



C-6 BSAI Groundfish Harvest Specifications

SSC December 2016

Anchorage

FLC Comments

- BSAI P-cod
- AI P-cod
- Turbot
- Sharks
- Black Spotted/Rougheye

EBS P-cod: Tier 3a

- Long process with CIE review; multiple Joint Team Sub-Committee recommendations; multiple Plan Team recommendations; and multiple SSC recommendations.
- Result is the brave new world of 16.xx models.
- Given where we are at in the model process, the FLC supports the author and Plan Team recommendation for 2017 ABC of **239,000 mt** and 2018 ABC of **255,000 mt** (Model 16.6).

EBS p-cod (con't)

- Arguments can be made for models that result in higher ABCs - and arguments can also be made for models that result in lower ABCs.
- Individual models have better fits or measures to individual parameters.
- With a few qualms about model averaging, FLC believes the author/PT approach for 2017/2018 is reasonable.
- FLC also supports the spring cod modeling meeting.
- Previously, the SSC discussed a workshop on model averaging for all stocks (before incorporating into SAFEs), and the FLC would support that as well.

EBS p-cod: 2017/2018: SAFE author approach

- *“Final Model: Conclusion: Given that each of the models has something to commend it but each also leaves something to be desired, and that a full model averaging approach does not seem possible at this time, it is reasonable to choose Model 16.6 as the final model, because its 2017 maximum permissible ABC comes closest to the average across all models.”*

EBS p-cod: Plan Team

- The Plan Team discussed issues related to model averaging as well as issues related to empirical weight-at-age (16.1) and modeled weight-at-age (16.6).
- *“The Team decided to adopt the Author’s approach for this year and accepted Model 16.6 as the preferred model for harvest specifications for 2017 [and 2018].”*

EBS p-cod: Empirical weight-at-age versus modeled weight-at-age

- *“A member of the public [Martell] noted that modeled weight-at-age (Model 16.6) was mostly heavier (possibly about 20% heavier) than the empirical weight-at-age used in the other models, which means that the model with the heavier weight-at-age would need fewer numbers of fish to achieve the same catch. It was suggested that Model 16.6 is inconsistent with the observed weight-at-age data.”* See attached comparing 16.1 and 16.6.

EBS p-cod: Future Work

- *“The Team also encourages the analyst to continue investigating these models and new models:*
- ***Comparing model predicted weight-at-age in Models 16.6 and 16.7 to the empirical weight-at-age used in Model 16.1.***
- *Weighting (tuning) composition data using the Francis method or the harmonic mean of the effective sample size (McAllister & Ianelli approach).*
- ***Continued investigation of time-varying fishery selectivity for use in future models.***
- *Investigating methods to determine the variance of the penalty function applied to the deviations (i.e., tuning the deviates).*
- *Comparing the estimated recruitment variability (σ_R) to the root mean squared error (RMSE) of the estimated recruitment deviations over a period of years that is well informed.”*

Aleutian Islands P-cod: Tier 5

- FLC supports Plan Team 2017/2018 ABC = 21,500 mt (up **+22%**).
- AI survey: Total biomass is up **+16%** and has been increasing since 2010 (**+43%** since 2010).
- The WAI SSL p-cod limit is approximately 25% of TAC = **3991 mt** (up **+18%** from last year).
- Support continued work towards age-structured models and movement to Tier 3.

BSAI Greenland Turbot: Tier 3a

- 2016 EBS slope survey: **+31%** (from 2012).
- 2012 survey had a lower biomass but higher abundance due to large 2007-2010 recruitment.
- Age classes now maturing, moving down slope, and contributing to the survey biomass.
- **83.5%** of biomass and **87.9%** of abundance located in depths between 400 and 800 meters
- 2017 estimate of female spawning biomass **+63%**

Greenland Turbot (con't)

- Support Plan Team recommendation for 2017 ABC of **9825 mt** and 2018 ABC of **10,864 mt**.
- Author proposed setting ABC below max ABC using an ad hoc “7000 mt rule” based on historic catches from the late 90s (ABC set at 7000 mt or max ABC – whichever is less).
- Plan Team: *“The Team discussed this approach for setting ABC, but ultimately decided that it was not appropriate at this time and thus decided that the ABC be set at the max ABC.”*

BSAI sharks: Tier 6: Background

- Sharks was formerly a portion of “other species”.
- When sharks were broken out of “o. species”, the decision was made to not use the average catch to set ABC/OFL (as proposed by the author) but to use maximum catch, in part based on the wide range of historical shark catches (and the likelihood to exceed ABC/OFL based on avg. catch) as well as other factors.
- Since 2011: OFL = **1364 mt** and ABC = **1022 mt**
- Shark catch is truly incidental in the BSAI: bycatch status only; no gear type is targeting sharks; and there is 0% retention in both trawl and longline.

