Revised 2022 NMFS Guidance for the California Coastal Chinook Salmon Evolutionarily Significant Unit (ESU)

March 14, 2022

At the March meeting, NMFS' guidance letter included an alternative to its default guidance for California Coastal Chinook that was intended to allow for consideration of additional information provided by the Council and/or its advisory bodies which NMFS might consider in further refinement of that guidance. At this time, I would like to provide some additional thoughts and refinements to our guidance based on additional information available since the guidance letter was finalized and provided to the Council. Our refined guidance, taking into account the information summarized below, was provided verbally to the Council on March 12, 2022 under Agenda Item D.4

The NMFS guidance for the California Coastal Chinook Salmon ESU was to manage ocean salmon fisheries more conservatively in 2022 so as not to exceed the 16% age-4 ocean harvest rate on Klamath River fall Chinook (KRFC) salmon given the pattern of performance in recent years (see background in Agenda Item D.3.b.). Specifically, the guidance was:

> "*...given the pattern of exceedance in recent years, to ensure ocean harvest rates do not exceed the 16 percent age-4 KRFC harvest rate consultation standard, fisheries should be managed using a buffer of 40 percent on the preseason target ocean harvest rate (this would result in a preseason target that will achieve postseason attainment of 16 percent given the pattern of recent model performance)* ***unless*** *the Council and its advisory bodies identify management measures or further model adjustments that the best available information indicates would have the same effect of keeping the post-season estimate of the harvest rate on KRFC age-4 at or below 16 percent for 2022 ocean salmon fisheries."*

Recall that in 2021 we collectively expressed concern regarding the pattern of exceeding the KRFC age-4 harvest rate on ocean fisheries. The Council at that time made substantial changes to the Klamath Ocean Harvest Model (KOHM) in hopes that the changes would correct the observed bias. Although the changes to the model showed improvement, the 2021 observed ocean rate substantially exceeded the limit. The consistent magnitude of the overage across recent years and concerns about the implications to management of KRFC harvest and spawning escapement, as well as protection of ESA-listed CC Chinook salmon, provided the basis of our default guidance of a 40 percent buffer on the preseason anticipated age-4 KRFC harvest rate as described in the guidance letter. However, we recognized there might be further actions that might be identified that might better find a balance to both the fishery and the resource while meeting the ESA guidance. That was the intent behind the alternative pathway offered in our guidance. In considering an alternative relative to the default guidance, NMFS must determine whether the alternative would provide the same level of certainty that 2022 ocean salmon fisheries would not exceed the 16% age-4 ocean harvest rate on KRFC. The range of age-4 KRFC harvest rates considered by the Council this week have ranged from about 11 to just over

14 percent. A 40 percent reduction applied to that range results in an age-4 KRFC harvest rate target of 7 to 8.5 percent.

In refining the guidance, NMFS considered the most recent revisions to the KOHM, the information presented in Pre-I analyzing the effects of the model revisions, environmental conditions that may have contributed to the high contact rates information, and discussions with the Salmon Advisory Subpanel and Oregon and California state managers.

