



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
West Coast Region  
1201 NE Lloyd Boulevard, Suite 1100  
PORTLAND, OREGON 97232  
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Agenda Item D.3.b  
Supplemental NMFS Report 1  
March 2022

Sent Via Electronic Mail

Mr. Marc Gorelnik, Chair  
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Dear Chair Gorelnik:

The Pacific Coast Salmon Fishery Management Plan (FMP) requires that the Pacific Fishery Management Council (Council) develop management recommendations for salmon fisheries under the FMP consistent with consultation standards analyzed and/or described in biological opinions on the fishery developed by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) to limit the impacts of the fisheries on species listed as threatened or endangered under the Endangered Species Act (ESA). This letter summarizes the consultation standards for ESA-listed salmon, steelhead, and Southern Resident killer whales (SRKW) affected by Council fisheries, and provides NMFS' preliminary guidance regarding their implementation for the 2022 ocean salmon fishing season.

We also use this opportunity to comment on other subjects of general interest and provide NMFS' recommendations for non-ESA-listed salmon stocks of particular relevance to Council salmon fisheries. For the 2022 salmon fishing season, these other subjects include: recommendations regarding expectations in implementing the provisions of the 2019-2028 Pacific Salmon Treaty Agreement (PST) related to Council management, and recommendations for fisheries affecting Sacramento River fall-run Chinook salmon and Klamath River fall-run Chinook salmon. In this letter, we first address the topics of general interest and non-ESA-listed salmon stocks, followed by guidance related to consultation standards on ESA-listed species.

We would also like to reiterate our appreciation for the collaboration and assistance by the Council and its advisory bodies, agency and tribal staff, and the public over the past two years as the ad hoc Southern Oregon/Northern California Coho (SONCC) salmon Evolutionarily Significant Unit (ESU) Workgroup completed its work. We thank the Council for its time and thoughtful deliberations that led to final adoption in January 2022 of the preferred alternative to address the effect of Council-area ocean salmon fisheries on the SONCC Coho salmon ESU. The preferred alternative informed our guidance for the SONCC Coho salmon ESU in 2022 as discussed later in the letter.

## **Non-ESA related topics**

### **Coho Provision under the PST**

**Background:** Chapter 5 of the 2019 PST Agreement contains obligations regarding management of coho salmon stocks from British Columbia and Washington that are caught in both countries' salmon fisheries. Carried over from the prior Agreement is the ability for either country to request increases in



any management unit's (MU) annual exploitation rate (ER) cap over those specified in the chapter, but new in the 2019 Agreement, per Section 8(g), is a commitment by both the United States (U.S.) and Canada to "not change the status or associated ER caps for an MU after March 31" in any given year. Therefore, any requests for modifying ER caps necessary to complete a Party's domestic process will need to be exchanged prior to March 31st. The 2022 preseason planning manager-to-manager meeting between the U.S. and Canada will occur on March 15, 2022. At the meeting, the Parties will exchange preseason expectations of stock status and anticipated fishery structure that can be readily incorporated into model inputs. Canada's Thompson River coho salmon stock is classified as being in critical status under the 2019 PST Agreement.

**Recommendation:** U.S. representatives that attend the meeting between the U.S. and Canada will share information on Canadian fishing levels and structure in 2022 with the Council's Salmon Technical Team (STT) for consideration in planning U.S. domestic fisheries. Council fisheries, together with other southern U.S. fisheries, must be managed to stay within the ER caps. The STT should report upon both the U.S. PST coho salmon MU obligations and 2022 expected ERs during the preseason process.

### **Sacramento River Fall-run Chinook Salmon (SRFC)**

**Background:** In 2018, SRFC escapements had declined to the point the stock was determined to be overfished. The Council adopted a rebuilding plan in 2019. NMFS published a final rule approving this rebuilding plan in November 2020.<sup>1</sup> In 2021, NMFS determined that SRFC was rebuilt because its three-year geometric mean spawning escapement (2018-2020) of 133,549 met the criteria for a rebuilt stock, i.e., above the stock's  $S_{MSY}$  of 122,000 spawners. The stock was rebuilt one year sooner than anticipated under its rebuilding plan.

