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November 16, 2020
Reply to: fish1ifr@aol.com

Pacific Fishery Management Council
Mike Gorelnik, Chair
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Filed Electronically

RE: Comments on proposed SRKW FMP Management Measure Amendments
Agenda Item: F.2 Supplement to oral comments of Glen Spain

To the Council:

Thank you for the opportunity to comment on the proposed Salmon Fishery Management Plan (FMP) management measures intended by their proponents to help the Southern Resident Killer Whales (SRKW) by supposedly increasing their prey base. The science is clear, however, that PFMC managed fisheries under the Salmon FMP are not, in fact, a major driver of SRKW declines, and that human salmon harvests in the ocean actually have very little impact on these orcas, especially given that these harvests have very small impacts on overall ocean salmon abundance in the oceans.

Our industry has long been working to minimize fisheries impacts on SRKW and other whale populations. Fisheries managers (in cooperation with the fishing community) have already incorporated a number of protective measures in modem fisheries management practices to strenuously avoid fishery impacts on whales and other non-target species. While we appreciate the zeal of orca advocates, and understand the intense emotions pushing their efforts to find better ways to help these orcas survive, the plain facts -- shown by the recent *SRKW Risk Assessment*, which simply confirms the results of prior scientific assessments -- is that *ocean salmon fisheries are actually not a major factor in SRKW declines.* In fact, current fisheries

management (including abundance-based quota systems under the current Salmon FMP), combined with "weak stock management" and multiple measures to meet other ESA-listed species' needs, already takes ecosystem prey needs into consideration for orcas as well as a multitude of other species.

Thus, the stringent salmon fishery management restrictions -- even to total fishery closures -- that some are suggesting the Council adopt will not likely be effective in helping these particular SRKW populations. Draconian restrictions of this sort would, however, inflict a great deal of economic harm and pain on our fleet, for no scientifically likely benefit to the whales.

In our comments below, we cite from the *PFMC Salmon Fishery Management Plan Impacts to Southern Resident Killer Whales Risk Assessment*, dated May 2020 (the "RA"), and also the *revised PFMC Salmon Fishery Management Plan Impacts to Southern Resident Killer Whales Draft Range of Alternatives and Recommendations*, October, 2020 (the "DRAR Report"). Other citations will be identified in footnotes or the body of the text as needed.

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There is Almost No Statistical Correlation Between SRKW Mortality Factors and Salmon Fisheries Harvests

Unfortunately, it is an erroneous belief that reductions in ocean Chinook salmon harvests alone will turn around the declines of the SRKW and save them from extinction. In fact, there are a multitude of adverse environmental impacts on the SRKW that have nothing to do with salmon fishing, including but not limited to dozens of pollutants in their food chains (including PCBs, found at alarming levels known to adversely affect fertility) as well as problems with boat noise affecting their ability to feed, ship strikes, and even what unfortunately amounts to outright harassment in their feeding areas in the name of tourist whale watching. Of all these impacts, the loss of potential prey to ocean salmon harvests is a very small factor.

> The hypothesis is this: That PFMC-managed ocean Chinook salmon fisheries are significantly reducing Chinook prey availability for SRKW and therefore limiting SRKW abundance.

However, this hypothesis is not supported by either the data or statistics. For one thing, at any given time there are well over a million Chinook salmon aged 2 and above in the North of Falcon (NOF) area, and many millions of Chinook within the west coast's oceans. Chinook ocean abundances throughout the period of record studied in the RA (1992-2016) generally far exceeded the number of prey the SRKW members need to survive. The DRAR Report notes:

> "The arithmetic mean of Chinook salmon from North of Falcon (NOF) stocks (Puget Sound, Washington Coast, and Columbia River) escaping to terminal areas is 1.1 million mature fish per year .... Still, the number reaching the terminal areas is approximately three times the number calculated to meet the energetic needs of the SRKW population at the current ESA-listed level of approximately 73 whales if they fed only on Chinook

> salmon, at 13-16 Chinook salmon per whale per day (NMFS 2019), and only on Chinook salmon that spawn in the NOF region (i.e., not including Chinook salmon from Canadian of South of Falcon waters)." (DRAR Report - pg. 5; underline added)

Refer to ATTACHMENT A from the RA, showing graphically the coastwide ocean Chinook abundances during the 1992-2016 period of record fluctuating from about 2 million to about 6 million adults.

