC *agreed* with author and PT recommendations to base 2021 assessment on an ensemble of four models, including
  - 19.12a – current base model
  - 19.12 – base model + time-varying survey catchability
  - 21.1 – base model + dome-shaped survey selectivity
  - 21.2 – base model + fishery CPUE index (VAST)

C3 BSAI Groundfish Harvest Specifications

- SSC ***supports*** ensemble member weighting based on CIE Reviewer model scores
- SSC support for ensemble based upon
  - Tractable set of alternative models, each with clear incremental change
  - Transparent scoring criteria and scores provided by independent (CIE) review
  - Potential for ensemble to provide stability over time

C3 BSAI Groundfish Harvest Specifications

EBS Pacific cod (5 of 6)

- Based on the model ensemble
  - 2022 maxABC = 153,383 t
  - 2022 OFL = 183,012 t
- Authors rated risk table all categories 1 except ecosystem (2)
  - Warm conditions and reduced prey availability in NBS
- The SSC *agreed* with the authors and PT that no reduction from the maximum ABC warranted
  - 2022 ABC = maxABC = 153,383 t

C3 BSAI Groundfish Harvest Specifications

<u>EBS Pacific cod (6 of 6)</u>

- SSC *highlights* this is not a blanket endorsement for ensemble approaches for this or other stocks
  - Clear and defensible justification for approach and ensemble members is expected
- Additional SSC recommendations
  - Authors should work with PT to define process wherein PT members assign model scores for weighting
  - Inclusion of available fishery age compositions is a top priority for future research

C3 BSAI Groundfish Harvest Specifications

AI Pacific cod 1 of 2

- Base Tier 5 plus three Tier 3 model alternatives with updated data
- No Aleutian Islands survey since 2018, the SSC strongly recommends AI BTS is conducted in 2022
- Author recommended new model with observer-collected maturity data and higher value for natural mortality
- The SSC agrees with the GPT to use the base model (13.4) rather than the author recommended model because:
  - Lack of new survey makes new models difficult to evaluate
  - Uncertainty in choices of maturity and natural mortality
- ABCs and OFLs are the same for 2022 and 2023

C3 BSAI Groundfish Harvest Specifications

AI Pacific cod 2 of 2

- The author recommended Tier 5 ABC as a reduction from Tier 3 recommended model because of uncertainties about the model
- Because retaining Tier 5 model, the SSC supports the PT determination that no additional reduction from maxABC is needed based on the risk table
- The SSC recommends bring forward an age-structured model in the next full assessment with

    - Combined maturity estimates from macroscopic and histological data

    - Use of new prior for natural mortality

- The SSC recommends exploring the utility of the AFSC longline survey in the assessment, including length data

C3 BSAI Groundfish Harvest Specifications

<ins>Yellowfin sole (1 of 2)</ins>

- Full assessment, survey biomass third lowest in time-series, but

- FSB is 80% greater than B_{msy}

- Tier 1a

- The SSC *recommends* Model 18.2 in agreement with author and PT

  - Reanalysis of survey weight-at-age improved retrospective pattern over last year

  - 2022 OFL = 377,071t

C3 BSAI Groundfish Harvest Specifications

Yellowfin sole (2 of 2)

- ABC = maxABC. However, the author and PT recommended a reduction from maxABC
  - o   SSC agreed that some concern existed, but did not warrant a reduction at this time (2022 maxABC = 354,014t)
- The SSC *recommends* the authors present standard MCMC convergence diagnostics
- The SSC *recommends* the authors bring forward models 18.2a and 18.2b (or similar) next year.
- The SSC *suggests* the authors seek input from the industry to examine effects of Amendment 80 on fishery catch compositions

C3 BSAI Groundfish Harvest Specifications

<u>Greenland Turbot (1 of 1)</u>

- Partial assessment, biennial schedule
- Long-term decline in stock biomass since the 1970's and 2021 lowest biomass in the time series
- Exploitation rate is low, catch is well below ABC
- Tier 3a, spawning stock biomass is above $B_{40\%}$
- The SSC *concurs* with 2022 and 2023:
  - o Author and PT recommended OFLs (7,687t in 2022) and ABCs
  - o No reduction from maxABC (6,572t in 2022)
  - o Apportionment between the BS and AI based on last 4 years of overlap of trawl surveys on EBS slope and AI

