Draft SSC Report
October 2021

Balance of SSC Report

Acknowledgements

● The SSC *congratulates* Dr. Jim Balsiger and Dr. Jeff Napp on their retirements and acknowledges their many contributions to the advancement of sustainable fisheries in Alaska.

Ecosystem and Socioeconomic Profiles

- The GOA Plan Team (PT) recommended the SSC provide clarity about how the incorporation of socioeconomic information should be used to meet the objectives of the ESPs (see GOA PT minutes under GOA Pacific cod ESP)

- The GOA PT notes that if the SSC's interest in incorporating community information within the ESP's is in terms of local ecological knowledge, that will necessitate new data collection

- There has been a pause in the development of ocmmunity/social indicators for the ESPs for some species

- The SSC *recommends* providing the draft response to the NS1 Technical Guidance Subgroup with these additions:

Ecosystem and Socioeconomic Profiles

- The SSC *recognizes* the outstanding work to date
- The SSC *recommends* a comprehensive review of how socioeconomic information is incorporated in evolving Council decision-informing productions
- The goal would be to explore existing partitioning of information, minimize redundancy, maximize coordination, ensure products align with purpose, and data gaps are addressed
- The SSC *suggests* consideration of how information informs short-term tactical and longer-term strategic Council decisions
- The SSC *suggests* SEASAW workshop may be a model for this review

Technical Memorandum on Alternative ACLs for Data Limited Stocks

- The SSC reviewed a draft response to a *Technical Memorandum on Alternative ACLs for Data Limited Stocks* prepared by SSC subgroup
- The SSC *recommends* providing the draft response to the NS1 Technical Guidance Subgroup with these additions:
  - Encourage the guidance document to include specific examples that illustrate how data-limited approaches have been implemented in each of the regions
  - Provided such an example for a Tier 6 stock from Alaska

B4 NOAA Climate Fisheries Initiative

- The goal of the CFI is to build a nationwide, operational ocean modeling and decision-support system.

- This effort will develop optimal management portfolios that includes climate enhanced adaptive management (stock assessments), infrastructural improvements, climate-smart long term strategies to anticipate interactions, reduce conflict and increase productivity, and overall dynamic management.

- The NPFMC already has a number of these applications in the Bering Sea, and the CFI lays the support for development of similar approaches in the GOA and AI.

B4 NOAA Climate Fisheries Initiative

- The SSC was pleased to see this integrated investment in climate-readiness and looks forward to following the progress of the initiative.
- The SSC *suggests* clarifying how these efforts map onto existing Council decision-informing analytic products.
- The SSC *notes* the key gaps were also identified, and in many cases additional funding will be needed to address these gaps.
- SSC *agrees* with the CPT that it would be helpful to note where research or key gaps are specific to groundfish or crab, or both
- The RAPs highlight new initiatives and projects that require additional funding but could be implemented quickly to build on the portfolio of climate-related research.
- The SSC was excited to hear about the ongoing and new research, and collaborative efforts to accomplish these goals.

B4 Climate Regional Action Plan

- Across all three RAPs, there was a strong emphasis on key gaps that derive from a lack of monitoring. The SSC *strongly supports* prioritization of fisheries independent and dependent surveys, and that these data are consistently collected and enhanced.

- All three RAPs highlighted a need for predator-prey information to understand mechanistic linkages. The SSC *supports* the efforts to stabilize funding for the diet lab and research efforts exploring the impacts of climate change on bioenergetics, foraging and energetic quality.

B4 Climate Regional Action Plans

- The SSC is *supportive* of efforts towards a collaborative research environment with Alaska Native communities in each of the RAPs and the development of a LK/TK/S Taskforce for the Arctic Region

- The SSC *stresses* the need for agencies and the Council (e.g., through its relevant committees and taskforces), to coordinate and make an efficient use of resources in communities for co-generation of knowledge, cooperation, and research.

- Similar to the CFI, the SSC *suggests* the RAPs consider including and clarifying how these existing and proposed new projects and efforts map onto existing Council decision-informing analytic products.