BSAI sharks (con't)

- **SSC 2010:** *““The authors recommend management of the shark complex under Tier 6, based on average catch over 1997-2007. However, the Plan Team recommended management under Tier 6 based on maximum catch. The Plan Team’s rationale for using maximum, rather than average, catch is two-fold.”*
- *“First, sharks were formerly in an “Other Species” category that had a very large OFL, but now are managed separately under a much smaller OFL that affords greater conservation. **Nonetheless it is based on catch records that are known to be underestimates.**”*
- *“Second, sharks are relegated to bycatch only, so there is no possibility for a new fishery to target sharks.”*

BSAI sharks (con't)

- **SSC 2010:** *“For these reasons, the SSC endorses the Plan Team’s recommended OFLs and ABCs for BSAI sharks based on Tier 6 using maximum catch.”*
- At the 2014 Plan Team, the author again proposed a BSAI shark ABC/OFL based on average catch with ABC = **454 mt** and OFL = **605 mt** (a -65% proposed reduction in ABC/OFL.).
- Historical catches would have exceeded ABC 8 times and OFL 3 times.
- The author based the proposed ABC/OFL method on a comment from one of the three CIE reviewers.

BSAI sharks (con't)

- However, the two other CIE reviewers did not concur.
- CIE Volstead stated that the “***Current method*** [maximum catch] ***of assessing sharks is therefore acceptable because of data limitations.***”
- CIE Cordue “***If historical catch has to be used then the average over a period is not appropriate.....It is just asking for trouble*** [using average catch] ***in that more than half of the time (because of the 25% buffer between OFL and ABC and assuming the distribution of catches is symmetric) the ABC will be exceeded.***”

BSAI Sharks 2017/2018

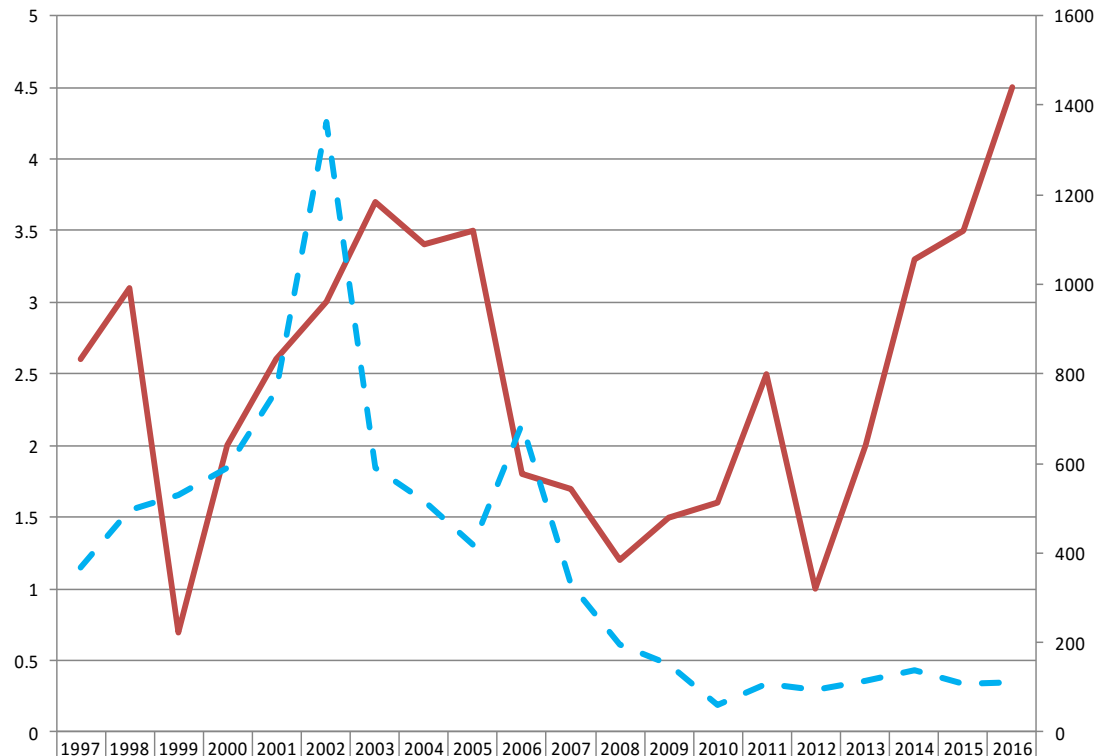
- Previously, the Plan Team and SSC rejected an ABC of **454 mt** (OFL of **605 mt**) based on average catch (a **-65%** reduction in ABC/OFL).
- Author/Plan Team now propose a 2017/2018 ABC similar size (ABC = **517 mt** and OFL of **689 mt**) based on maximum catch (**-49%** reduction in ABC/OFL).
- 2017/2018 ABC/OFL is reduced by the author/PT by moving the base years from **1997-2007** (Tier 6 established methodology) to a new set of years **2003-2015** – which removes the higher historical catches and results in a lowers ABC/OFL.
- The proposed ABC would have been exceeded **6** times and OFL exceeded **3** times.

