



North Pacific Fishery Management Council

Simon Kinneen, Chair | David Witherell, Executive Director
1007 W. 3rd Avenue, Suite 400, Anchorage, AK 99501
Phone 907-271-2809 | www.npfmc.org

Crab Plan Team REPORT

November 29, 2022, 9am-12pm AK time
Virtual Meeting

Crab Plan Team Members in attendance:

Mike Litzow, Co-Chair (AFSC-Kodiak)	Brian Garber-Yonts (AFSC-Seattle)
Katie Palof, Co-Chair (ADF&G-Juneau)	Krista Milani (NMFS- Dutch Harbor)
Sarah Rheinsmith, Coordinator (NPFMC)**	Shareef Siddeek (ADF&G-Juneau)
William Bechtol (UAF-Homer)	William Stockhausen (AFSC-Seattle)
Ben Daly (ADF&G-Kodiak)	Cody Szuwalski (AFSC–Seattle)
Ginny Eckert (UAF/CFOS-Juneau)	Miranda Westphal (ADF&G-Dutch Harbor)
Erin Fedewa (AFSC-Kodiak)	

Members Absent

André Punt (Univ. of Washington)

Others in attendance:

Anne Vanderhoeven	Jamie Goen	Madison Heller-Shipley
Chris Siddon	Jennifer Gardner	Merrill RuddNicole Kimball
Cory Lescher	John Gauvin	Rachel Baker
David Witherell	Jon McCracken**	Ruth Christiansen
Diana Stram	Jonathan Richar	Sarah Marrinan
Emily Ryznar	Karla Bush	Scott Goodman
Heather McCarty	Kendall Henry	Sherri Dressel
Heather McCarty	Kenny Down	Stephanie Madsen
Ian Stewart	Landry Price	Steve Kasperski
James Johnson	Leah Zacher	Wes Jones

** presenter

Administrative

The November 2022 Crab Plan Team (CPT) meeting was a virtual meeting held on Zoom, and connection information was posted to the CPT [eAgenda](#). The meeting began at 9:00 a.m. AKT on Tuesday, November 29, 2022, with a technical setup and overview of the meeting application. The CPT Co-Chairs, Mike Litzow and Katie Palof, reviewed guidelines for the meeting, including how public comments would be addressed during the meeting, as well as note-taking assignments and timing for meeting deliverables. Meeting participants were reminded that this meeting was called to allow the CPT to review the draft Initial Review of a rebuilding plan for the Eastern Bering Sea (EBS) snow crab, with the Council

scheduled to undertake an initial review next week and a final review in February 2023. The EBS snow crab stock was declared overfished in October 2021, and the MSA requires a rebuilding plan be implemented within two years of being overfished.

Snow Crab Rebuilding Initial Review Analysis

Sarah Rheinsmith and Jon McCracken (NPFMC staff) presented an overview of the Draft Environmental Assessment for the EBS snow crab rebuilding plan. The CPT expressed its appreciation for the presentation. Several members provided Council staff with editorial comments on the draft document. The presentation focused on the current alternatives for a plan to rebuild the stock to B_{MSY} including Alternative 1 – status quo; and Alternative 2 - Option 1 – which allows only bycatch removals and no directed fishing; and Alternative 2 -Option 2 – which allows bycatch removals and directed fishing under the ADF&G harvest strategy. A rebuilding trajectory considered two recruitment and mortality scenarios, 1982-2017 and 2005-2019, with the 1982-2017 scenario ultimately recommended by the SSC and CPT at the Sept/Oct 2022 NPFMC meetings. The median minimum time (T_{min}) with >50% probability of rebuilding to B_{MSY} was similar under Options 1 and 2. Since T_{min} was estimated to be 6 years for EBS snow crab, T_{max} would be 10 years for this stock. Several recent studies suggested the snow crab collapse was more tied to climate change, possibly linked to density dependence, and fishing mortality may not be a large driver. Thus, if current ecosystem conditions continue, rebuilding may take substantially longer.