C1 BSAI Crab Harvest Specifications

Trawl Survey

- The SSC greatly *appreciates* the completion of the trawl surveys and *commends* the survey team for the quick turnaround of the survey data for the fall 2021 crab assessments

- Combined MMB abundance of all BSAI crab stocks are at their lowest point in the time series
  - Declines evident across all species, sex, and size classes, with only some exceptions
  - The SSC is *extremely concerned* regarding the status of BSAI crab stocks
  - Emphasizes the importance of the fishery-independent surveys

C1 BSAI Crab Harvest Specifications

Trawl Survey

- The SSC *acknowledges* the work done by BSFRF/ADFG/NMFS on tagging BBRKC and *strongly encourages* expansion to snow crab (differentiate between movement and mortality)

- The SSC *encourages* consideration of deeper sampling in the EBS trawl survey
  - Acknowledging previous recommendations regarding the prioritization of the regional bottom trawl surveys
  - Noting that pot sampling may be beneficial for untrawlable habitat

- Finally, the SSC *notes* that a holistic look may be necessary to explain the decline in snow crab
  - Including: food conditions, thermal-induced metabolic stress, predation

C1 BSAI Crab Harvest Specifications

Norton Sound RKC Model Runs

- SSC *supports* authors bringing forward the base model (19.0) and two new models (21.0 and 21.1) and, if possible, 21.0 with estimated M
- Changes to the base to 21.0 and 21.1 were:
  - Update to the fishery CPUE model (21.0, 21.1)
  - Proportional method for discard estimation (21.0, 21.1)
  - Single M for all ages (21.1)
- The SSC *recommends*
  - A total catch OFL (including discards) for 2022 and methods to deal with lack of observer program
  - Continue transition to GMACS model
  - Bridging models to show effects of changes

C5 Observer Draft 2022 Annual Deployment Plan

- Proposed deployment of observer and electronic monitoring resources to vessels in the partial coverage and EM programs
  - Incorporated input from Fishery Monitoring Science Committee (FMSC)
- Analysts indicated preliminary budget for 2022 appears sufficient to support baseline observer coverage
- Projected 2022 fishing effort and examined 4 partial coverage allocation strategies in response to the Council's June 2021 motion
- Similarity analyses used to compare how strategies were likely to generate data representative of unobserved fishing

C5 Observer Draft 2022 Annual Deployment Plan

- The SSC *commended* the authors and *recognized* the extensive efforts to maintain critical data streams under challenging COVID conditions

- The SSC *supports* NMFS and FMSC recommended Adjusted Minimum + Optimization strategy for 2022 and 2023 ADP

- The SSC *supports* the NMFS recommendation to holistically develop an integrated evaluation of the partial coverage category and a new contract for observer coverage in the partial coverage category for implementation in 2024.

- SSC discussion of the impacts of EM expansion on the collection of biological samples can found under the C6 – Joint Plan Team section of our minutes

C6 Groundfish general comments

- BSAI GPT requested guidance from SSC on data weighting
- SSC *recommended* Plan Teams and assessment authors consider a workshop to build on previous efforts to develop standard practices for data weighting in stock assessments

C6 Joint Plan Team Report

EM Workshop (1 of 3)

- AFSC virtual workshop held in July to discuss EM programs and resultant data collections
- Workshop report offered several recommendations
  - Deployment of at-sea observers in a way that is representative of fishing effort
  - Develop a process for coordinated feedback to NPFMC and advisory bodies regarding stock assessment data needs
  - Metrics on EM program performance and potential impacts on assessments
  - Continued work on methods to estimate weight of at-sea discards in the EM strata

C6 Joint Plan Team Report

EM Workshop (2 of 3)

- The SSC *concurs* with the JPT for continued work on 4 workshop recommendations to improve sampling programs and data pipelines used in assessments
- PT advised that a process be developed to deliver and solicit feedback to assessment authors and to develop performance metrics
- The SSC *recommends* a workgroup of stock assessment authors to:
  - Work with the Fisheries Monitoring and Science Committee (FMSC) to integrate assessment author advice on
    - ADP, Annual Report, performance metric development
    - Cost Efficiencies Integrated Analysis
  - Improve data coordination among data suppliers/assessment authors

C6 Joint Plan Team Report

EM Workshop (3 of 3)

- Workgroup noted that information about whale depredation, seabird interactions, and marine mammal presence is not currently detectable in EM videos.
- SSC encourages further exploration of methods to address these data gaps, which are of management interest.

C6 Joint Plan Team Report

Essential Fish Habitat (1 of 3)

- The SSC received an overview of the JPT discussion on Component 1 (EFH descriptions), the plan for Component 2 (fishing effects models, FE), and the stock author reviews of the species distribution models (SDMs).

- SSC *appreciates* the progress made on the new SDM modeling and was pleased to hear about assessment author involvement

- JPT noted concern that the current timeline may preclude a sufficient iterative review process with the stock authors and/or review bodies

- SSC has not yet had an opportunity to review analytical results: Review is scheduled for February 2021.

