

## Excerpt from September 2018 Crab Plan Team Report

### Snow crab PSC

Steve MacLean from the North Pacific Fishery Management Council (NPFMC) presented (over Webex) the Council's proposed action and the current action plan regarding Bering Sea snow crab prohibited species catch (PSC) limits which trigger the C. Opilio Crab Bycatch Limitation Zone (COBLZ). In 2016, the Council proposed that C. opilio PSC limits be reviewed, citing the rationale that recent changes in model estimates for snow crab have significantly improved since the PSC limits were originally specified in 1997.

Diana Stram (NPFMC) provided some background and historical context of the proposed action within the Council process, as this action was distilled through the Council process after several discussion papers over the last ten years. She noted that the C. opilio stock is distributed broadly within the COBLZ, however there is also a band south of the COBLZ where C. opilio are found. The COBLZ is a trawl-specific fishery area closure, which is closed to trawling by fishery category when a category reaches its apportionment of the snow crab PSC limit inside the area. Recently, only the yellowfin sole fishery has been closed out of the COBLZ due to reaching its limit.

The Council will undertake initial review of this analysis in December 2018, and Council staff is both seeking input from the CPT to guide the analysis, as well as seeking feedback on the current alternatives to bring to the Council's attention if they choose to revise the purpose and need statement or the alternatives (below).

In 2016, the Council proposed the following three alternatives:

1. *No action*
2. *Revise C. opilio PSC limits to be based on the stock assessment model estimate. Remove the minimum and maximum C. opilio PSC limit for trawl vessels in the COBLZ and reduce the C. opilio PSC limit to (Option 1: 0.10%, Option 2: 0.075%, Option 3: 0.05%) of the total abundance of C. opilio.*
3. *Revise C. opilio PSC limits to be based on the stock assessment model estimate. Reduce the maximum and/or minimum C. opilio PSC limit for trawl vessels in the COBLZ by (option 1: 10%, Option 2: 15%, or Option 3: 50%).*

The Council currently sets PSC limits based on model estimates of survey abundance of C. opilio, and that under both action alternatives, the PSC limit would be based on the model estimate of total C. opilio abundance. Alternative 2 would remove the current minimum and maximum (min (floor)= 4.5 million, max (ceiling) = 13 million) and change the multiplier from the current 0.1133% to one of three options (Option 1: 0.10%, Option 2: 0.075%, Option 3: 0.05%). Alternative 3 would base PSC on total C. opilio abundance, and leave the multiplier the same, but would reduce the floor and ceiling by 10%, 15%, or 50%. In drafting alternatives for this analysis, the Council chose to focus on changing the floor and ceiling as well as the multiplier but did not indicate an interest in modifying the COBLZ area nor extending PSC limits to fixed gear at this time.

The initial analysis will investigate potential economic and environmental impacts. This includes exploring historical data to see how frequently these fisheries would be constrained by these modified limits, and how the fleet would potentially respond to these changes (for example, if fleets may move outside of the COBLZ to complete their fishing seasons if constrained, and whether vessel traffic through a walrus protection area could increase). Thus far, it is unlikely that there would be significant environmental impacts due to the proposed action. Mr. MacLean described his plan to use data beginning in 2008 due to the passage of Amendment 80, and confidentiality issues with that data may exist.

Feedback and recommendations from the CPT were as follows:

The CPT noted that the analysis should consider the pros and cons of the use of total abundance as an appropriate measure to inform and index the PSC limit. The analysis should consider the exploitation rate on males and females, as well as by size, to determine the historical impact of bycatch on the population numbers and size/sex categories. The analysis should also consider the exploitation rate on a population level by the proportion of the population impacted. CPT members questioned the rationale for a floor noting that it would not protect the stock at low levels. Team members suggested the analysis consider how often the limits (by fishery category) have been constraining both with and without the floor imposed.

The CPT discussed the importance of considering crab size in the PSC limit. Some discussion focused around what is intended to be measured as PSC, i.e., is the concern surrounding legal-size snow crab or all sizes? Previously, a lack of information on the size composition of snow crab bycatch did not allow for assessing whether small or immature crab were being differentially exploited in trawl fisheries. A subset of the stock may be more vulnerable to trawl bycatch due to size selectivity, and an understanding of this size selectivity may be useful in informing an appropriate PSC limit. If the subset of the population that is vulnerable to trawl bycatch increases, then the fleet would likely see bycatch overall increase. Additionally, the CPT recommends that while crab PSC is currently calculated in numbers, a PSC limit in biomass should also be considered. Managing PSC by biomass would accommodate issues such as large numbers of incoming immature crab which would be subject to high levels of natural mortality in the absence of fishing mortality and are not equivalent to mortality of adult crabs. The CPT recommends that consideration be given to investigating crab PSC limits in both abundance and biomass.

The CPT also highlighted the benefit of flexible PSC limits due to changes in the Bering Sea ecosystem. Additionally, PSC limits should reflect the status of the stock. When looking at a lower level of snow crab abundance, the PSC limit may need to be more constraining than during levels of high abundance. Other biological or physical variables may also trigger changes in PSC limits. For example, if predators shift, PSC limits may need to be adjusted accordingly.