C3 BSAI Groundfish Harvest Specifications

<u>Arrowtooth flounder (1 of 1)</u>

- Partial assessment, biennial schedule
- Stock biomass increasing since 2013
- Exploitation rate is low, catch is well below ABC
- Tier 3a, spawning stock biomass is above $B_{40\%}$
- The SSC *concurs* with 2022 and 2023:
    - Author and PT recommended OFLs (94,445t in 2022) and ABCs
    - No reduction from maxABC (80,389t in 2022)

C3 BSAI Groundfish Harvest Specifications

<u>Kamchatka flounder (1 of 1)</u>

- Partial assessment, biennial schedule
- Stock biomass is stable, slow increase since 2014
- Exploitation rate is low
- Tier 3a, spawning stock biomass is above $B_{40\%}$
- The SSC *concurs* with 2022 and 2023:
  - o   Author and PT recommended OFLs (10,903t in 2022) and ABCs
  - o   No reduction from maxABC (9,214t in 2022)

C3 BSAI Groundfish Harvest Specifications

<u>Northern rock sole (1 of 1)</u>

- Partial assessment, biennial schedule
- 2020 model shows large 2015–2018 age-1 recruit classes
- Exploitation rates have been decreasing, catch is well below ABC
- Tier 1a, female spawning biomass is above B_{MSY}
- The SSC *concurs* with 2022 and 2023:
    - Author and PT recommended OFLs (214,084t in 2022) and ABCs
    - No reduction from maxABC (206,896t in 2022)
- Large increases in OFLs/ABCs in 2022 and 2023 due to recruitment

C3 BSAI Groundfish Harvest Specifications

Flathead sole (1 of 1)

- Partial assessment, biennial schedule

- Two-species complex (flathead sole and Bering flounder)

- BSAI biomass is stable

- Exploitation rates are low, catch is well below ABC

- Tier 3a, female spawning biomass is above $B_{40\%}$

- The SSC *concurs* with 2022 and 2023:

    o   Author and PT recommended OFLs (77,967t in 2022) and ABCs

    o   No reduction from maxABC (64,288t in 2022)

- The SSC *requests* authors investigate the order of magnitude decrease of Bering flounder in the EBS trawl survey over the last 4 years

C3 BSAI Groundfish Harvest Specifications

<u>Alaska Plaice (1 of 2)</u>

- Full assessment, survey biomass lowest in time-series, but
- Female Spawning Biomass is 25% greater than $B_{40\%}$
- Tier 3a
- The SSC *recommends* Model 11.1 in agreement with author and PT
  - This model continues to perform well.
  - 2022 OFL = 39,305t

C3 BSAI Groundfish Harvest Specifications

<u>Alaska Plaice (2 of 2)</u>

- ABC = maxABC (32,697t in 2022), in agreement with author and PT
- The SSC *recommends* examining new models that include NBS data, perhaps combined EBS+NBS VAST estimate.
- The SSC *suggests* the authors examine estimating q rather than relying on a fixed value (1.2).

C3 BSAI Groundfish Harvest Specifications

Pacific Ocean Perch (1 of 1)

- Partial assessment; exploitation rates increasing steadily since 2004; preliminary 2021 exploitation rates are reduced from 2020 except for the WAI

- Projected Spawning Stock Biomass is above B35%

- Tier 3a

- The SSC *recommends* projected harvest specifications and use of maxABC, in agreement with authors and PT

    - 2022 OFL = 42,605t, maxABC = 35,688t

- The SSC *accepts* the author and PT recommended area apportionments

C3 BSAI Groundfish Harvest Specifications

<u>Northern Rockfish (1 of 3)</u>

- Full assessment; last full assessment in 2019 (biennial schedule)
- Limited information on stock trends because no AI survey since 2018
- Increased direct targeting of northern rockfish in recent years
- New models investigate use of tight prior for ages 30 and above to estimate survey selectivity
- The SSC *recommends* Model 21 for harvest specifications, in agreement with authors and BSAI PT
  - Asymptotic survey selectivity shape = reasonable assumption (supported by selectivity from an alternative model without restrictive prior)
  - Aligns with how selectivity is estimated for other rockfishes

C3 BSAI Groundfish Harvest Specifications

Northern Rockfish (2 of 3)

- Results from Model 21 place this stock in Tier 3a

- 2022 OFL = 23,420t

- The SSC *recommends* the use of maxABC (19,217t in 2022), in agreement with the authors and BSAI PT
  - Risk table – assessment considerations score = 2, due to negative, moderate retrospective pattern and need for restrictive prior on selectivity
  - Other risk table scores = 1s