While the stock is now rebuilt, the larger picture is important in shaping 2022 salmon fisheries to ensure to the extent possible that the stock does not become overfished again. Escapement of SRFC in 2021 was estimated to be 104,483 hatchery and natural area adults, well below both the projected 2021 escapement of 133,900 and the maximum sustainable yield escapement ( $S_{MSY}$ ) of 122,000 adults. The three-year geometric mean of spawners is now 133,192 (2019-2021), which exceeds  $S_{MSY}$ . However, spawner abundance has been below the escapement floor of 122,000 associated with the FMP objective in five of the last seven years. This pattern is a function of both fishery and forecast performance. Forecasts of the Sacramento Index have been higher than the post-season estimates in five of the last seven years. Exploitation rates estimated post-season continue to be consistently higher than projected pre-season exploitation rates, substantially in most years, and post-season estimates of escapement have been well below preseason expectations in six of the last seven years (Table 1). The Sacramento River has also experienced low flows and high temperatures in recent years associated with the on-going drought which have adversely affected the stock. This pattern, including the low escapement in 2021, combined with the much higher than anticipated exploitation rate and likely continuation of poor in-river environmental conditions are a cause for concern for 2022.

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<sup>1</sup> Final rule approving the Council's rebuilding plans for SRFC and KRFC (85 FR 613575920, November 27, 2020). Available: <https://www.federalregister.gov/documents/2020/11/27/2020-26042/fisheries-off-west-coast-states-west-coast-salmon-fisheries-rebuilding-chinook-salmon-stocks> (website accessed February 23, 2022).

**Table 1. SRFC preseason abundance, escapement, and exploitation rate forecasts for 2015-2021, and comparison to post-season estimates.**

Year	Sacramento Index Forecast	Preseason Forecasted Spawning escapement	Preseason Exploitation Rate	Sacramento Index Post-Season	Post-Season Spawning escapement	Post-Season Exploitation Rate
2015	651,985	341,017	48%	254,949	113,468	55%
2016	299,609	151,128	50%	205,317	89,699	56%
2017	230,700	133,242	42%	137,063	44,329	68%
2018	229,432	151,000	34%	220,366	105,466	52%
2019	379,632	160,159	58%	507,056	163,767	68%
2020	473,183	233,174	51%	352,426	138,091	61%
2021	271,000	133,900	51%	322,200	104,483	68%

The conservation objective for SRFC in the FMP specifies a range of 122,000-180,000 combined hatchery and natural adult spawners. The harvest control rule describes maximum allowable exploitation rates at any given level of abundance; however, the Council may recommend lower exploitation rates as needed to address uncertainties or other year specific circumstances.

**Recommendation:** Given the pattern described above, particularly the tendency of the model to over-forecast abundance and underestimate exploitation rates, we recommend caution in setting the SRFC escapement target for 2022 ocean salmon fisheries. In 2022, a risk-averse management approach is warranted, such that fisheries should be structured to target an escapement at the upper end of the SRFC conservation objective range.

We encourage the Council to discuss what improvements might be made to forecasts or impact assessments in the short term to better align the preseason and postseason estimates of escapement and exploitation rates.

### **Klamath River Fall-run Chinook Salmon (KRFC)**

**Background:** The status of KRFC also declined to the point that it was declared overfished in 2018. The Council adopted a rebuilding plan in 2019 and NMFS published a final rule approving this rebuilding plan in November 2020.<sup>2</sup> The Council’s rebuilding strategy includes using the current KRFC harvest control rule to set maximum allowable exploitation rates and minimum escapement values based on forecasted abundance. Natural-area escapement of KRFC in 2021 was 30,196 adults, close to the projected 2021 escapement of 31,574, and below the  $S_{MSY}$  of 40,700. The three-year

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<sup>2</sup> Ibid.

geometric mean of spawners is 25,109 (2019-2021), which is below the minimum stock size threshold and, therefore, KRFC continue to meet the criteria for overfished status.

The KRFC harvest control rule specifies maximum allowable exploitation rates that vary with abundance, but generally seeks to provide for an  $S_{MSY}$  escapement level of at least 40,700 natural-area adults (i.e., adult fish that spawn in natural areas regardless of origin). When KRFC potential spawner abundance is projected to be less than 54,267 natural-area adults, fisheries are managed under the *de minimis* portion of the control rule, which allows for some fishing opportunity but results in the expected escapement falling below 40,700 natural-area adult spawners. The 2022 KRFC potential spawner abundance prior to fishing is predicted to be 50,906 Chinook salmon, thus for 2022 fisheries would be managed under the *de minimis* portion of the control rule.

The FMP also requires that the Council consider the following set of factors in setting an allowable *de minimis* exploitation rate:

- the potential for critically low natural spawner abundance, including considerations for substocks that may fall below crucial genetic thresholds;
- spawner abundance levels in recent years;
- the status of co-mingled stocks;
- indicators of marine and freshwater environmental conditions;
- minimal needs for tribal fisheries;
- whether the stock is currently approaching an overfished condition;
- whether the stock is currently overfished; and
- other considerations as appropriate.

The Council may recommend lower exploitation rates as needed to address uncertainties or other year-specific circumstances.

