

Overview of Current NMFS Ocean Fishery Management Guidance for Sacramento River Winter-run Chinook

On April 30, 2010, NOAA's National Marine Fisheries Service (NMFS) completed a biological opinion of fishery impacts on Sacramento River winter-run Chinook (winter-run), where NMFS concluded that the ocean salmon fishery, as managed under the Pacific Coast Salmon Fishery Management Plan, was likely to jeopardize the continued existence of winter-run (http://swr.nmfs.noaa.gov/pdf/Final_Harvest_BiOp_043010.pdf). This determination is based on the recent substantial declines in winter-run spawning returns, and the lack of sufficient analytical information and tools to establish specific harvest impact level targets or an explicit management process to specifically avoid or reduce impacts to winter-run when this stock is declining and/or facing increased extinction risks (NMFS 2010a). By analyzing expected harvest levels on the declining status of winter-run, NMFS is fulfilling its obligation under the Federal Endangered Species Act (ESA), which is to "ensure actions are not likely to result in appreciable reductions in the likelihood of both survival and recovery of the species."

As part of the biological opinion, NMFS issued a Reasonable and Prudent Alternative (RPA) to allow the operation of the ocean salmon fishery while ensuring the continued existence of winter-run. The RPA introduced a requirement to implement a new framework for managing impacts on winter-run, which includes the development of new models and analyses that will evaluate and quantify impacts of various fishery management options on winter-run. Clearly defined and measureable status thresholds and management objectives are to be established and supported by new analytical tools for use by the Pacific Fishery Management Council (PFMC) and NMFS. The RPA stipulates that this framework shall be implemented by March 2012.

In the interim, NMFS has issued guidance to the PFMC for protecting winter-run, which includes options for implementing time/area closures during the recreational fishing season and/or increasing minimum total size limit restrictions in the recreational fishery, as well as potential combinations of these options, to minimize and reduce fishery impacts to winter-run (NMFS 2010b). These measures were recommended in addition to the fishery management standards established for winter-run during previous ESA consultations (NMFS 2004). This interim guidance option of increasing the size limit to 24 inches in the recreational fishery south of Point Arena was implemented for the 2010 season. The interim RPA recommends similarly conservative measures for the 2011 fishing season unless new information becomes available, including updated estimates of spawning returns in 2010 or additional analysis resulting from the effort to develop the RPA management framework, before the March 2011 PFMC meeting.

Rationale for the option of a 24-inch minimum total size limit in the recreational fishery south of Point Arena

Two lines of evidence were used to develop and support the 24 inch size limit guidance option presented to the PFMC in 2010: (1) the size-at-age model used in the winter-run cohort reconstruction estimates of fishery impacts; and (2) the size distribution of coded-

wire tagged winter-run captured in past recreational fisheries. The recent cohort reconstruction analysis used in the 2010 biological opinion confirms that ocean fishery impacts continue to occur primarily on age-3 winter-run in the recreational ocean salmon fisheries south of Point Arena (NMFS 2009). The size-at-age model used in the cohort reconstruction suggests that almost all age-3 winter-run are larger than the 20-inch minimum total size limit that historically has been in place for the recreational fishery south of Point Arena starting in March during the fishing season (Figure 1). However, this model also suggests substantial portions of age-3 winter-run would be required to be released if the minimum size limit were greater during most of the fishing season. An examination of this size-at-age model suggested that 24 inches was likely the smallest size limit that could be implemented to make a substantial difference on the relative retention rate and mortality of age-3 winter-run fish in the recreational fishery, as the average size of winter-run is at least 24 inches during early summer when fishery impacts are most expected¹.