C3 BSAI Groundfish Harvest Specifications

Northern Rockfish (3 of 3)

- The SSC *recommends* any additional sources of data be investigated, given the relative scarcity of data for this Tier 3 stock
- The SSC *recommends* updating the stock structure template (2012) for this species
  - Evidence of spatially explicit differences in growth across the AI
  - Genetic data indicates spatial structure smaller than current management scale
- The SSC *registers concern* with the uncertainty in the scale of the population and the increases in harvest specifications over time, given the lack of survey data and the life history of this species

C3 BSAI Groundfish Harvest Specifications

Blackspotted/Rougheye (1 of 2)

- Partial; exploitation rates in the WAI area remain high while the CAI, EAI and EBS remain lower and are not increasing in 2021

- The 2022 projected AI portion SSB is slightly above B35% but below B40%, although continued concern over the possibility of a localized depletion in the WAI and CAI

- The AI portion of the stock is Tier 3b

- EBS portion of stock is Tier 5

- The SSC *accepts* the recommended BSAI-wide harvest specifications for 2022 and 2023, with no reduction from maxABC, in agreement with the author and PT
    - 2022 BSAI OFL = 598t, BSAI ABC = 503t

C3 BSAI Groundfish Harvest Specifications

Blackspotted/Rougheye (2 of 2)

- The SSC *accepts* the area apportionments in addition to the maximum subarea species catch (MSSC) for the WAI and CAI, in agreement with the authors and PT

- The SSC *reiterates* its October 2021 recommendation to develop a white paper summarizing how the Spatial Management Policy can be used to address concerns surrounding disproportionate spatial harvesting, as seen in the WAI and CAI

C3 BSAI Groundfish Harvest Specifications

- Full assessment using base model with no changes and updated fishery data.
- Projected female spawning biomass increased and selectivity to older fish resulted in 7% increase in 2022 ABC compared to 2021.
- Tier 3b with 2022 Female Spawning Biomass is at $B_{39\%}$
- The SSC *concurs* with the use of model 16.0b, and supports Team and author recommended 2022 and 2023 Tier, specifications of OFL and ABC and the apportionment.
  - 2022 OFL = 91,870t, maxABC = 78,510t

C3 BSAI Groundfish Harvest Specifications

Atka Mackerel (2 of 2)

- The SSC **commends** the author for the thorough risk table discussion.

- SSC *recommends* continued research into possible reasons for dome-shaped fishery and survey selectivity patterns, including senescence or differential distribution by age.

- The SSC *recommended* that BSAI Atka mackerel would be a good case study to examine when the GPTs develop guidance to assessment authors on what selectivity to use in projections for Tier 1-3 stocks (see General Stock Assessment Comments).

C3 BSAI Groundfish Harvest Specifications

<u>Skates (1 of 1)</u>

- Partial assessment, on a biennial assessment cycle
- Two components for harvest specifications:
  - Alaska skates – Tier 3 age-structured model
  - Projection model updated with new catches
  - Other skates – Tier 5 random-effects model (not re-run)
- Complex biomass from 2021 EBS trawl survey in 2021 slightly from 2019 survey
- The SSC *concurs* with the author and BSAI GPT's recommended Tier 3a and Tier 5 harvest specifications for BSAI skates, with no reduction from maxABC
  - 2022 OFL = 47,790t, maxABC = 39,958t

C3 BSAI Harvest Specifications

<u>Forage Fish (1 of 2)</u>

- The purpose of this biennial report is to monitor potential impacts of bycatch on forage fish by (1) investigating trends in forage fish abundance and distribution, and (2) describing interactions between federal fisheries and forage species.

- Noteworthy items from 2021 include:

  (1) The reclassification of squids as Ecosystem Components, for which catch limits are not required, has resulted in substantially increased squid catches in the EBS during 2019-2021. These catches are now similar in scale to catch levels during the 1970s and 1980s.

  (2) Capelin, eulachon, and other FMP forage species have decreased greatly in abundance since 2015. This general pattern occurs in the EBS and NBS.

C3 BSAI Harvest Specifications

Forage Fish (2 of 2)

- The SSC *concurs* with the Plan Team recommendation for a forage species workshop to discuss several topics, including but not limited to surveying, importance of forage to managed species, minimizing redundancy in reporting (e.g. ESR), and impacts of climate change.

- The SSC *recommends* that in light of the recent substantial increases in squid catch levels, this workshop should also focus on identifying the threshold for placing squid back in the fishery.

End of JGPT/BSAI specifications