**Recommendation:** Council ocean salmon fisheries in 2022 should be managed consistent with the KRFC harvest control rule. Applying the forecast abundance to the control rule results in a maximum allowable exploitation rate of 25 percent and a minimum expected natural area adult escapement of 38,180. Given the extremely low abundance forecast and resulting low level of allowable fishing mortality, NMFS anticipates harvest opportunity will be substantially constrained in the region between Cape Falcon, Oregon, and Point Sur, California. Given the status, performance, and outlook for the stock in 2022, NMFS encourages the Council to take a cautious approach and carefully consider the factors described in the FMP in setting the exploitation rate.

## **ESA-listed Chinook Salmon Species**

### **California Coastal (CC) Chinook Salmon Evolutionarily Significant Unit (ESU)**

**Background:** The CC Chinook salmon ESU has been listed as threatened under the ESA since 1999. The current consultation standard for CC Chinook salmon is described in the FMP and is based on a 2000 NMFS biological opinion, which included a reasonable and prudent alternative (RPA) specifying fishery management measures needed to avoid jeopardy to the ESU. In 2005, NMFS re-evaluated and clarified the RPA in a Memorandum to the File. Because data at the time of the 2000 biological opinion were insufficient to determine ESU-specific conservation objectives for the ESU, the RPA uses a proxy based on harvest of KRFC, such that fishing under annual management measures is not to exceed a projected KRFC age-4 ocean harvest rate of 16 percent. Data remain insufficient to develop

ESU-specific conservation objectives for CC Chinook salmon, therefore we continue to rely on the KRFC proxy to manage impacts to the CC Chinook salmon ESU.

The Klamath Ocean Harvest Model (KOHM) is the model used by the Council to forecast the impacts of ocean and river fisheries on KRFC for the purposes of planning annual ocean salmon fisheries. The KOHM was updated in 2005 and 2021 (Agenda Item D. 1, 2021 Preseason Report II, Appendix B) to specifically address bias in the difference between pre-season and postseason estimates of the KRFC age-4 ocean harvest rate, because fishery impacts were exceeding the KRFC age-4 ocean harvest rate limit. Both updates incorporated more contemporary information on the relative spatial distribution of catch and catch per unit effort for ocean salmon fisheries off the West Coast. Based on the success of the adjustment made in 2005, and the results of the hindcast analysis in 2021 investigating the anticipated effects of the 2021 adjustment, we expected that the updated data inputs to the KOHM model in 2021 would bring pre- and post-season estimates of the ocean harvest rate for age-4 KRFC into better alignment. However, the postseason estimate of the 2021 KRFC age-4 ocean harvest rate was 27 percent, substantially exceeding the RPA goal of 16 percent (Review of 2021 Ocean Salmon Fisheries, PFMC 2022). The magnitude of the deviations in recent years are of great concern, both with respect to the management of KRFC harvest and spawning escapement, as well as ensuring protection of ESA-listed CC Chinook salmon.

**Table 2. Estimates of ocean harvest rates of age-4 KRFC salmon pre- and postseason in recent years.**

<b>Year</b>	<b>Preseason Age-4 Harvest Rate Forecast</b>	<b>Post-Season Age-4 Harvest Rate Estimate</b>	<b>Pre/Post for Years &gt; 16%</b>
<b>2017</b>	0.03	0.04	
<b>2018</b>	0.12	0.24	0.5
<b>2019</b>	0.16	0.36	0.4
<b>2020</b>	0.09	0.23	0.4
<b>2021</b>	0.11	0.27	0.4

**Guidance:** Council salmon fisheries in 2022 should be managed to achieve the RPA of the 2000 biological opinion (i.e., limits on the forecast KRFC age-4 ocean harvest rates serve as the consultation standard to ensure that CC Chinook salmon are not subject to increasing harvest rates in the future), and the 2005 clarification (i.e., management measures shall result in a KRFC age-4 ocean harvest rate of no greater than 16 percent). However, 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

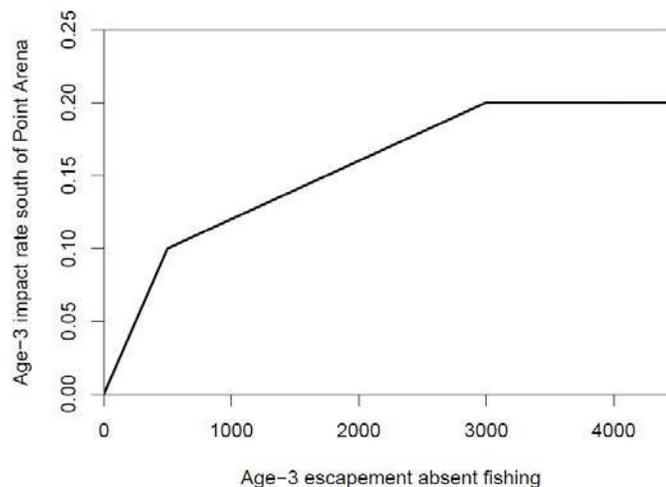
pattern of recent model performance) *unless* the Council and its advisory bodies identify management measures or further model adjustments that the best available information indicates would have the same effect of keeping the post-season estimate of the harvest rate on KRFC age-4 at or below 16 percent for 2022 ocean salmon fisheries.