C6 Joint Plan Team Report

Essential Fish Habitat (2 of 3)

- SSC shares JPT concerns about the scientific review timeline
  - Recommended the EFH team provide an updated review schedule: what has been reviewed to date and timeline for key review/decision points
  - The timeline should consider stock author input on EFH descriptions/FE modeling
  - Stock author input on the fishing effects model results/EFH descriptions likely not available prior to SSC review in February

C6 Joint Plan Team Report

● SSC shares JPT concerns about the scientific review timeline (cont'd)

  ○ EFH results are hierarchical (i.e., SDMs inform Fishing Effects). Should more analysis and review be required after SSC review in February, adjustments to the schedule should be considered

  ○ The SSC *requests* the EFH authors provide the EFH materials as early as possible to maximize review time

  ○ SSC *requested* a number of items to facilitate review in February

21

C6 Joint Plan Team Report

VAST BTS

- JPT report on work done by the AFSC Groundfish Assessment Program (GAP) on VAST indices

- GAP group proposed a priority list of VAST development activities

- SSC *supports* the JPT recommended species prioritization pending review by the Crab Plan Team

- SSC *endorsed* JPT recommendations to add Greenland Turbot and Rock Sole to the priorities

- SSC *noted* a number of areas of future development and *requests* species-specific work be aligned with assessment cycles

C6 Joint Plan Team Report

Age Composition Estimation (1 of 3)

- Simulation used to evaluate how changes in sampling intensity for compositional data influence effective sampling sizes and assessment uncertainty

- Work done by Jim Thorson (AFSC), Andre Punt(UW), Pete Hulson (AFSC), Jim Ianelli (AFSC), and Meagan Bryon (AFSC)

- The SSC *supports* JPT recommendation for further work
  - Useful for guiding survey sampling and age reading
  - Include species in the Bering Sea

C6 Joint Plan Team Report

Age Composition Estimation (2 of 3)

● The SSC **agrees** with JPT recommendation that this analysis should be periodic rather than an annual assessment product, but notes changes in assessment methods may influence results

● The SSC had a number of suggestions for future work:

   ○ Differentiate onboard sampling costs from aging costs

   ○ Evaluate potential impacts for changes in assessment and data weighting methodology

   ○ Better define what is an optimal level of sampling

   ○ Consider whether results could be broadly applied across Tiers

C6 Joint Plan Team Report

Age Composition Estimation (3 of 3)

- SSC had a number of suggestions for future work (cont'd):

  - For the ABC uncertainty (P*) cost analysis, consider situations where the ABC/TAC is not fully utilized

  - SSC and JPT noted the work may have utility for fishery dependent data, but deployment methods (i.e., sample stratification and intensity) and data acquisition costs different from the survey complicate its use.

C6 Joint Plan Team Report

Tiers 4 and 5 Considerations

- AFSC Workgroup report detailing Tiers 4 and 5 assessment methods
- The report outlined several important findings:
  - Differing random effects methods among assessments
  - Inconsistent treatment of zeros among assessments
  - Differing methods exist for combining multiple indices
  - Modeling approaches for complexes differ considerably
  - Combing lognormal estimates is a challenge
- The SSC and JPT *endorsed* the workgroup plan to address findings
- The SSC *highlights* inconsistent treatment of zeros among assessments and recommends evaluation of this issue be a priority

C6 Joint Plan Team Report

- The SSC reviewed the June 2021 Council motion, received presentations from the JPT and CPT, and reviewed the June 2021 SSC's recommendations to provide final revisions to the Risk Table guidance.

- The SSC *recommends* the following changes:

  o Adopt Council language that previous reductions to maxABC should not be the basis for reducing maxABC unless relevant risk factors for a stock continue to be present

  o Risk Table are mandatory for Tiers 1-3 stocks; Tiers 4-6 are at discretion of author(s), but they must provide appropriate rationale.

C6 Joint Plan Team Report

Risk Table Review (2 of 4)

- The SSC *recommends* the following changes (cont'd):
  - For stock complexes, authors will be responsible for deciding which species Risk Table(s) will be completed.
  - Category levels will be reduced from 4 to 3 (normal, increased, extreme), but not until 2022/23 season.