Existing measures to minimize snow crab bycatch would be maintained in the rebuilding plan. Snow crab bycatch (PSC, Prohibited Species Catch) accrues for non-pelagic trawl in the COBLZ (*C. opilio* Bycatch Limitation Zone), but no PSC limits exist for non-trawl gear inside or outside of the COBLZ, nor for non-pelagic trawl gear outside of the COBLZ. The PSC limit is set annually as 0.1133% of snow crab abundance estimates with a floor and a ceiling. Unobserved mortality due to contact with fishing gear is not accounted for in PSC limits.

The recent EFH 5-year review concluded that historical fishing areas and associated bottom contact by fishing gear has not drastically altered snow crab habitat in recent years. Because current ecosystem conditions are expected to persist into the near future, available analysis suggests that habitat impacts by fishing gear is likely to be a minor consideration in rebuilding compared to ecosystem conditions.

A review of economic indicators showed substantial deviation in 2021-22 from historical patterns. Despite a higher ex-vessel value, higher operating costs and limited alternative fishing opportunities, the fleet and communities involved in snow crab have perceptions of overall negative economic impacts. Option 1 to close directed fishing during the rebuilding plan would likely have substantial to severe impacts on the fishing industry and associated communities, Option 2 would improve socioeconomic impacts compared to Option 1, but impacts would be similar for years when the fishery is closed under the State harvest strategy.

The CPT noted that summaries of projected TACs may be useful for Council analysis under Option 2. Cody Szuwalski indicated that these could be included in the next document iteration, but pointed out that TACs for the projections are calculated as 40% of the ABC; a simplification that does not incorporate the more nuanced elements of the State harvest strategy. Regardless of whether TAC projections are calculated, existing population projections indicate low harvest levels through at least 2027 due to low stock size. The aspect of optimum yield (OY) as mentioned in NS1 was brought up, but it was noted that OY was not calculated for the initial review.

It was noted that the (unqualified) term “ B_{MSY} ” was used at various places in the document in reference to both the Federal and State of Alaska definitions of B_{MSY} , and CPT members acknowledged that the two are not strictly equivalent. As defined in the SAFE introduction, the Federal definition for snow crab B_{MSY} is $B_{35\%}$, 35% of the long-term equilibrium biomass of morphometrically mature male crab in the absence of fishing, while the State defines B_{MSY} as the long-term average of total mature male and female biomass

based on morphometric maturity (i.e., chela height in males and the abdominal flap in females). Katie Palof and Cody Szuwalski will provide edits for the draft document.

It was also suggested that the projected TACs be shown in a figure similar to those for the rebuilding trajectories (Fig. 2-2) for the final review draft. These projections may be used to explore the socioeconomic effects of having a small directed fishery during the rebuilding timeframe. The projections could be used to consider potential fleet consolidation under the assumption that the least efficient vessels would leave the fishery. Under any scenario, there is the potential for a significant contraction of the fleet, with resulting structural changes to the crab industry. However, any potential estimates of TAC or predicted removals in the directed fishery would be largely inaccurate due to the uncertainty in the current status of this stock and the TAC setting process. Additionally, given all of the interannual variables in the fishing industry, there is high uncertainty in forecasting ex-vessel revenue six or more years out, as well as how that revenue might be distributed among different components of the industry. In the future, the Council may choose to consider structural aspects of the crab rationalization program in addressing the socio-economic impacts of fleet consolidation.

Multiple members of the public provided comments on monitoring the stock such as the use of environmental “multi-stressors,” and assessing meat fill as an index to monitor stock health. As previously mentioned, the CPT noted that the time frame for rebuilding will depend substantially on the subsequent evolution of environmental processes in the EBS that influence recruitment, growth, and mortality in the snow crab stock. A public comment noted that snow crab stocks in eastern Canada and Russia have not experienced crashes similar to that exhibited by EBS snow crab. Cody Szuwalski (NMFS) responded that in the past, the Newfoundland/Labrador (NL) stock in eastern Canada has shown similar swings in abundance as the EBS due to the influence of the environment; however, the NL stock did not experience the same level of warming in 2018-19 which appears to be related to the mortality events in the Bering Sea. The CPT and members of the public noted the importance of continued monitoring of the ecosystem, as well as the potential for additional novel analyses to better characterize important environmental processes affecting recovery.