### **Sacramento River Winter-run Chinook Salmon (SRWC) ESU**

**Background:** The SRWC ESU was listed under the ESA as threatened in 1990 and relisted as endangered in 1994. SRWC is one of eight species identified in NMFS' "Species in the Spotlight" initiative because it is at high risk of extinction. For more information about actions for its conservation and recovery, please refer to its Species in the Spotlight Priority Action Plan.<sup>3</sup>

NMFS has completed several ESA consultations regarding the impacts of the ocean salmon fishery on SRWC. The most recent and currently applicable biological opinion was completed in March 2018. That biological opinion analyzed the Council's proposed new abundance-based control rule, informed by extensive analysis by the Council's ad hoc SRWC Workgroup, in conjunction with size and season limits previously implemented. The 2018 biological opinion concluded that salmon fisheries managed under this new control rule, and maintaining the fishery season and size restrictions that were part of the previous RPA, are not likely to jeopardize SRWC.

The harvest control rule uses a forecast of SRWC age-3 escapement in the absence of salmon fisheries ( $E_3^0$ ) to determine the allowable age-3 impact rate.<sup>4</sup> If  $E_3^0$  is above 3,000, a maximum impact rate of 20 percent is allowed. If  $E_3^0$  is between 3,000 and 500, then the impact rate ranges from 20 percent to 10 percent. If  $E_3^0$  is below 500, then the impact rate has a steeper decline from 10 percent until it reaches zero at an  $E_3^0$  of zero (Figure 1).



**Figure 1. The adopted harvest control rule for management of ocean fisheries that affect Sacramento River winter-run Chinook salmon.**

<sup>3</sup> Species in the Spotlight: priority actions, 2016-2020. Sacramento River winter-run Chinook salmon, *Oncorhynchus tshawytscha*. Available: <https://repository.library.noaa.gov/view/noaa/10746> (website accessed January 29, 2021).

<sup>4</sup> O'Farrell, M., N. Hendrix, and M. Mohr. 2016. An evaluation of preseason abundance forecasts for Sacramento River winter Chinook salmon. Pacific Fishery Management Council Briefing Book for November 2016, 35 pages. Available: <https://www.pcouncil.org/documents/2016/11/agenda-item-d-2-attachment-1-an-evaluation-of-preseason-abundance-forecasts.pdf/> (website accessed February 2, 2021).

**Guidance:** The 2022 forecast of SRWC age-3 escapement in the absence of fisheries is 5,971. Applying this abundance forecast to the control rule results in a maximum allowable age-3 impact rate of 20 percent in 2022 salmon fisheries south of Point Arena, California. Council salmon fisheries in 2022 should be designed to not exceed a 20 percent age-3 impact rate on SRWC along with continuing to require minimum size limits and seasonal fishing windows specified in the FMP south of Point Arena for both the commercial and recreational fisheries specified in the FMP.

### **Central Valley (CV) Spring-run Chinook Salmon ESU**

**Background:** The CV spring-run Chinook salmon ESU was first listed as threatened in 1999. Effects of the ocean salmon fishery on this ESU were most recently analyzed in NMFS' 2000 biological opinion. That biological opinion concluded that the fishery, as regulated under the FMP and NMFS' consultation standards for SRWC, is not likely to jeopardize the continued existence of CV spring-run Chinook salmon.

The management framework for SRWC that includes the updated harvest control rule consulted on by NMFS in its March 2018 biological opinion, and the size and season limits from the previous RPA for SRWC contains equivalent and/or additional restrictions on the salmon fishery when compared to the management measures considered in the analysis in the 2000 opinion on spring-run and is more responsive than prior management frameworks to information related to the status of CV spring-run Chinook salmon by accounting for changes in freshwater conditions in the CV for SRWC. As a result, there is no new information or other circumstances suggesting that a reinitiation of the 2000 biological opinion may be warranted, and the management framework developed for SRWC, along with other regulatory measures in the FMP, limits impacts to CV spring-run Chinook salmon in a manner still sufficient to avoid jeopardy to CV spring-run Chinook salmon.

**Guidance:** The Council should continue the existing approach of relying on current management for SRWC. Council salmon fisheries in 2022 should be managed consistent with the control rule for SRWC analyzed in the 2018 biological opinion to be sufficiently protective of the CV spring-run Chinook salmon ESU.