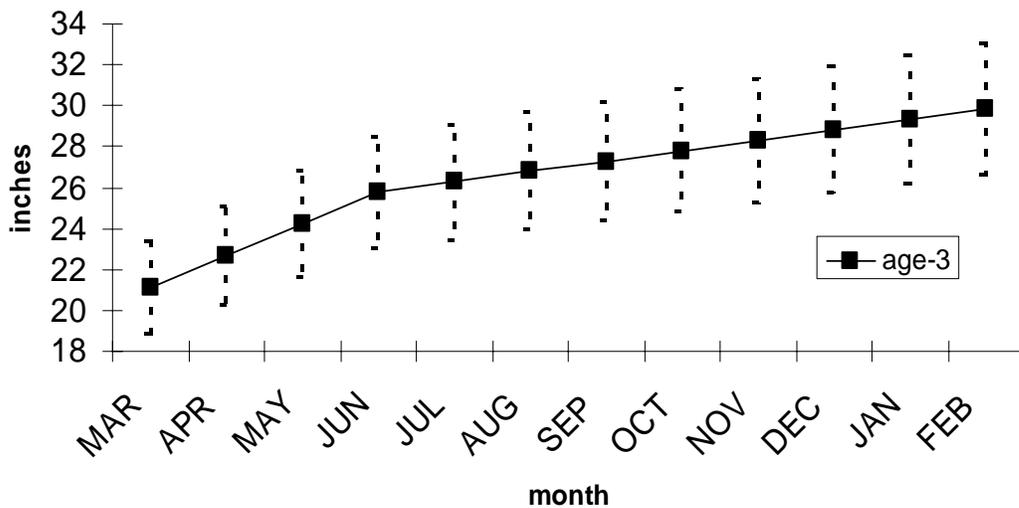


Figure 1: Average size-at-age of age-3 winter-run with 1 standard deviation (confidence interval of about 70%) (CDFG 1989; O’Farrell *et al.* 2010). All age-4 fish would be expected to be greater than any minimum size limit, although few winter-run fish remain in the ocean past age-3.

Length data from winter-run coded wire tag (CWT) recoveries were analyzed to determine the historical pattern of size distributions (Figure 2). In general, these results agree with the size-at-age model. CWT data suggest that substantial portions of age-3 winter-run that were harvested in the recreational fishery south of Point Arena when the size limit was 20 inches would have been required to be released with a larger minimum size limit of 24 inches, and this proportion decreases as the year progresses. The CWT data indicate that historically 20-70% of winter-run that would have been retained with a 20-inch limit would have been required to be released with a 24-inch limit from April through August, depending on exactly when impacts occurred.

¹ Given the normal distribution of the size data in this model, average size implies that 50% of fish will be less than the average; 50% will be more than the average.

