Reconsideration of the Sacramento River winter Chinook Harvest Control Rule
NMFS, West Coast Region

The Council and NMFS have an ongoing conversation regarding harvest management constraints for Sacramento winter-run Chinook salmon (winter-run). Recall that the most recent biological opinion for winter-run was completed in 2010. The Reasonable and Prudent Alternative (RPA) for that opinion was updated in 2012. The 2012 RPA describes the current harvest control rule for winter-run. The control rule sets an upper limit on the allowable age-3 impact rate for fisheries south of Point Arena, California, based on the most recent 3-year geometric mean of spawner escapement. The control rule allows for decreasing levels of harvest as escapement levels decline but requires that the impact rate be reduced to zero when mean escapement declines below a 500 fish threshold. The Council expressed concern that the control rule was unnecessarily restrictive in years with low mean escapement, particularly when the 3-year mean falls below 500 fish. In August 2013 the Council asked NMFS to consider alternative control rules that allowed for *de minimis* levels of fishing when abundance was low without significantly increasing the risk of extinction to winter-run Chinook.

In response, NMFS issued a Notice of Availability and Request for Comment on January 23, 2014 (79 FR 3783). The notice asked for comments that focused on the current winter-run control rule and alternative control rules that otherwise reduced the impact rate at low abundance. The request for comments closed on April 23, 2014. NMFS took the comments received into consideration, including those from the Council, but decided not to reconsider the control rule prior to the 2015 season. In fact, the attention of NMFS and the Council on the RPA shifted substantially in early 2015 as our concern related to the drought conditions evolved and particularly as information related to poor survival of recent broods became apparent. In 2015 the control rule allowed for an impact rate of 19 percent. By the time we got to the March and April meetings in 2015 the primary consideration was what more the Council could or should do to reduce harvest notwithstanding the allowable impact rate of 19 percent. In the end, the Council took a more conservative approach and recommended management measures with an associated impact rate of 17.5 percent.

NMFS will reconsider the RPA control rule but the focus has changed. The current RPA sets allowable impact rates by looking back at escapement information from the last three years. This retrospective approach was used largely because we did not have information necessary to forecast preseason abundance. However, a consequence of this approach is that allowable impact rates are slow to respond to rapid changes in abundance. The circumstances 2015 provide an example. In 2015, we had forward looking information that indicated that natural-origin juvenile survival for the 2014 brood was very poor. This brood could be encountered in 2015 fisheries as age-2 fish and will be recruited to the fishery in 2016 as age-3 fish. The current control rule simply does not account for this sort of advance survival rate information. The Council, to their credit, did consider indicators such as the poor juvenile survival of the 2014 brood into account while making a precautionary adjustment to the allowable impact rate in 2015.

NMFS will reconsider the control rule, but the goal is to develop and evaluate alternatives that incorporate forward looking indicators and be more responsive to rapid changes in abundance. The SWFSC will initiate an evaluation of alternative control rules that incorporate more information about the strength of the primary cohort recruiting to the ocean fishery. The evaluation will be part of a broader effort to develop a life cycle model for winter-run that specifically considers information and indicators from the freshwater and ocean environments. This will augment substantially the previous analysis used to evaluate the current control rule. The results of the new analysis will not be available for use in 2016 and possibly 2017. The delay is unfortunate but necessary to provide the time needed to conduct the sort of complex and comprehensive review that is required. In the meantime, we expect to continue to rely on the current control rule to set the upper bound on the allowable ocean fishery impact rate for winter-run Chinook with the expectation that NMFS and the Council will consider the available information and, if appropriate, take additional and potentially substantial conservation action as we did in 2015.

Continue reliance on the existing control rule for the short term is not ideal as it leaves us to make more subjective decisions about what additional actions may be appropriate. However, NMFS concludes that the current control rule and underlying analysis continues to provide the best available information for setting an upper limit on the allowable impact rate. A key consideration is if, or to what degree, the current analysis accounted for catastrophic events. In this context "catastrophe" is defined as an instantaneous decline in population size due to effects that occur randomly in time (Lindley et al. 2007, p.5).

NMFS previous analysis of alternative control rules for winter-run Chinook considered extinction risk and fishery cost using a management strategy evaluation (MSE) approach (ref – Winship et al2012). The MSE quantified extinction risks relative to previously defined conservation criteria for Central Valley salmon, of which 'catastrophe' was one such criterion (Lindley et al. 2007). While the modeling framework did not directly incorporate catastrophic events, the environmental variability inherent to the model resulted in steep and rapid generational declines in population size of sufficient magnitude to be classified as catastrophes in some simulations. Hence, the effects of catastrophic changes in abundance, like those that may arise owing to the California drought, have been evaluated under the existing MSE and do not necessarily trigger the requirement to reinitiate consultation in response to the development of new information. Nonetheless, as discussed above, NMFS intends to consider development of a new control rule that is more responsive to known events that cause rapid declines in abundance relative to the status quo approach.

In closing, it is useful and appropriate to update the Council on other conservation related initiatives that NMFS is involved with that focus on winter-run Chinook. NMFS recently

designated eight “Species in the Spotlight.” This is a national initiative to identify species that we consider are most at risk of extinction in the near future. Winter-run Chinook is one of the spotlight species. As a consequence, NMFS is currently developing a set of priority actions to be implemented over the next five years. Our goal is to organize our own efforts, in close coordination with our many partners, to provide a comprehensive approach to address the current critical circumstances. NMFS’ plan to review the harvest control rule, as discussed above, is one element of this overall plan. For more information on the spotlight species initiative see (http://www.nmfs.noaa.gov/stories/2015/05/05_14_15species_in_the_spotlight.html).

References

Lindley, S. T., Schick, R. S., Mora, E., Adams, P. B., Anderson, J. J., Greene, S., Hanson, C., May, B. P., McEwan, D. R., MacFarlane, R. B., Swanson, C. and Williams, J. G. 2007. Framework for assessing viability of threatened and endangered Chinook salmon and steelhead in the Sacramento-San Joaquin Basin. San F. Estuar. Wat. Sci., 5, http://repositories.cdlib.org/jmie/sfews/vol5/iss1/art4.

Winship, A.J., O’Farrell, M.R., and Mohr, M.S. 2012. Management strategy evaluation for Sacramento River winter Chinook salmon. Unpublished Report. Available at: http://www.pcouncil.org/wp-content/uploads/SRWC_MSE_2012_02_28.pdf.