C6 Joint Plan Team Report

Risk Table Review (3 of 4)

- The SSC discussed and continues to *support*:
  - Including the term "unusual" in the Population Dynamics category. This includes rapid increasing and decreasing trends. Rapid changes in stock abundance and atypical recruitment are often also highly uncertain.
  - Only including negative trends in Assessment, Ecosystem and Fishery Performance sections. Default is postive or neutral and default option is no reduction from maxABC

C6 Joint Plan Team Report

Risk Table Review (4 of 4)

- The SSC discussed and continues to *support* (cont.):
    - o Stock assessment author(s) should (but aren't required to) initiate recommendations for reductions from maxABC.
    - o The CPT bring forward draft Risk Tables for BBRKC and snow crab so they can better evaluate and recommend uses.
    - o That the SSC regularly revisit and revise this guidance as needed.

C6 Joint Plan Team Report

Preliminary harvest specifications for 2022/2023 & Halibut DMRs

- The SSC *recommends* approval of the proposed preliminary groundfish harvest specifications for the BSAI and GOA for 2022 and 2023.

- The SSC also *supports* the BSAI and GOA GPT's recommendations to approve the Halibut DMR working group recommendations for proposed halibut DMRs for 2022-2023.

  o The SSC notes that the GOA GPT agreed that the GOA non-pelagic trawl CP sector now has sufficient sample size to calculate the GOA trawl CP DMR instead of using the BSAI DMR.

C6 Joint Plan Team Report

Sablefish

- The SSC reviewed proposed model changes for the 2021 full assessment.

- Authors considered updated weight and growth for the period 1996-present, and updated age- and length-based maturity including skip spawning.

- Authors explored three structural changes – priors on catchability; time blocks for fishery and survey catchability; and data weighting.

- The SSC *recommends* that models 16.5, 21.10, 21.10 without skip spawning, and a model that explores alternative treatments of longline survey selectivity and catchability.

C6 Joint Plan Team Report

<u>Sablefish</u>

- The SSC *recommends* requests a bridging exercise to distinguish the impacts of proposed changes to fishery selectivity and catchability from proposed changes to survey selectivity and catchability.

- The SSC *supports* the author's incorporation of a new "Post-2016" fishery CPUE catchability and selectivity time block due to observed changes in fish distribution, gear and fisher behavior.

- The SSC *recommends* that the authors justify why survey selectivity would have changed after 2016. The SSC *recommends* that the authors explore other methods for constraining time varying survey selectivity.

C6 Joint Plan Team Report

<u>Sablefish</u>

- The SSC *requests* that whale depredation estimates are updated and that authors consider how rapid changes in the prevalence of pot gear would impact these estimates.

- The SSC is *concerned* that the 2020 fishery CPUE data may not be available for this assessment. The SSC *requests* that the author explore options for how this information could be processed more quickly.

- The SSC *inquired* about what steps would be taken to advance this assessment toward the 5-year survey average apportionment approach and noted that a 50% step from the 2021 apportionment would be consistent the intent of moving toward full use of the 5-year average approach. The SSC also requests that the authors also present the 5-year average for comparison.

C6 BSAI Groundfish Plan Team Report

EBS Pollock

- Brief informational update on the status of responses to previous requests and fishery trends in 2021

- The SSC clarified its request regarding the performance of selectivity projections used to calculate OFLs and ABCs

- The SSC *recommends* an evaluation of the Tier 1 classification relative to Tier 3 or Tier 2, given uncertainty in the stock-recruitment relationship

- The SSC *recommends* that conditioned on the Tier classification the ABC buffer be based on the risk table rather than the continued use of Tier 3 calculations for a Tier 1 stock

C6 BSAI Groundfish Plan Team Report

EBS Pacific Cod (1 of 3)

- The SSC *recommends* models for consideration in an ensemble modeling approach that add one feature each to the base model:

  - including models that use time-varying survey catchability (21.12a), dome-shaped selectivity (21.1), or a fishery CPUE index (21.2)

  - excluding model 21.3, which appears to put an unrealistically low weight on the survey and results in a much lower recent biomass

- The SSC highlights the extensive contributions of three CIE reviewers to developing this year's set of models and recommending model weights

C6 BSAI Groundfish Plan Team Report

EBS Pacific Cod (2 of 3)

- The SSC notes several features that address critical concerns:
  - inclusion of the new combined NBS + EBS survey biomass index in all models accounting for fish outside traditional (EBS) survey area
  - dome-shaped selectivity in one of model 21.1 may account for unobserved, large Pacific cod not available to the NBS + EBS survey
- The SSC *provisionally supports* the authors' conclusion that, for the ensemble modeling, the harvest control rule should be used before applying model averaging, but encourages further work on best practices for model averaging
- The SSC highlights results from a tagging study that documents movements of Pacific cod between the eastern Bering Sea and Russian waters and movements from the NBS to the Gulf (1000 km+)