The *Risk Assessment* (RA) documents the fact that the human harvest "take" of Chinook salmon in the ocean is really a very small impact as compared to the overall abundances estimate for the EEZ:

> "While there is a more consistent SRKW spatial overlap with the NOF [North of Cape Falcon] area, PFMC fisheries have a relatively small impact (1.2 to 7.7 percent reduction to the modeled ocean abundance) on the overall NOF Chinook abundance and the overall percentage of the abundance taken by PFMC fisheries has decreased over the time series examined (1992-2016)." (RA, Executive Summary, pg. 10)

> "Overall, due to weak stock management in Council Area fisheries, a significant portion of the overall abundance goes unharvested and that portion has been increasing over the time period examined in the RA (1992-2016)." (DRAR Report, pg. 6)

Likewise, the *Risk Assessment* (RA) itself notes:

> "The proportion of estimated ocean adult Chinook abundance in the US West Coast Exclusive Economic Zone (EEZ) removed by PFMC directed ocean salmon fisheries has generally declined over this time period [1992-2016], following changes to harvest control rules and ESA limitations on the fisheries." (RA, Executive Summary, pg. 9)

Showing these findings in graphic form, refer to ATTACHMENT A - From *Risk Assessment* (RA) Figure 4.5.a (North of Falcon - pg. 69); Figure 4.5.b (Oregon Coast - pg. 70); Figure 4.5.c (California Coast - pg. 70), and; Figure 4.5.d (Coastwide EEZ-pg. 71). These charts also show that the total reduction out of this abundance by ocean Chinook fisheries is still only small fractions (i.e., 1.2% to 7.7%) of that total ocean abundance, depending on locations. Additionally, Figure 4.5.e (pg. 72) shows that the overall harvest utilization rate for all ocean commercial harvest is actually trending downward, as compared to past history, not upwards -- so even more salmon are being left in the ocean as a percentage of the total abundance under current "abundance-based" quota management regimes than in the past.

As noted in the *Draft Range of Alternatives and Recommendations* (DRAR Report, October, 2020), the Ad hoc Workgroup writes:

> "[I]t is reasonable to conclude from the results of the RA that there may not be a strong and persistent relationship between aggregate salmon abundance and SRKW demographics in the spatial and temporal strata examined, and across the abundances and

> years utilized or observed ..... (DRAR Report, pg. 6)
>
> "In the end, that approach [describing the method of analysis to determine relationships between harvests and SRKW survival demographics] produced few significant or marginally significant relationships in the RA ..... [O]nly 1 out of 126 of the fitted regressions met the typical criterion of $p \leq 0.05$ that is often associated with 'statistical significance.' Five additional regressions fell between the typical $p \leq 0.05$ and a more relaxed criterion of $p \leq 0.10$ that is often used with limited data or analyses with high levels of 'noise.' In total, 120 of 126 fitted regressions failed to meet either criterion....." (DRAR Report, pg. 6)

In other words, the rigorous analysis of the *Risk Assessment* (RA) found <u>little or no correlation</u> between levels of ocean Chinook harvests and SRKW demographics related to their survival, except in a handful of known areas of high SRKW use, and even then the correlations were weak at best:

> "However, despite the limitations or caveats applied to the p-values themselves, in many cases even the sign of the fitted regressions were not suggestive of a predictable, strong, or persistent relationship, being opposite the expectation that SRKW demographics responded favorably to increasing salmon abundance. Many more were less than convincing when the coefficient was of the expected sign, but was not 'strong.'" (DRAR Report, pg. 6)

The logical conclusion from the above data must be that even the most Draconian fishery closure measures would only add just a few more salmon to this already normally abundant SRKW prey base, resulting in very little additional benefit to the SRKW orcas.

The RA's most important finding is that the mathematical relationship between ocean Chinook salmon abundance and survival rates of the SRKW orcas is <u>not linear</u>! That being the case, then above a certain (currently unknown) minimum Chinook ocean abundance threshold the SRKWs would typically have all the prey they need to survive. Thus, at least when operating above these minimum abundance levels, extracting yet more salmon from the fishing fleet to keep them in the ocean for the orcas would not provide any additional benefit to the orcas, but would most certainly economically devastate the fishing fleet and multiple fishing-dependent communities, all to no purpose!