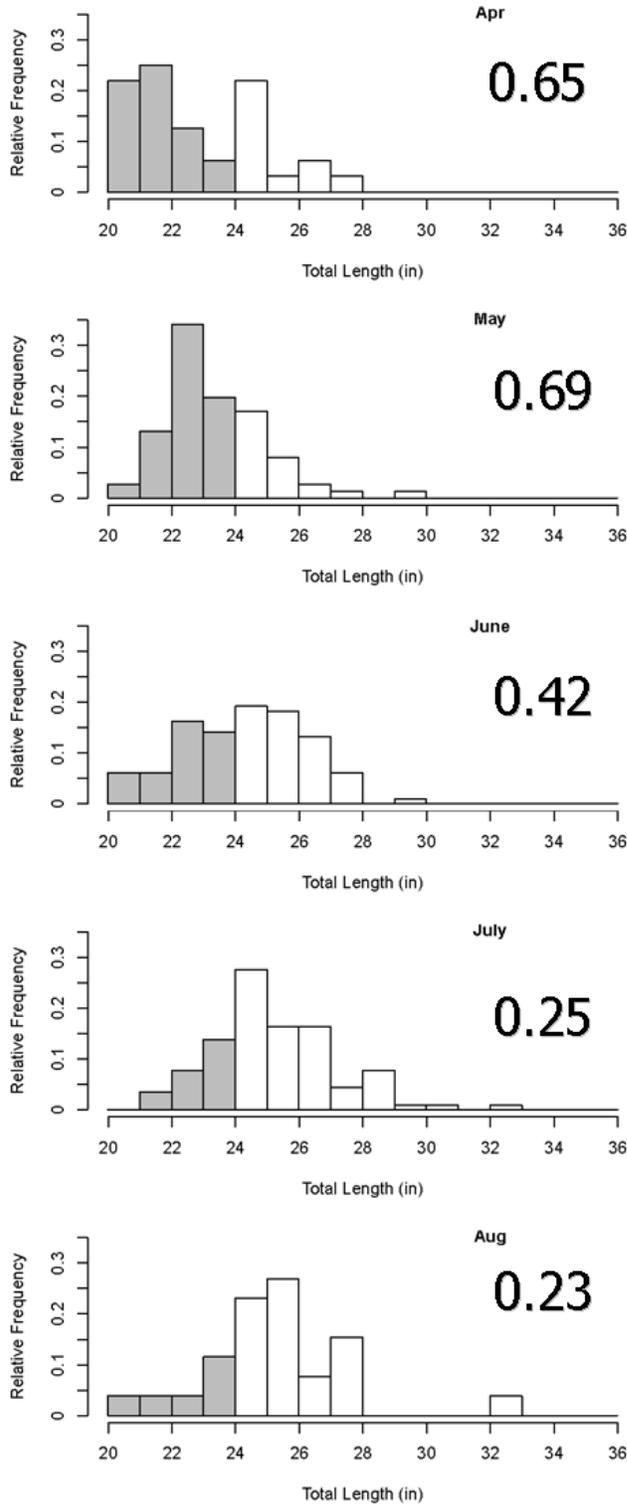


Figure 2: Frequency distribution of size by month (total length in inches) from CWT recoveries of age-3 winter-run in the recreational fishery south of Point Arena (SF, MO, and SS) from 2000-2007. The proportion of recoveries between 20 and 24 inches for each month for this specific dataset is provided in the right corner of the graph (NMFS 2010).

NMFS acknowledges that additional mortality occurs with the release of any salmon in the recreational fishery, and varies depending on fishing method. However, the life history of winter-run is important to consider when assessing the value of releasing undersized fish. Cohort reconstruction data suggest that annual maturation rates of age-3 fish, which are fish most likely in the 20-24 inch range caught during the fishing season, typically exceed 90% (O'Farrell *et al.* 2010). Consequently, most age-3 winter-run that survive the fishing season will be attempting to spawn the following winter, minus any fish that succumb to other sources of mortality, such as predation. As a result, most winter-run that are saved and survive the fishing season because of the 24-inch size limit restriction probably would be expected to represent a direct and immediate contribution to spawning returns that would not have otherwise been realized.

NMFS also acknowledges that instituting a 24-inch size limit south of Point Arena in the recreational fishery may lead to the additional release of fish from other target stocks, primarily Sacramento River fall Chinook. A review of size data from Sacramento River fall Chinook CWT recoveries south of Point Arena presented at the April 2010 PFMC meeting indicated that historically only a small percentage of Sacramento River fall Chinook retained in the recreational fishery with a 20-inch size limit would have been required to be released with a 24-inch size limit. As a result, NMFS generally expects a 24-inch minimum total size limit to benefit winter-run at relatively high levels with minimal increases in the release of other target fish, although it is not possible at this time to accurately predict or characterize this relationship for any particular fishing year.

Outlook

At this time, NMFS is in the process of developing a new management framework for winter-run and the analytical tools necessary to forecast exploitation rates for implementation in the PFMC process. In addition, NMFS is also still in the process of conducting analyses to determine appropriate exploitation rate targets, given varying circumstances and the population dynamics of winter-run. These efforts are being led by the Salmon Assessment Team at the NMFS Southwest Fisheries Science Center. These tools and the new management framework are expected to be developed and in place for the 2012 season, as stipulated in the RPA. In the meantime, NMFS is relying upon information presented in the 2010 biological opinion (summarized in this document) as the basis for concluding that the 24-inch size restriction in the recreational fishery is one option that the Council may choose that is protective of winter-run until more quantitative information and analysis is available.

References

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