### **Lower Columbia River (LCR) Chinook Salmon ESU**

**Background:** The LCR Chinook salmon ESU was listed as threatened under the ESA in 1999. In 2011, the Council recommended implementation of an abundance-based framework for limiting fishery impacts on this ESU. NMFS analyzed the effects of using this framework to manage ocean fisheries on LCR Chinook salmon in a 2012 biological opinion. The Council's abundance-based framework and the 2012 biological opinion continue to provide the basis for our guidance.

LCR Chinook salmon includes a spring-run component, a "far-north" migrating bright component, and a component of north-migrating tules. The bright and tule components both have fall run timing. The historic spawning habitat for the Upper Cowlitz, Cispus, and Lewis River spring-run Chinook salmon populations in Washington is now largely inaccessible to salmon due to impassable dams. These populations are therefore dependent, for the time being, on the associated hatchery programs.

a) *Cowlitz, Lewis River, and Sandy River Hatcheries populations* – Per the Lower Columbia Salmon and Steelhead Recovery Plan, the Cowlitz Salmon Hatchery and Lewis River Salmon Hatchery are being used for reintroduction of LCR spring-run Chinook salmon into the upper basins

above the existing dams.<sup>5</sup> The hatchery programs are critical to the overall recovery effort. Given the circumstances, maintaining the hatchery brood stocks for the Cowlitz and Lewis River Hatcheries is essential for implementation of the recovery plan. The Cowlitz Salmon Hatchery met its escapement objective 10 out of the last 12 years, with the last five years experiencing two shortfalls. Over the same period, Lewis River Salmon Hatchery escapements declined between 2011 and 2016, but have since rebounded, achieving hatchery escapement goals every year since 2016. Although additional progress is required to meet the high viability objective for the Sandy River spring-run Chinook salmon population, harvest objectives specified for the population through recovery planning are being met.

b) *North Fork Lewis and Sandy River bright populations* – There are two extant natural-origin bright populations, both considered relatively healthy, in the LCR Chinook salmon ESU: the North Fork Lewis and Sandy River populations. The North Fork Lewis River population is used as a harvest indicator for ocean and in-river fisheries. The escapement goal used for management purposes for the North Fork Lewis River population is 5,700, based on estimates of maximum sustainable yield derived from spawner-recruit analysis. Annual escapements averaged 18,400 between 2010 and 2021 and, with few exceptions, have met or exceeded the goal since at least 1980. The Sandy River population is considered to be viable under current harvest conditions in the Lower Columbia River Salmon and Steelhead Recovery Plan. Given the long history of healthy returns and management constraints that will be in place this year for other stocks (e.g., tules and upriver brights), NMFS does not anticipate the need to take specific management actions in the ocean to protect the bright component of the LCR Chinook salmon ESU in 2022. NMFS expects that the states of Washington and Oregon will continue to monitor the status of the LCR Chinook salmon bright populations, and take the specific actions necessary through their usual authorities to deliver spawning escapement through the in-river fisheries they manage sufficient to maintain the health of these populations.

c) *LCR tule Chinook salmon* – The tule component of the LCR Chinook salmon ESU comprises twenty-one separate populations, which are caught in large numbers in Council fisheries, as well as fisheries to the north and in the Columbia River. NMFS’ 2012 biological opinion on the abundance-based management (ABM) framework concluded that fisheries managed under this framework are not likely to jeopardize LCR Chinook salmon. The ABM framework sets the annual exploitation rate limit depending on the abundance of Lower River Hatchery (LRH) tule Chinook salmon (Table 3).

**Table 3. Variable exploitation rate limits based on the preseason forecast of LRH Chinook salmon.**

Lower River Hatchery Abundance	Total Exploitation Rate Limit
0-30,000	30%
30,000-40,000	35%
40,000-85,000	38%
> 85,000	41%

<sup>5</sup> Recovery Plan for Lower Columbia River Coho Salmon, Lower Columbia River Chinook Salmon, Columbia River Chum Salmon, and Lower Columbia River Steelhead. Available: <https://www.fisheries.noaa.gov/resource/document/recovery-plan-lower-columbia-river-coho-salmon-lower-columbia-river-chinook> (website accessed February 23, 2022).