In summary, and quite contrary to the unsupported assumptions and assertions of those pushing for stringent shutdown measures, the *Risk Assessment* (RA) science demonstrates that PFMC managed ocean Chinook fisheries as they are managed today actually have a very small impact on total Chinook ocean abundances, and those impacts are being reduced (not increased) under current PFMC FMP restrictions, which already include abundance-based management restrictions and weak stock management constraints. This is an excellent argument for having a "no action" alternative, at least in years of reasonable ocean abundance.

This means that even a complete and total closure of all ocean Chinook fisheries on the west coast (which some groups have advocated) would not result in more than a few percent increase in ocean Chinook abundance, and even then would only benefit those few areas in which SRKW most commonly feed (i.e., mostly North of Falcon and the Puget Sound and Salish Sea areas).[1] These whales are not found everywhere, all the time, and modem fisheries management already takes their migrations into account by opening and closing fisheries so as to avoid their presence.

There is No Scientific Basis for Selecting Any Particular "Minimum Abundance" Threshold Trigger At This Time

Given that SRKW prey abundance is related to the total ocean Chinook abundance, and that the relationships between prey availability and SRKW survival are not linear, but are threshold-based, in the document *PFMC Salmon Fishery Management Plan Impacts to Southern Resident Killer Whales Draft Range of Alternatives and Recommendations*, October, 2020 (the "DRAR Report"), the Ad Hoc Workgroup set forth a number of potential management measures that could be automatically put under Council consideration on the basis of a low Chinook ocean abundance "threshold trigger." This is a common-sense as well as precautionary approach. If, as is most likely, ocean Chinook abundances remain well above that "threshold" in the future, then it would indicate that ordinary FMP measures were sufficient, and so further regulation would be unnecessary.

Unfortunately, there is nothing in the science that clearly indicates what the appropriate ocean abundance "threshold" should be. In fact, the PFMC's Scientific and Statistical Committee noted in its November 2019 Supplement Report to the Council on this issue:

> "The SSC did not find the available information sufficient to quantitatively justify a threshold at which risk may be greater for SRKWs due to the effects of PFMC salmon fisheries." (Supplemental SSC Report 1, Agenda Item E.4.a (Nov. 2019)).

Given the enormous economic harm that could occur from the use of a triggering Chinook ocean abundance threshold that is too high, we agree with the comments and recommendations of the PFMC's Salmon Advisory Subpanel as statement in its Supplemental SAS Report 1 for the Council's November, 2020 meeting (Agenda item F.2.a):

> "Following lengthy discussions, the SAS continues to recommend the adoption of Alternative 3.1.1: No Action – Status Quo Fishery Management Plan implementation….. While there are uncertainties about the outcomes of implementing the other

[1] The *2012 Independent Science Panel* review referenced in the RA found that (on the basis of fisheries management measures then in place under old management regimes prior to 2012) the maximum possible increase in Chinook ocean abundance even with the closure of all ocean salmon fisheries would be theoretically at most an 18% to 25% increase. That Panel, as noted in the RA, also stated that "The best potential for increased Chinook salmon abundance is restoration of freshwater habitat, reducing downstream migration mortality and a change in ocean conditions." The RA (as cited above) found that ocean harvests under current and more restrictive abundance-based management regimes of today accounted for only a reduction of between 1.2% to 7. 7% of ocean abundance.

> Alternatives, there is no uncertainty as to the impact of those actions on fishermen and coastal communities. Reduced opportunities, shortened seasons, and severe financial impacts will have very real consequences for the industry with only speculative benefit for the SRKW population. The SAS feels that eliminating fishing in April and May removes the most lucrative fishing period and the strongest markets for troll-caught Chinook salmon and is an unnecessary burden to place on the fishing community…..
>
> "Should the Council consider an action alternative rather than the status quo, the SAS feels the least restrictive in warranted until more contemporary data are collected, until other means of increasing the prey base such as increased hatchery production are implemented, and until other factors affecting SRKW health are addressed….. The SAS would propose for consideration a trigger value of 957,330 based on the arithmetic mean of preseason abundances north of Cape Falcon in timestep 1 from 1994, 1995 and 1996, recognizing the importance of using a suite of low abundance years in succession when evaluating the lag survival of SRKWs…. The SAS believes a tiger level of 957,330 finds a balance between proving opportunity to the fleet in years of low abundance while potentially benefiting the forage need of SRKW." (pgs. 1-2)

We also support the other recommendations in the Supplemental SAS Report 1 (Nov., 2020).