C6 BSAI Groundfish Plan Team Report

EBS Pacific Cod (3 of 3)

- The SSC appreciates the combined analysis of Russian and US survey data and **recommends** further research on spatial modeling and other ways to address the transboundary nature of the stock

C6 BSAI Groundfish Plan Team Report

AI Pacific Cod

- The SSC *supports* the development of the age-structured model and will consider the GPT recommended models along with a Tier 5 approach

C6 BSAI Groundfish Plan Team Report

Impact of Altering Survey Design and Density on Survey Indices

- Simulation study that examined impact of sampling design, density, and estimators for the EBS shelf bottom trawl survey indices.
- The SSC *supports* conclusion to continue systematic survey design at present.
- The SSC *recommends* continued evaluation of SE estimator that produces less-biased estimates for possible implementation
- The SSC *recommends* additional analysis: other species, comparison to VAST estimates, extend to stock assessment to evaluate impact.
- The SSC *supports* PT recommendation to add GAP staff to study team.

C6 BSAI Groundfish Plan Team Report

Performance of Model-Based Indices Given Alternative Sampling Strategies

- Analyses to investigate performance of model-based indices with large survey areas missing and reduced survey density or frequency.

- The SSC *supports* conclusion that effects of reduced sampling density and frequency need to be considered in developing future survey strategies.

- The SSC *recommends* extending analyses to stock assessment examples to understand impact.

- The SSC *suggests* authors consider if number of knots used is sufficient.

- The SSC *supports* GPT recommendation that reduced density is preferred over reduced frequency of surveys.

C6 BSAI Groundfish Plan Team Report

BSAI Greenland Turbot

- Center for Independent Experts (CIE) Review
- Current model was found to be adequate for management
- CIE reviewers made several recommendations for model improvements
  - Evaluation of selectivity and catchability parameterization
  - Ageing otoliths currently in backlog
  - Simplify the model
  - Conducting sensitivity analysis on the early catch history
  - Investigate potential model convergence issues
- The SSC *concurs* with the JPT recommendation for authors to evaluate the CIE recommendations for the next full assessment (2022)

C6 BSAI Groundfish Plan Team Report

Blackspotted/Rougheye Rockfish Genetics and Spatial Management (1 of 2)

- Update on BS rockfish genetic stock structure and spatial management concerns.

- The SSC remains **concerned** with disproportionate spatial harvest and vulnerability to localized depletion.

- The SSC **recommends** Council consider moving to Step 2 of the Spatial Management Policy.

- The SSC **recommends** white paper focusing on new information, how to address conservation and management concern, economic and management implication, and tools to achieve management and conservation.

- The SSC **recommends** exploration of level of depletion that would cause conservation concern given lack of genetic structure.

C6 BSAI Groundfish Plan Team Report

Blackspotted/Rougheye Rockfish Genetics and Spatial Management (2 of 2)

- The SSC *supports* BSAI GPT recommendation to evaluate cost/benefit of tagging and larval studies.
- The SSC *notes* an upcoming full assessment in 2022 if changes in setting of specifications are recommended.

C6 GOA Groundfish Plan Team Report

GOA Pollock

- New lead author, Dr. Cole Monnahan transition from Dr. Dorn
- Brief informational update on the status of responses to previous SSC and PT
- Alternatives to time-varying catchability and selectivity were explored
- The impacts of different survey indices were evaluated
- The SSC **encourages** further explorations on the spatial and temporal coverage between the surveys
- The SSC looks forward to adapting geostatistical models from EBS pollock to combine acoustic and bottom trawl survey estimates

C6 GOA Groundfish Plan Team Report

GOA Pacific Cod (1 of 3)

- The SSC received a presentation describing several research models, which:
  - o Incorporate a new beach seine index of age-0 cod abundance
  - o Estimate SST and heatwave effects on growth, recruitment, and natural mortality
  - o Expand the assumed natural mortality time block from 2014-2016 to 2015-2020
  - o Tune effective sample sizes for age and length compositions, and variances for survey indices

C6 GOA Groundfish Plan Team Report

GOA Pacific Cod (2 of 3)

- The SSC ***supports*** the authors' recommendation to bring forward Model 19.1 for the November assessment