**Guidance:** a) *Cowlitz, Lewis River, and Sandy River Hatcheries populations* – The 2022 forecast to the Columbia River mouth for Cowlitz Salmon Hatchery spring-run Chinook salmon is 4,079 adults, compared to a hatchery escapement goal of 1,337. The 2022 forecast to the Columbia River mouth for Lewis River Salmon Hatchery spring-run Chinook salmon is 2,358 adults compared to a hatchery escapement goal of 1,380. We understand that the states of Washington and Oregon will manage the mainstem Columbia River spring season salmon fisheries, along with salmon fisheries in Columbia River tributaries, to ensure the escapement to the Cowlitz and Lewis River Hatcheries will meet requirements in 2022. The Sandy River spring-run Chinook salmon population is meeting the recovery planning harvest objective and NMFS does not anticipate the Council will need to take specific management actions in the ocean to protect the spring component of the LCR Chinook salmon ESU in 2022. We anticipate that the management agencies will continue to manage in-river fisheries, coordinating between mainstem and terminal tributary fisheries management, toward meeting hatchery escapement in 2022.

b) *North Fork Lewis and Sandy River populations* – Given the long history of healthy returns and management constraints that will be in place this year for other fall-run stocks (e.g., tules and upriver brights), we do not anticipate the Council will need to take specific management actions in the ocean to protect the bright component of the LCR Chinook salmon ESU in 2022. The Council should continue to manage ocean fisheries such that when combined with fisheries in state waters the escapement goal of 5,700 Chinook salmon to the North Fork Lewis River is met. We anticipate that the states of Washington and Oregon will continue to monitor the status of the LCR Chinook salmon bright populations and take the specific actions necessary through their usual authorities to deliver spawning escapement through the in-river fisheries they manage sufficient to maintain the health of these populations.

c) *LCR tule Chinook salmon* –the preseason forecast for LRH tule Chinook salmon in 2022 is between 67,700 and 73,100; therefore, Council fisheries in 2022 should be managed such that the total exploitation rate on LCR tule Chinook salmon in all ocean fisheries and all mainstem Columbia River fisheries below Bonneville Dam combined does not exceed 38 percent.

### **Upper Columbia River Spring-run Chinook Salmon, Upper Willamette River Chinook Salmon, Snake River Spring/Summer-run Chinook Salmon ESUs**

**Background:** NMFS has considered the effects of Council fisheries on spring-run Chinook salmon stocks from the Upper Columbia River and Upper Willamette River Basins in a 2001 biological opinion and spring/summer-run Chinook salmon stocks from the Snake River in a 1996 biological opinion. In these biological opinions we concluded that the expected take in Council salmon fisheries of salmon originating from any one of these ESUs is at most an occasional event; therefore, the fisheries were not likely to jeopardize any of these ESUs.

**Guidance:** Consistent with those biological opinions, management actions designed to limit catch from these ESUs beyond what will be provided by harvest constraints for other stocks in 2022 are not necessary.

### **Snake River (SR) Fall-run Chinook Salmon ESU**

**Background:** NMFS completed a biological opinion on the impacts of Council salmon fisheries on SR fall-run Chinook salmon in 1996. In that biological opinion, NMFS concluded that a 30.0 percent reduction in the age-3 and age-4 adult equivalent total exploitation rate in ocean salmon fisheries

relative to the 1988-1993 base period standard provided a necessary and appropriate level of protection for SR fall-run Chinook salmon. That consultation standard is equivalent to an ocean exploitation rate limit of 29 percent on age-3 and age-4 SR fall-run Chinook when using the Fishery Regulation Assessment Model (FRAM) base period calibration produced in September 2021.

**Guidance:** In 2022, Council salmon fisheries must be managed to ensure that the 30.0 percent base period reduction criterion for the aggregate of all ocean salmon fisheries, including Southeast Alaska, Canada, and Council fisheries, is achieved.

### **Puget Sound (PS) Chinook Salmon ESU**

**Background:** With respect to the PS Chinook salmon ESU, NMFS acknowledges the importance of, and continues to strongly support, the integrated management structure between the Council and North of Falcon planning processes. The PS Chinook salmon ESU was listed as threatened in 1999. The conservation objectives for PS Chinook salmon stocks that NMFS includes in this letter are described in terms of total or southern U.S. salmon fisheries (SUS) impacts rather than Council salmon fishery specific impacts. Under the current management structure, Council salmon fisheries are included as part of the suite of fisheries that comprise the fishing regime negotiated each year by the co-managers under *U.S. v. Washington* to meet management objectives for Puget Sound and Washington Coastal salmon stocks.

Although Council and Puget Sound fisheries are intertwined with respect to PS Chinook salmon, it is worth noting that impacts on PS Chinook salmon stocks in Council salmon fisheries are generally quite low. In 2004, NMFS issued a biological opinion on the anticipated effects of Council salmon fisheries on the listed PS Chinook salmon ESU for 2004 and future fishing years. The 2004 biological opinion found that exploitation rates in Council area salmon fisheries would not jeopardize the continued existence of the species. Exploitation rates on PS spring- and fall-run Chinook salmon stock aggregates, in Council salmon fisheries, had been less than two percent and five percent on average, respectively.