However, it is also our strong recommendation that, given the paucity of data to draw from, the Council should prioritize additional studies, both to more accurately be able to predict annual ocean salmon abundances as well as to ascertain the appropriate threshold below which there are substantial SRKW prey deficits at sea, specific to geographic areas over time. Otherwise any regulations imposed under these provisions are little better than guesswork.

Additional Salmon Fishery Restrictions Are a Political Response, Not Based on Science

As we wrote the Ad Hoc Working Group on this issue on October 9, 2019:

> "Our organization has been monitoring and participating in the Work Group's various meetings and webinars since the process was initiated. The quantitative and statistical approaches used by the group to investigate the relationships between salmon populations and the demographic and health status indicators for the killer whales are clearly based on the best scientific information available and established approaches that are appropriate for this analysis. And these results are conclusive: based on the statistical analyses that have been conducted, the null hypothesis that there is no relationship between salmon populations at any time-area stratum and each of the SRKW demographic and life history indicators cannot be rejected.
>
> "However, over the course of the past several months, we have been alarmed by language used by some Work Group members to describe the outcomes of the impartial statistical analyses that have been conducted so far. Work Group members have used phrases including 'results we had hoped for' when describing the results of these analyses, terms

> like the 'right' or 'wrong' sign when describing the relationships between variables elucidated through regression analyses, and describing 'meaningful' results as only those that would demonstrate a statistical relationship between salmon and killer whale indices.
>
> "These phrases indicate the existence of a predecisional bias towards a preferred outcome. It would be wholly inappropriate to devise a 'second step' of the Work Group's analysis that deviates from established scientific practice in order to achieve a qualitative result in alignment with this predecisional bias. It would also be wholly inappropriate to abandon the robust quantitative approaches the Work Group has taken in favor of a 'weight of evidence' approach based on qualitative criteria and unverified assumptions or, worse, assumptions that have been contradicted by this very process."

Unfortunately, given the intense political and public pressure push for the Council to "do something -- *anything* -- to help the SRKW orcas" the concern that these proposed regulations will be imposed for political reasons, but with little or no scientific justification still remains.

Ultimately, the causes of decades of decreases in the abundance of salmon in the ocean are not fisheries-related at all; they are related to the accelerating loss of inland salmon spawning and rearing habitat over which neither the PFMC nor fishermen have any control. Inland river salmon habitat has been destroyed in many ways for decades, including the systematic blockage of salmon rivers by impassable dams, the industrial scale destruction of salmon-producing rivers by decades of excessive logging, by systematic dewatering of the west coast's once productive salmon-bearing river systems, and by multiple poorly thought out land uses causing deteriorating water quality, chemical pollution and rising temperatures in once productive cold-water salmon river systems. The likely impacts of the ongoing disaster of climate change will almost certainly exacerbate these past problems.

It is these devastating and still operating inland salmon habitat-destructive forces which account for the devastating and tragic losses of west coast salmon productivity everywhere, as well as the loss of many of our west coast's once far more abundant salmon fisheries. These habitat-destructive forces are the common enemies of both orca advocates and salmon-dependent coastal communities. These groups should be working together to address these common threats to salmon from lost habitat, rather than be pitted against each other!

Sincerely,
Glen H. Spain
Glen H. Spain
PCFFA Northwest
Regional Director

earlier seasons, and do not account for the possibility that fish harvested in one area might have moved to another area if they were still alive. The modeling exercise instead compared projected abundances with and without the impacts of Council-area directed salmon fisheries. This was done by calculating stock-specific reductions in ocean-wide abundance (from all PFMC ocean salmon fishing) using the usual fishery management models, calculating alternative abundances that would be projected if those fisheries had not occurred, and then apportioning the modeled changes in abundance across areas using the Shelton et al. (2019) spatial distribution model.