BSAI sharks 2017/2018

- In contrast, the 2016 EBS BTS biomass estimate for BSAI sharks is **+18%** higher than 2015 (Table 20.11)
- Part of the author's rationale for the reduced ABC/OFL is: *"the recommended change is unlikely to have implications on the TAC determinations."*
- The fact that TAC is set lower than ABC should not be a consideration in establishing ABC/OFL. In 2016 in the BSAI, 36 out of 40 stocks had TAC set less than ABC.
- Historical catches of BSAI sharks have a wide range, but the previous higher catches also coincided with the period of warmer bottom temperatures. Highest 5 year catch avg = 2000-2004. Highest 5 year BT avg = 2001-2005.

BSAI shark catch versus Bottom Temperature

BSAI shark catch (mt) versus EBS average summer bottom temperature (C degrees) for 1997-2016. Highest five year average shark catches = 2000-2004. Highest five year average BT = 2001-2005.



— EBS avg. Bottom T	2.6	3.1	0.7	2	2.6	3	3.7	3.4	3.5	1.8	1.7	1.2	1.5	1.6	2.5	1	2	3.3	3.5	4.5
- - BSAI shark catch, mt	368	497	530	590	764	1362	589	515	417	689	332	194	151	60	107	96	114	138	107	112

FLC recommendation

- The status quo method should be retained for 2017/2018 (based on maximum catch 1997-2007) with an ABC of 1022 mt and OFL of 1363.
- The author/PT proposed ABC would have been exceeded 6 times and OFL exceeded 3 times.
- There is uncertainty of the effect of sea temperature on the incidental catch of sharks.
- Changes to Tier 6 methodology (base years) should not be done on an ad hoc basis in order to lower ABC/OFL. The proposed ABC/OFL are levels that were previously rejected in 2010 and 2014 (using a different method) by the both the SSC and Plan Team.

Blackspotted/Rougheye: Tier 3b

- 2017 ABC = 501 mt (-5% from 2016 = 528 mt)
- 2018 ABC = 614 mt
- 2016 AI survey biomass (Table 9) = **+113%**
- Southern BS survey biomass = **+93%**
- EAI survey biomass = **+543%**
- CAI survey biomass = **-3%**
- WAI survey biomass = **-15%**
- WAI 2017 MSSC = 31 mt (-47% from 2016 = **58 mt**). WAI 2018 MSSC = **37 mt**.

Blackspotted/Rougheye (con't)

<u>Year</u>	<u>BSAI ABC</u>	<u>BSAI catch</u>	<u>WAI MSSC</u>	<u>WAI catch</u>
2014	416 mt	197 mt	na	56 mt
2015	453 mt	181 mt	46 mt	67 mt
2016 *	561 mt	159 mt	58 mt	38 mt
2017	501 mt		31 mt	
2018	614 mt		37 mt	

Note: WAI catches: 2010 = 85 mt; 2011 = 46 mt;
2012 = 65 mt; and 2013 = 84 mt

Blackspotted/Rougheye (con't)

- Plan Team minutes: *“Noted that bycatch catch rates have been declining due to increased avoidance by the fleet, and that catch for the WAI was significantly below the MSSC after having exceeded it the last two years. The Team commended industry for cooperating to ensure that catch did not exceed the WAI MSSC.”*

Blackspotted/Rougheye (con't)

- WAI biomass **-15%** and WAI MSSC **-47%**.
- Potential set up for failure. Proposed 2017 WAI MSSC will be exceeded every year since 2010.
- The large increase in biomass in EAI (**+543%**) affects the apportionment method for total AI biomass between mgmt areas and results in a disproportionately lower WAI MSSC (and CAI MSSC) than the drop in survey biomass in those same areas.
- May need to consider limits on the effect of growth in one area in the apportionment method or use a rolling average to set MSSC and smooth large changes (both up and down).