- The SSC encourages the authors to explore a tuned version of Model 19.1

- The SSC supports presentation of the following research models at the authors' discretion
  - 21.1e – age-0 index, environmentally-linked growth, mortality and recruitment
  - 21.1g – tuned version of 21.1e
  - 21.5c – environmentally-linked growth and recruitment, updated time block for M
  - A possible variant (21.6) – including the age-0 index and tuning

C6 GOA Groundfish Plan Team Report

GOA Pacific Cod (3 of 3)

- The SSC supports further research to identify possible model misspecification with respect to M
  - o Evidenced by conflict between age-0 index, and NMFS BTS and LL survey
  - o Exploration of age-specific M, either time-invariant, heatwave-linked, or time blocked
- With respect to the age-0 beach seine index
  - o SSC encourages consideration of whether model-based uncertainty estimates accurately reflect true uncertainty
  - o Given small spatial extent of sampling relative to juvenile Pacific cod distribution in the GOA

C6 GOA Groundfish Plan Team Report

GOA DSR/Other Rockfish Spatial Management

- The SSC *supports* GOA GPT recommendation separating DSR from other rockfish complex GOA-wide.

- The SSC *recommends* Council consider moving to Step 2 of the Spatial Management Policy.

- The SSC *suggests* as part of Step 2 that white paper be written (update 2017 discussion paper) to identify economic and management implication and tools to achieve management and conservation goals.

C6 GOA Plan Team Report

GOA Pacific Ocean Perch

- The SSC reviewed a summary of recommendations from the 2021 CIE review for this assessment. POP is on a biennial cycle and full assessments are scheduled for odd years to coincide with the Gulfwide bottom trawl survey.

- Authors do not plan to address the CIE recommendations until 2023.

- The SSC *recommends* that the approved model from December 2020 be used as the base model for 2021.

- The SSC *requests* that the authors develop responses to the CIE recommendations and looks forward to reviewing proposed model changes in the future.

C6 GOA Plan Team Report

<u>GOA Flathead sole</u>

- The SSC *supports* the author's and GPT recommendation to proceed with a partial update for 2021, as the survey index remains high and there is no indication of a conservation concern at this time.

C6 GOA Plan Team Report

GOA Northern/Southern Rock Sole

- The SSC reviewed reports from CIE reviews of the northern and southern rock sole assessment and proposed model changes to address some of these recommendations.

- The SSC *commends* the CIE reviewers for their thorough and thoughtful comments on this assessment.

- The SSC *commends* the assessment authors for their timely responses to CIE recommendations.

- The SSC *agrees* with the GOA GPT that the following models should be brought forward in November: 17.1, 17.1d, and 17.1f.

- The SSC *agrees* with the author that split area models and models that freely estimate survey catchability (17.1e) are not ready for consideration for the 2021 assessment.

D2 ACLIM and GOA CLIM reports

- The SSC *recognizes* the urgency of developing climate-resilient approaches to managing Alaska's fisheries, given recent climate-related declines in several important stocks

- The SSC *finds* that the ACLIM 2.0 and GOA CLIM projects can provide the backbone of a system to build more resilient fisheries

- The SSC *suggests* some possible management actions and scenarios for the authors to consider in simulations / MSEs:

  - modified / dynamic OY ranges (caps), gear limitations / spatial management options, transboundary arrangements, dynamic control rules, catch/bycatch allocations, etc.

  - the SSC *suggests* that these projects provide an opportunity for more broadly evaluating alternatives to current management approaches (e.g. retention requirements, 'balanced harvesting', etc)

D3 October Preview of ESR

- The SSC received presentations on the preliminary information available for inclusion in the EBS, AI and GOA ESRs to be presented to the Council at the December 2021 meeting

- The SSC *emphasizes* the need for mechanistic studies to understand impacts of climate change

D3 October Preview of ESR

- Highlighted were several red-flag issues.

<u>Eastern Bering Sea</u>

1) Female BBRKC decline

<u>Northern Bering Sea</u>

1) Snow crab decline
2) Seabird die off
3) Low AYK chum and Chinook returns

<u>Aleutian Islands</u>

1) Marine heatwave
2) EAI - HABs
3) WAI/CAI - Mercury in SSL and fish

<u>Gulf of Alaska</u>

1) Seabird die off Middleton Island
2) Right Whales in Barnabus Trough and SW of Kodiak Island

- Positive note: primary productivity in NW GOA was the highest in 24 yrs