Figure 4.5.a through Figure 4.5.d show Chinook salmon adult (age 3 and older) abundance and reductions in adult abundance attributable to Council-area directed salmon fisheries for the major management areas the Workgroup aggregated: North of Cape Falcon, Oregon coast (Cape Falcon south to Horse Mountain, California) and California coast (south of Horse Mountain). However, it should be noted that reductions in specific areas may be partially driven by fisheries occurring in other areas of the EEZ, and cannot be interpreted as the direct effect of fishing in that particular area. Note that although only Council-area directed salmon fisheries were considered, the model estimated that these fisheries would lead to some reduction in abundances outside the EEZ, due to how the model was implemented (see Chapter 5) and to account for movement of fish within and between time steps.

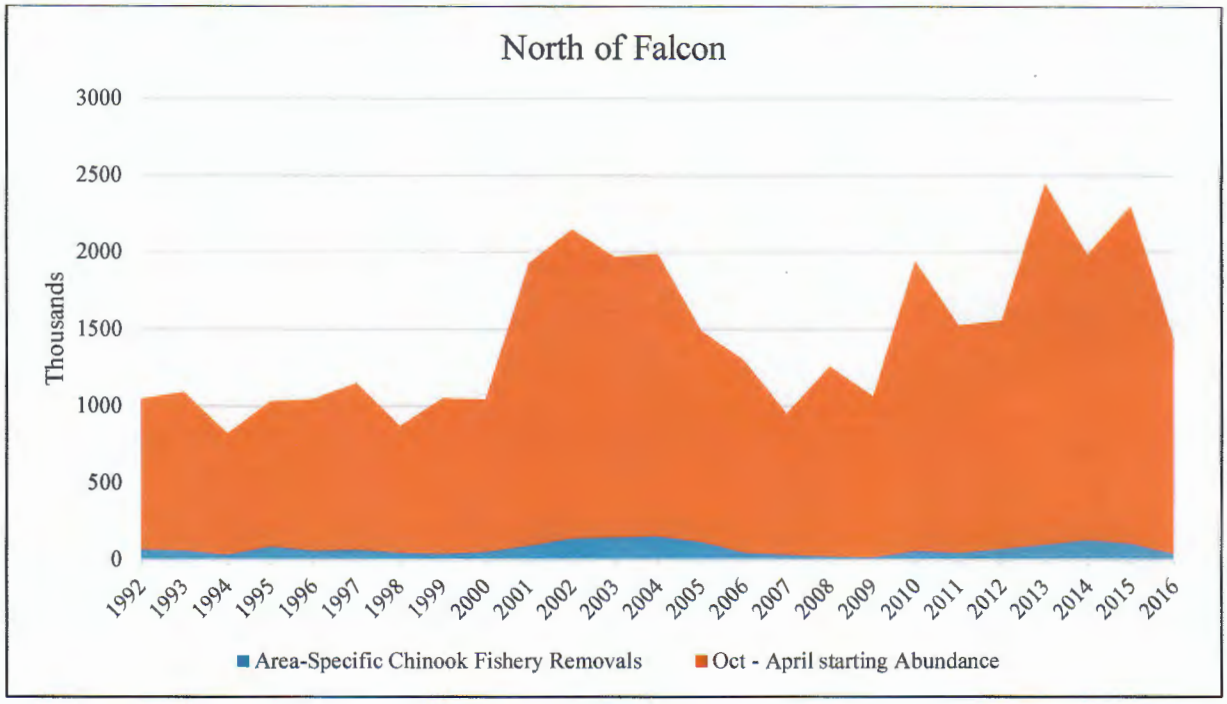

Figure 4.5.a. North of Cape Falcon 1992-2016 trends in annual adult abundance (estimated annually to be present on October 1) and area-specific reduction in adult abundance modeled to result from all PFMC salmon fisheries (from October through the following September).