NMFS has consulted on a series of federal actions related to implementation of proposed harvest plans for Puget Sound salmon fisheries impacting the PS Chinook salmon ESU since the ESU was listed under the ESA in 1999. NMFS is currently reviewing a new (February 2022), comprehensive ten-year joint Chinook Resource Management Plan (RMP) developed by the Washington Department of Fish and Wildlife and the Puget Sound Treaty Tribes (collectively the Puget Sound co-managers). However, NMFS' review of the new RMP under NMFS' ESA 4(d) rule will not be completed prior to the 2022 fishing season. Therefore, in 2022 NMFS expects to consult on proposed actions related solely to the 2022 Puget Sound salmon fishing season. We expect to issue the biological opinion for federal actions related to the Puget Sound fisheries by early May 2022. The following guidance reflects NMFS' discussions with the Puget Sound co-managers to date and our best preliminary assessment of appropriate conservation objectives for 2022.

**Guidance:** For 2022, the Council salmon fisheries should be managed such that exploitation rates on PS spring- and fall-run Chinook salmon populations do not exceed 3 and 6 percent, respectively. Additionally, the Council should determine that its fisheries, when combined with the suite of other fisheries impacting the PS Chinook salmon ESU, meet the conservation objectives identified in this letter for populations within this ESU. For that reason, we describe below our expectation for the full suite of SUS fisheries that will affect PS Chinook salmon stocks in 2022.

Our preliminary 2022 guidance for conservation objectives for all PS Chinook salmon populations is summarized in Table 4. The guidance is a mixture of total and SUS exploitation rates, escapement goals, or noted expectation in place of specific objectives. Based on the forecasts for 2022, NMFS is providing the following guidance for the planning of 2022 salmon fisheries. This guidance does not reflect a full and thorough review of the recently submitted ten year RMP, as that will require more time than is available in the preseason process for 2022. In some instances, as noted below, discussions will continue between NMFS and the Puget Sound co-managers during the preseason planning process for the Council fisheries and Puget Sound fisheries.

For 2022 Puget Sound preseason run size information indicates that the North and South Fork Nooksack early-run, Mid-Hood Canal, and the Stillaguamish populations will be at very low abundance in 2022. One or more of these stocks will likely have a limiting effect on some Puget Sound pre-terminal fisheries, such that full attainment of the exploitation rate ceilings, as proposed by the co-managers, may not occur for several Puget Sound populations. For the Skagit summer/fall, the Stillaguamish, the Puyallup, and the mid-Hood Canal populations, the management objectives proposed by the co-managers for use in the 2022 fisheries, represent some level of change to the objectives used in the planning of fisheries in recent years. Some of these are minor numeric changes, based on updates to the FRAM, others represent a more substantive change to the objective for the populations. Importantly, with the RMP currently under review, assessment of the applicability of the proposed objectives for use in 2022 will be borne out through the pre-season planning process. For these specific populations, NMFS intends to work closely with the co-managers to assure that the fishery package that develops during the pre-season process provides similar levels of conservation, for each of these populations, as has been provided in recent years. NMFS will provide further guidance to the Council, as necessary, during the March and April meetings to ensure this outcome.

In summary, while the primary purpose of this document is to provide guidance for the Council salmon fisheries in 2022, we acknowledge the importance of the integrated management structure between the Council and North of Falcon planning processes. Management actions taken to meet the above-described conservation objectives will occur primarily in Puget Sound fisheries because impacts on PS Chinook salmon in Council fisheries are low. However, since impacts in both fisheries contribute to meeting these objectives, any delay in reaching the necessary agreements through the North of Falcon process by the end of the April 2022 Council meeting will complicate NMFS' ability to approve regulations for Council area fisheries and to complete the biological opinion for Puget Sound fisheries by mid-May 2022.

To avoid such complications, we strongly recommend that the Council provide assurance that the final option adopted at its April 2022 Council meeting, when combined with Puget Sound fisheries negotiated during the North of Falcon process, results in harvest impacts that are consistent with the conservation objectives for each Puget Sound Chinook salmon management unit included in Table 4, based on the anticipated 2022 abundances.