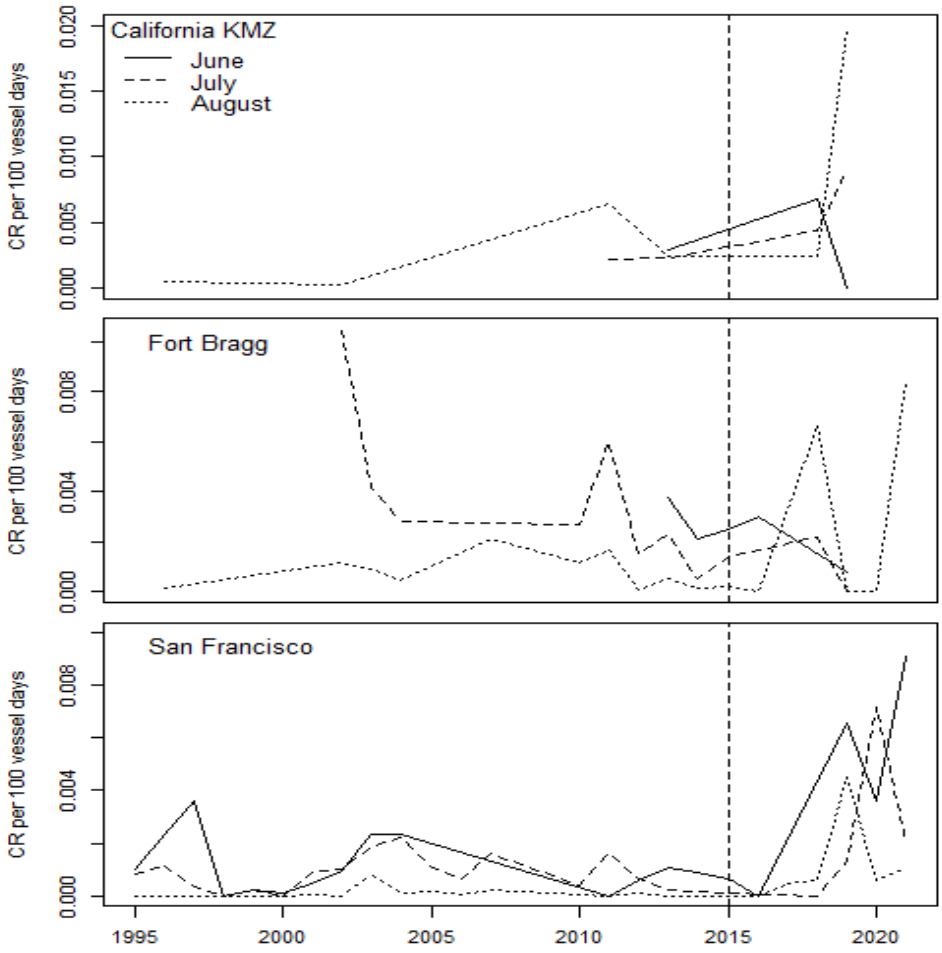
- Unusually high contact rates relative to effort in the fishery appear to be one of the primary drivers in the higher age-4 KRFC rates in recent years. Contact rates experienced in 2021 were higher than those anticipated when revisions were made to the model for 2021 preseason planning. The revisions to the KOHM use contact rates in the most recent years (2015-2019). Contact rates in those years are the highest in the data series for most areas and are higher in most areas and months when compared to the contact rates used in 2021 modelling (see Figures 1 and 2). The information in Figure 1 indicates that the contact rates in the California KMZ, Fort Bragg and Monterey management areas continue to trend upwards introducing uncertainty as to whether the rates for 2022 could exceed those in the data series.
- The analysis of the KOHM revisions as summarized in Appendix D of the Pre-I report indicates that the revisions made in 2022 substantially reduce the likelihood of exceeding the age-4 KRFC ocean salmon limit when compared to the data used in the 2021 KOHM revision and the performance summarized in NMFS' guidance letter. However, the retrospective analysis indicates that the updated model would still have underpredicted the KRFC age-4 ocean exploitation rate limit in 3 of the 4 years in the analysis by an average of 18 percent but substantially so in 2021. The 2021 result may be an anomaly or it may represent a further shift in the behavior of the fishery. Adjusting for the 18 percent over prediction results in an age-4 KRFC harvest rate target of 9 to 11.5 percent.
- Environmental Indicators have also been an important driver in the pattern of contact rates in recent years. Ocean conditions have likely led to the high survival and concentration of anchovies and other preferred prey off Fort Bragg and San Francisco management areas in recent years. Salmon have followed the food, concentrating in those areas as well. Low flows and high temperatures in the Sacramento and Klamath Rivers may have let to thermal blockages impeding migration into the rivers and low freshwater survival of spawners. As resource stewards, we know the importance of looking ahead; considering this year in the context of what we expect in the near future. The Integrated Ecosystem Assessment presented at the March meeting indicates the conditions observed in 2021 are likely to continue in 2022.
- Discussions with the SAS and CDFW staff along with the documentation describing proposed fishing regimes under consideration by the Council indicate that ocean salmon seasons in 2022 will be much more constrained in 2022 when compared with 2021 for the areas and months with greatest impacts to KRFC Chinook. State fishery managers are proposing to reduce the number of days open in the San Francisco management area for salmon fishing by about 60 percent in June and 35 percent in August.