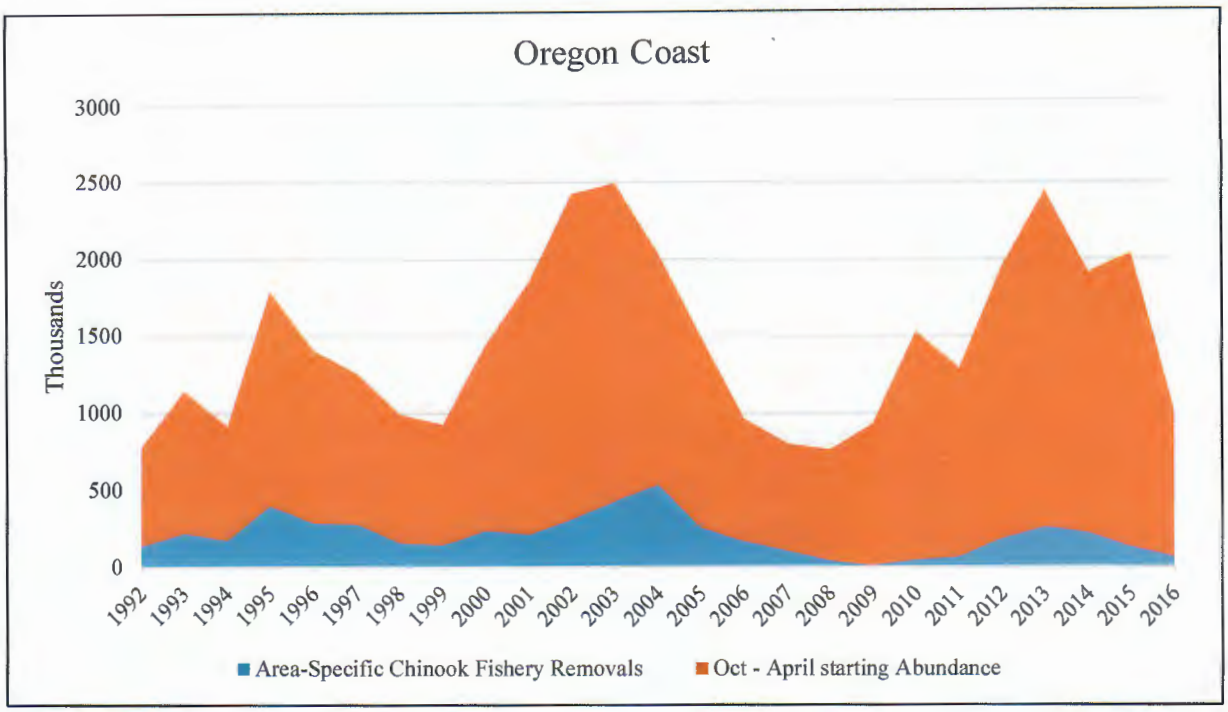

Figure 4.5.b. Oregon coast (Cape Falcon south to Horse Mountain, California) coastal 1992-2016 trends in annual adult abundance (estimated annually to be present on October 1) and area specific reduction in adult abundance modeled to result from all PFMC salmon fisheries (from October through the following September).