The CPT discussed how progress towards rebuilding should be evaluated prior to reaching either T_{min} or T_{max} . The CPT noted that a gauge of rebuilding progress is critically important, including potential spatial and temporal variability in recovery, as this stock has shown considerable resilience following historical periods of low abundance. Part of the proposed rebuilding plan includes a biennial review of the rebuilding plan and continued annual stock assessments. The assessment author’s projections provide a roadmap for evaluating progress, but ESP indicators could be adopted to assess rebuilding progress. Under the MSA, the NOAA Fisheries Regional Office is responsible for determining if inadequate progress is being made biennially once the rebuilding plan is in place, but would be interested in some input from the CPT regarding markers that could be examined. Regional Office staff noted that criteria to strictly evaluate “progress” have not yet been developed and that substantial leeway exists on how to approach it. The CPT noted its desire to more formally develop guidelines for this process at future meetings, but it also noted that the biennial time frame for revisiting progress, together with annual updates to the stock assessment, ESP, and ESR provide adequate opportunities to “keep its finger on the pulse” of progress towards rebuilding.

The CPT discussed criteria for declaring the stock rebuilt. When snow crab was previously declared overfished (1999), the criterion for declaring the stock rebuilt was that the biomass B_{MSY} was exceeded for two consecutive years while that requirement is now for only one year. Council staff responded that the older criterion was based on survey biomass, which can exhibit fairly substantial interannual sampling variability, while the current criterion for snow crab is based on the Tier 3 GMACS assessment model which takes into account the survey sampling variability and smooths the annual population trajectory. Overall, the CPT supported the status quo approach of one year above B_{MSY} as the criterion for establishing rebuilt status, but does acknowledge potential high variability in interannual sampling can

occur at reduced stock levels, and notes the importance of the population model in smoothing these results.

Based on the information provided in the analysis, including the rebuilding projections under various fishing mortality scenarios, the CPT noted that there were negligible differences between the two options in the rebuilding trajectories and median rebuilding time based on the model projections, and no difference in the options with respect to the interactions within the marine ecosystem. Given the data, the CPT provided additional support for the description under Option 2 of Alternative 2 (allowing bycatch and a directed fishery under the State's harvest strategy), as it was shown that there was the potential for additional social and economic benefits.

Although beyond the scope of the rebuilding process, two other issues were raised in discussion and public comment. First, the rebuilding analyses suggest current levels of bycatch captured in the assessment model have little impact on rebuilding trajectories. The CPT expressed concern, and received public comment, regarding the potential for PSC and gear interactions to have impacts for the snow crab population not reflected in the model. Council staff noted that under the proposed rebuilding parameters, bycatch did not affect rebuilding time. Additionally, given the MSA timeline requirements, any regulatory amendments would require substantial modifications to the analysis. However, the Council could address concerns related to PSC outside the context of the rebuilding plan. CPT members also supported exploring increased protection for snow crab in the COBLZ area south of 58 deg. Lat., the area that has historically been the main center of distribution for the stock. Plus, bycatch outside of the COBLZ does not currently accrue to the PSC limit. Consequently, the CPT would like to recommend revisiting conservation issues associated with PSC (appropriate levels, geographic extent of the COBLZ).

Second, it was noted that even under Option 2 of Alternative 2, there is the possibility that the snow crab fishery will remain closed in the near term under the State's harvest strategy and thus the economic consequences under either Option have the potential to be severe. It is also unlikely that these consequences will be equally distributed within different stakeholder groups and will depend on the ability of the entities to withstand a period of negative cash flow. While it is not possible to address this concern within the context of the rebuilding plan, given the existing Options, the Council was urged to undertake a consideration of structural elements of the Crab Rationalization Program that might be available to mitigate potential differential impacts.