So, the information available at this time including the revisions to the model and the practical realities of the fishing seasons under consideration, indicate the risk of an overprediction of the age-4 KRFC ocean harvest rate is reduced compared to NMFS default

analysis. However, given the uncertainties described above taking a cautious approach to the 2022 season in setting the guidance for CC Chinook is a prudent approach. NMFS' revised guidance is that managing for a target age-4 KRFC ocean exploitation rate of 10 percent would best balance the needs and interests of the fisheries with the needs and interests of the fish.

I appreciate all the work of the STT and SAS on the issues, the creative problem solving, the open conversation and time spent to help me better understand the fisheries and the implications of NMFS' guidance to those fisheries.

Figures 1. Age-4 contact rates per effort (normalized to 100 vessel days, for display purposes) estimated for the KOHM's Commercial Troll fisheries, 1995-2021, for June, July, and August; the vertical dashed line denotes the period encompassing the new model base years (2015-2021). For most areas the contact rates during the high catch summer months are some of the highest in the history of the cohort reconstruction (Source: P. McHugh CDFW, March 12, 2022).



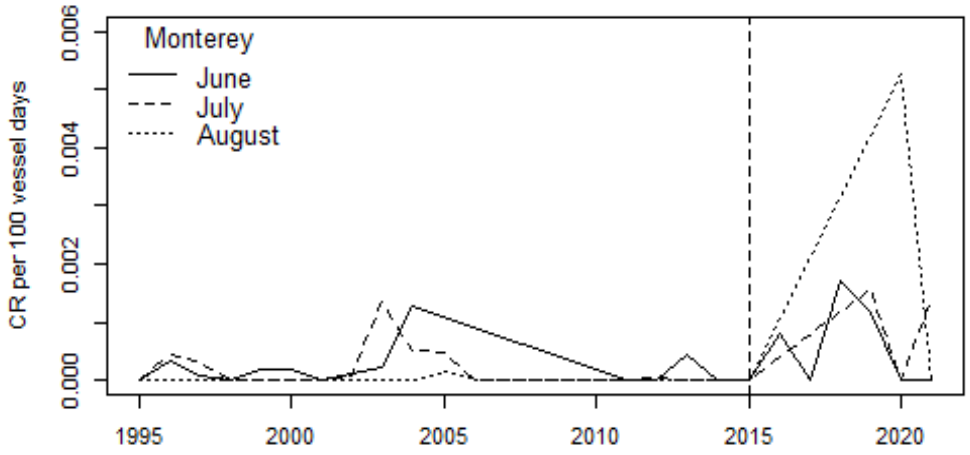

Monterey
June
July
August
CR per 100 vessel days
0.000
0.002
0.004
0.006
1995
2000
2005
2010
2015
2020

Figure 2. Change in contact rates between the 2021 (2013-2020) and 2022 (2015-2021) parameterizations of the KOHM. Substantial increases in contact rates, relative to the 2021 KOHM parameterization, are evident across nearly all fisheries. Most notably, contact rates for the times and areas that contributed most to the 2021 overage of the preseason projection of the KRFC age-4 contact rate (i.e., SF June, July; FB August) increased by 60% on average. Note the horizontal line equates to equal rates for the 2021 and 2022 versions of the KOHM.