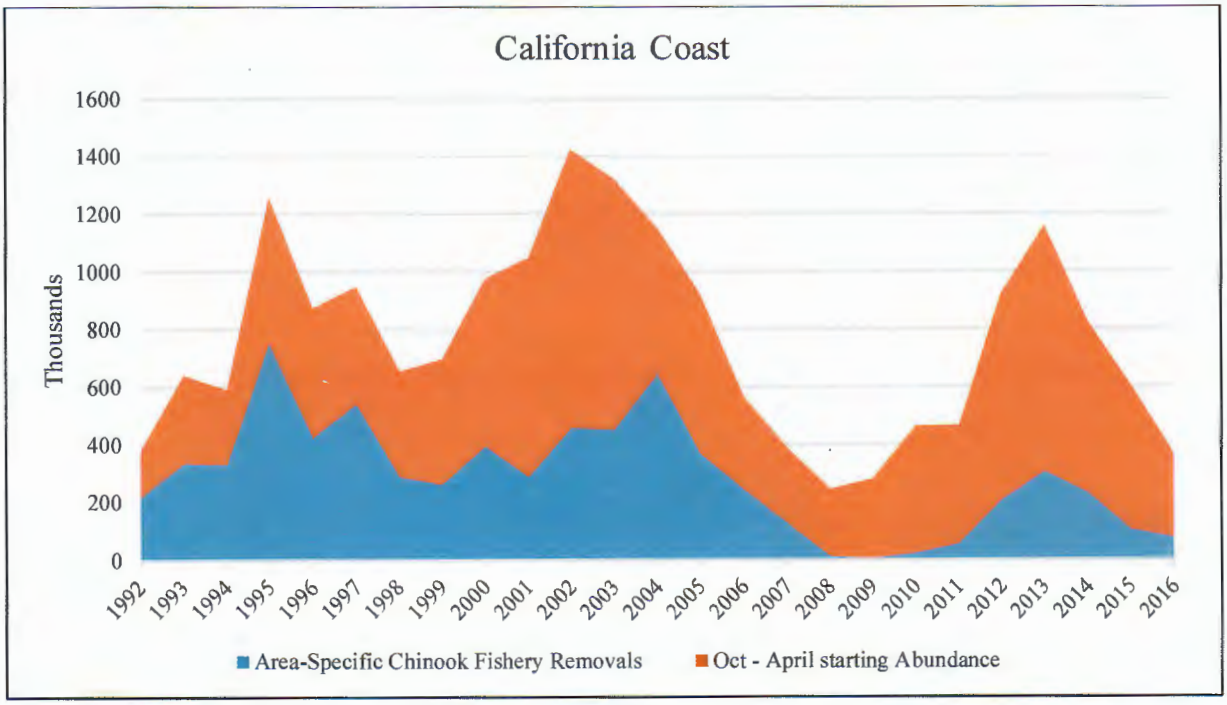

Figure 4.5.c. California coast, south of Horse Mountain coastal 1992-2016 trends in annual adult abundance (estimated annually to be present on October 1) and area specific reduction in adult

abundance modeled to result from all PFMC salmon fisheries (from October through the following September).

At a coastwide level Figure 4.5.d. depicts Chinook salmon abundance, and the area-specific reductions in adult abundance attributable to PFMC salmon fisheries, aggregated across all areas of the EEZ. As described above, the level of fishery mortality has changed, and has generally been reduced, over time relative to implementing changes to harvest control rules and ESA limitations on the fisheries. By dividing the estimated end of year abundance without fishery by the estimated end of year abundance with the fishery, we calculate the percent of potential ending abundance that remains after PFMC fisheries have occurred. When plotted by year for coastwide abundance, the percent of potential abundance that is remaining after ocean fisheries occur is increasing over time – meaning fisheries have been taking a lower proportion of the available abundance over time (Figure 4.5.e). The trend line depicted in Figure 4.5.e. is not intended to reflect any particular level of significance, but is simply to demonstrate the trend.

