

C3: Ecosystem Status Reports for the Eastern Bering Sea and Aleutian Islands

- The SSC appreciates the excellence of the three Ecosystem Status reports and their findings.
- In the **EBS**, the most important findings are **the extraordinary warm winter of 2017-18**, the lack of sea ice in the northern Bering Sea, and the major northward shifts in the distributions of Pacific cod, walleye pollock and other stocks.
 - The **lack of ice** in the southeastern Bering is likely **to result in weak year classes of pollock** and possibly cod.
- In the Aleutian Islands, there continue to be **indications of problems in the westernmost portion of the Chain**.

C3 BSAI Groundfish Specifications

EBS Pollock

- The author considered 4 different models in this assessment. The SSC **supports** the author and PTs choice of Model 1 as the preferred model and to set maxABCs and OFLs for 2019 and 2020. Model 1 is Model 16.1 updated with new data.
- The SSC agrees that this stock qualifies for management in Tier 1a.
- The SSC reviewed the risk table and agrees that there are elevated population and ecosystem concerns and agreed with the proposed 30% reduction in ABC from the maximum permissible.

EBS Pollock

- The SSC encourages authors to periodically review and update information regarding the mechanistic understanding of underlying dynamics that determine stock productivity including environmental and density-dependent effects.
- The SSC supports the PT request for further exploration of methods for inclusion of the NBS and exploration of alternative spatio-temporal modeling options.
- The SSC supports other PT recommendations for data exploration.

C3 BSAI Groundfish Specifications

Bogolof Pollock

- The SSC agreed that this stock should be managed as a Tier 5 stock.
- The SSC supported the use of a random effects model updated with recent survey biomass.
- The SSC accepted the author and Plan Team recommendations for the 2019 and 2020 ABCs and OFLs.
- The SSC recommends that the genetic stock composition of this population is updated with more recent information.

C3 BSAI Groundfish Specifications

AI Pollock

- This assessment was a routine update of the last accepted model with new data.
- Projected stock status indicates that management of this stock can be transitioned from Tier 3b to Tier 3a.
- The SSC accepted the author and Plan Team recommendations for ABC and OFL.
- The SSC recommends that the authors reconsider the time period over which recruitment estimates are used to estimate biological reference points.

C3 BSAI Groundfish Specifications

EBS Pacific cod

- The SSC ***supports*** the author and PTs choice of a new model including Northern Bering Sea survey information
 - Low recent recruitment identified as an important concern leading to reduced SSB and ABCs in the projections.
- The SSC ***supports*** the author's recommendation for the maximum ABC
 - In-season reporting of 2019 fishery performance should be used to track the presence and success of the cod currently in the Northern Bering Sea and supports new tagging studies.
- The SSC ***recommends*** continued development of the assessment models, and research to better understand the population dynamics of the Bering Sea stock

C3 BSAI Groundfish Specifications

AI Pacific cod

- The SSC ***supports*** the PT and author's recommended Tier 5 status and ABC
- The SSC also ***supports*** the use of the random effects model for apportionment.
 - Further research recommended on alternative model-based apportionment methods
- The SSC ***requests*** that an age-structured model be developed and brought forward for review

C3 Atka Mackerel

- The SSC *agrees* with the authors and team to use last year's base model (Model 16.0b), updated with new data including the 2018 AI trawl survey, for setting OFLs and ABCs for 2019 and 2020.
- The SSC *agrees* with the decision to drop the 1986 survey age composition data from the assessment.
- Spawning biomass is experiencing an ongoing decline from a peak in 2005 to $B_{38\%}$ in 2019, moving this stock from Tier 3a to 3b.
- The SSC appreciates the use of the risk matrix and *agrees* with the resulting authors' and team's recommendation to use maxABC.
- The SSC *agrees* with the authors' and team's apportionment among the Eastern, Central and Western AI based on a pre-2015 method using weighted average of the previous four surveys. The random effects model did not accommodate a large apparent decrease in biomass for the Central AI that is inconsistent with fishery data.

C3 - BSAI specifications

Yellowfin Sole, Northern Rock Sole, Greenland Turbot

- The SSC ***supports*** Plan Team recommendations for ABC and OFL for these stocks under Tier 3a (Greenland Turbot) or Tier 1a.
- The SSC highlights efforts to use environmental information in these assessments to inform estimates of survey catchability or recruitment
- The SSC ***suggested*** several improvements to these assessments that includes considerations of stock distribution
 - A considerable portion of yellowfin sole biomass occurs in the NBS, highlighting the importance of the NBS survey
 - Consideration of Russian catches in the Turbot assessment
- The SSC ***re-iterates its support*** for using the Northern Rock sole stock assessment as a test case for the use of an ensemble model in the specification process

C3 BSAI Arrowtooth flounder

- The assessment authors presented five models that explored three methodological changes.
- The SSC *supports* the Plan Team and author recommended model for harvest specifications (Model 18.9)
- The SSC *agrees* with the Tier 3a status for arrowtooth flounder and the recommended OFL and maximum permissible ABC

C3 BSAI Kamchatka flounder

- The assessment authors presented two alternative models that included 1) updated data and 2) updated length-at-age transition matrices
- The SSC ***supports*** the Plan Team and author recommended model for harvest specifications (Model 16.0a – model with updated data only)
- The SSC ***agrees*** with the Tier 3a status for Kamchatka flounder and the recommended OFL and maximum permissible ABC
- The SSC supports the Plan team recommendation to revisit the length-at-age matrices in the next full assessment.

C3 BSAI Flathead sole

- The assessment author is to be commended for the clear and thorough transition to the Stock Synthesis platform for this assessment
- Seven alternative models from the new SS3 platform were presented
- The SSC *supports* the Plan Team and author recommended model for harvest specifications (Model 18.2c)
- The SSC *agrees* with the Tier 3a status for flathead sole and the recommended OFL and maximum permissible ABC

C3 BSAI Alaska plaice

- An updated projection model was run in this Tier 3 partial assessment
- Survey biomass continues a slow decline and the SSC notes the catch in 2018 is above the long-term average (though within ABC)
- The SSC **agrees** with the recommended OFL and maximum permissible ABC

C3 BSAI Other flatfish

- The random effects model was updated with survey biomass in this Tier 5 partial assessment
- The SSC **agrees** with the recommended OFL and maximum permissible ABC

C3 BSAI Groundfish Specifications

Pacific ocean perch

- The authors made a very minor change to fishery selectivity
- The SSC **agrees** with the authors and PT recommendations for OFL and ABC
- The ABC is up 19% from 2018
- The authors found that adding time-varying catchability reduced large retrospective bias, but the SSC agrees that this seems unlikely for the AI survey given its nearly fixed-station design
- The SSC **suggests** the authors try incrementally removing data sources to see if the poor fit to the AI survey could be isolated to another data source.

C3 BSAI Groundfish Specifications

Northern rockfish

- Partial assessment
- Catch was updated and catches were projected for 2018 and 2019
- The SSC *agrees* with the authors and PT recommendations for OFL and ABC
- Next year will be a full assessment

C3 BSAI Groundfish Specifications

Blackspotted/Rougheye rockfish (1/2)

- The authors suggested, through the use of age data, that the old fish were highly exploited, but down-weighted these data in the recommended assessment
- Age composition fit was degraded, to fit the survey marginally better
- Retrospective bias still poor
- Improvement over base model was not evident
- Model averaging by PT was not done ideally
- The SSC **agrees** with the authors moving to an AI only Tier 3 age-structured model and a Tier 5 for the BS
- The SSC **disagrees** with the authors recommended model and PT model averaging for recommended OFL and ABC

C3 BSAI Groundfish Specifications

Blackspotted/Rougheye rockfish (2/2)

- The SSC ***recommends*** the AI only model that corresponds to the base model recommended in 2016 for AI ABC/OFL
- The SSC ***recommends*** the authors configure an AI model without length data to see if retrospective pattern and poor fits can be improved
- The SSC ***recommends*** the authors evaluate new maturity-at-age estimates to determine if they should be used in the AI assessment
- The SSC ***recommends*** the authors evaluate dome-shaped survey selectivity to resolve poor fits to older aged fish
- The SSC remain concerned about the exploitation in the Western AI and ***recommends*** the authors continue to monitor the MSSC

C3 BSAI Groundfish Specifications

Shortraker rockfish

- Full Tier 5 assessment included new 2018 AI survey biomass (up 74% from 2016)
- Model did not follow point closely as it was imprecise, so modest increase in ABC/OFL
- The SSC *agrees* with the authors and PT recommendations for OFL and ABC

C3 BSAI Groundfish Specifications

Other rockfish

- Full Tier 5 assessment included new 2018 AI survey biomass and 2017-2018 EBS shelf survey biomass
- Small decline ABC/OFL
- The SSC **agrees** with the authors and PT recommendations for OFL and ABC
- The SSC **recommends** the evaluate whether SST and non-SST portions should be pooled for better model estimation

C3 BSAI Groundfish assessments and specs

Skates complex

- Full assessment, updated survey data. All but Alaska skate are Tier 5
- Model for Alaska skate same since 2014, but new method applied to estimate catch and exploitation based on species composition of observer-sampled portion of catch. Tier 3.
 - Same method applied to Tier 5 assessments in complex
- OFL and ABC are sum of Tier 3 and Tier 5 assessments, and increased 5% over 2018 (driven by very high Alaska skate biomass)
- The SSC **supports** model improvements and **accepts** OFL and ABC as proposed by the authors and Plan Team
- Aggregate ABC for entire complex *may* expose other skates to undue risk, especially the endemic leopard skate

C3 BSAI Groundfish assessments and specs

Sharks complex

- Full assessment, updated survey data. Tier 6
- Utilize average catch from 2003-15. No reliable estimates of biomass
- OFL and ABC are same as 2018
- The SSC **supports** assessment continuity and **accepts** OFL and ABC as proposed by the authors and Plan Team
- Catch rates of Pacific sleep shark have been decreasing past several years, but the reason is unclear
 - Could be avoidance, population decrease, or movement out of the survey area

C3 BSAI Groundfish assessments and specs

Octopus complex

- Full assessment, updated survey data. Tier 6
- Seven species in the complex, but dominated by giant Pacific octopus
- Novel assessment method uses gut contents from Pacific cod to provide index of abundance
- OFL and ABC are same as 2018
- The SSC **supports** assessment method and **accepts** OFL and ABC as proposed by the authors and Plan Team