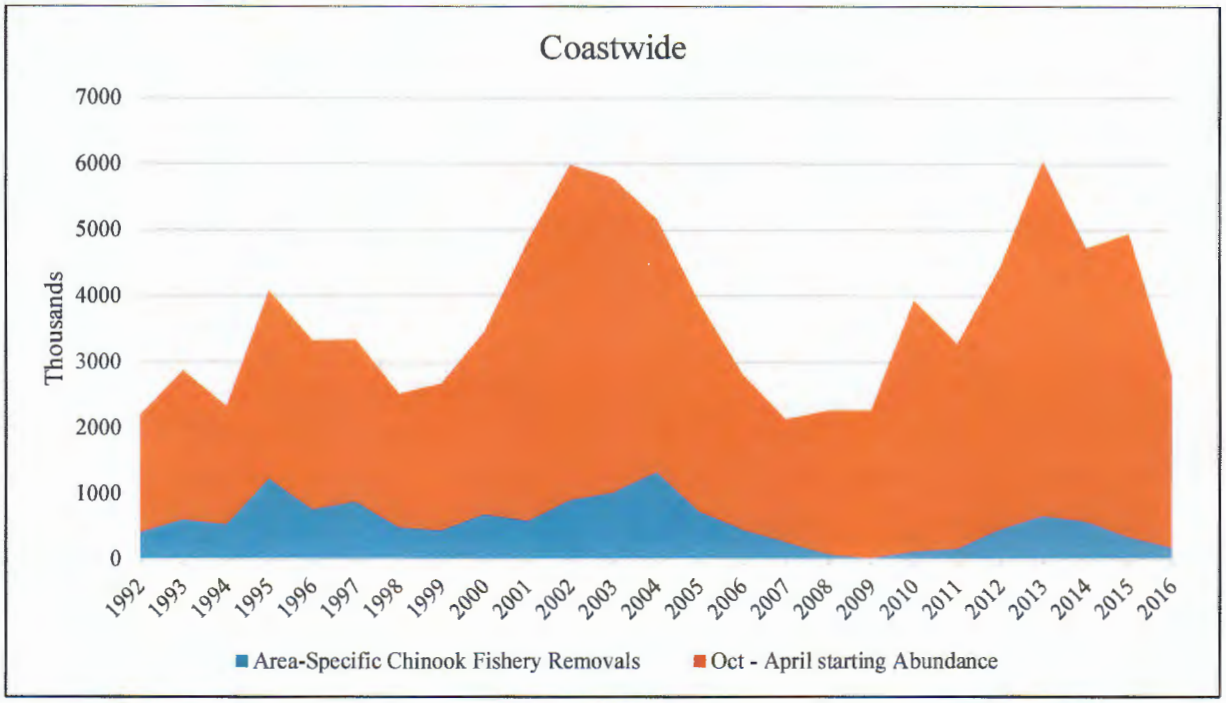

Figure 4.5.d. Coastwide (EEZ) 1992-2016 trends in annual abundance (estimated annually to be present on October 1) and reductions in abundance attributable to PFMC ocean salmon fisheries (from October through the following September). Note that this does not include abundance outside the EEZ, nor the modeled reduction in abundance outside the EEZ owing to PFMC fisheries within the EEZ impacting fish that would have moved between areas.

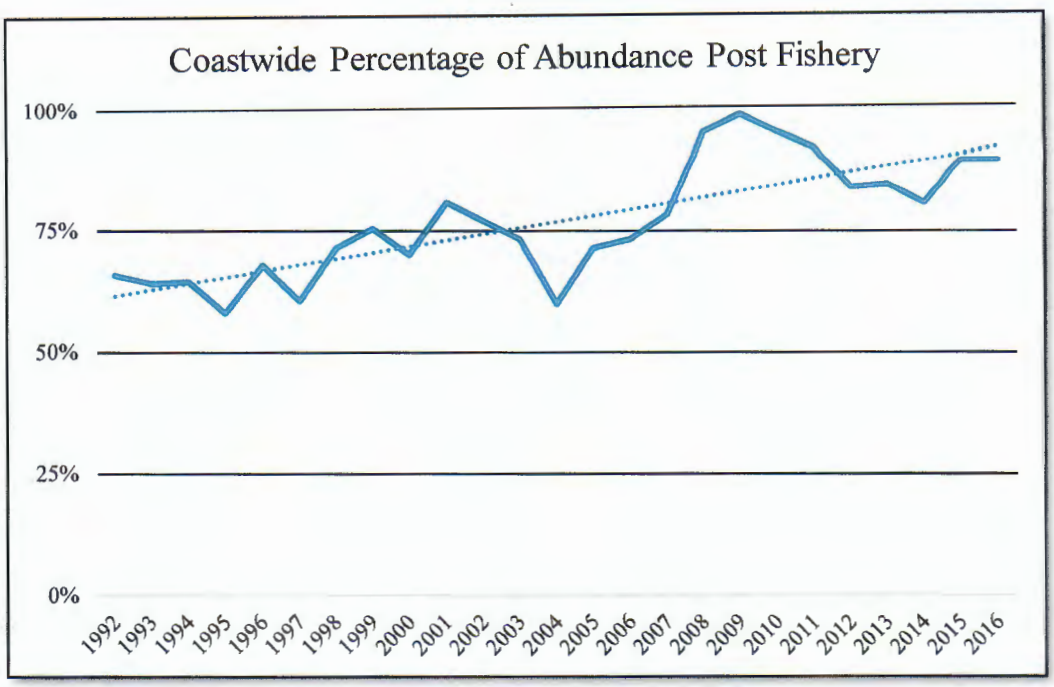

Figure 4.5.e. Coastwide (EEZ) 1992-2016 trend in percent of Chinook adult abundance remaining after PMFC ocean salmon fisheries (from October through the following September).

Estimates of reductions in abundance attributable to PFMC salmon fisheries for each geographic area aggregated for evaluation in this report using the methodology described in Section 5 are contained in Appendix E. They are available annually, also by the time steps described in further detail in Section 5.1. PFMC salmon fisheries also cause some reduction in modeled abundances outside of the EEZ (notably, the Salish Sea and West Coast Vancouver Island) which are not reflected in the "coastwide" total in Figure 4.5.e above.