(continued next page)

**Table 4. NMFS’ guidance for Puget Sound Chinook salmon conservation objectives for the 2022 fishing year. Table footnotes are provided on the following page.**

Management Unit/Population	2022 Exploitation Rate Ceilings or Escapement Guidance	
	Total	Southern U.S. (SUS)
<b>Nooksack spring</b> NF Nooksack SF Nooksack	-	10.9% <sup>1</sup>
<b>Skagit Summer/Fall</b> Upper Skagit Lower Skagit Lower Sauk	See description above	
<b>Skagit Spring</b> Suiattle Upper Sauk Cascade	36%	
<b>Stillaguamish</b> NF Stillaguamish SF Stillaguamish	See description above	
<b>Snohomish</b> Skykomish Snoqualmie	20%	8.3% <sup>2</sup>
<b>Lake Washington</b> Cedar River	500 total spawning escapement	Up to 15% Pre-terminal SUS <sup>3</sup>
<b>Green</b>	2,744 total spawning escapement	Up to 15% Pre-terminal SUS <sup>3</sup>
<b>White River</b>	-	22%
<b>Puyallup</b>	See description above	
<b>Nisqually</b>	49% <sup>4</sup> (47% base limit plus up to 2% for experimental selective fishery)	-
<b>Skokomish</b>	50% <sup>5</sup>	-
<b>Mid-Hood Canal</b>	See description above	
<b>Dungeness</b>	-	10.0%
<b>Elwha</b>	-	10.0%

<sup>1</sup> Nooksack SUS ER may increase to up-to 14.1 percent in one of every five years.

<sup>2</sup> SUS ER of 8.3 percent may be adjusted lower, by co-managers, when forecast falls below the lower bound threshold (LBT) of 1,745 and 700 natural-origin spawners, in the Skykomish and Snoqualimie Rivers, respectively.

<sup>3</sup> Pre-terminal SUS ER can be increased up to a 14 percent limit when all three mid-Puget Sound populations are forecasted to exceed their first level upper management spawning ground escapement thresholds (UMT 1: Lake WA=500;

Green=4,500; Puyallup=1,538) and up to a 15 percent limit when all three populations are forecasted to exceed their UMT 2 spawning ground escapement levels (Lake WA=500; Green=6,700; Puyallup=1,895).

<sup>4</sup> Up to 47 percent total ER on unmarked fish, plus up to two percent additional ER for selective gear project in 2022 when total system escapement (to spawning grounds and to hatchery, combine) is greater than 6,300.

<sup>5</sup> Up to 50 percent total ER when forecasted total escapement is higher than 1,650 to the natural spawning grounds and 2,000 to the hatchery.

## **ESA-listed Coho Salmon Species**

### **Oregon Coast (OC) Coho Salmon ESU**

**Background:** The OC coho ESU is currently ESA-listed as threatened. Amendment 13 specifies the harvest management matrix for managing fisheries on this ESU. NMFS concluded in its 1999 biological opinion that Amendment 13 was not likely to jeopardize the ESU.

Under the matrix, the total exploitation rate limit is set each year based on measures of parental escapement and marine survival for three sub-aggregates of stocks within the ESU (northern, north-central, and south-central). The southern sub-aggregate of stocks is within the SONCC coho salmon ESU (below). Ocean fishery impacts each year are limited to the lowest impact level specified for the weakest sub-aggregate. The total exploitation rate in all ocean and freshwater fisheries must not exceed the limits specified in the matrix for each sub-aggregate.

In 2000, the Council appointed the Oregon Coast Natural Coho salmon Work Group (Work Group) to review Amendment 13. The Work Group recommended expanding the original harvest matrix in Amendment 13 to explicitly define the very low parental escapement levels and extremely low marine survival that would trigger lower exploitation rates in fisheries. The Council and the Oregon Department of Fish and Wildlife have been applying the Work Group's expanded harvest matrix for ocean and freshwater fishery impacts.

**Guidance:** Using the expanded matrix in 2022 will ensure a level of protection consistent with the 1999 biological opinion. Under this management framework, ocean fishery impacts are limited to the status of the weakest sub-aggregate; for this season the north-central sub-aggregate is the weakest as it had low parental escapement in 2019. The marine survival index is in the medium category. Under these circumstances, the total exploitation rate in marine and freshwater salmon fisheries are limited to no more than 15 percent for the north-central sub-aggregate.<sup>6</sup> For the northern and south-central sub-aggregates, parental spawner status is in the high category and marine survival is in the medium category such that the total exploitation rate in 2022 marine and freshwater salmon fisheries are limited to no more than 30 percent. As mentioned above, the southern sub-aggregate is within the SONCC coho salmon ESU; therefore, it should be managed consistent with the SONCC coho salmon ESU section as described below.

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<sup>6</sup> OCN Work Group Report. 2000 Review of Amendment 13 to the Pacific Coast Salmon Plan. October 12, 2000. Exhibit B.3.b in the November 2000 briefing book. Available: <https://www.pcouncil.org/documents/2000/11/b-salmon-management-november-2000.pdf/> (website accessed February 6, 2021).

## Lower Columbia River (LCR) Coho Salmon ESU

**Background:** The LCR coho salmon ESU was listed as threatened under the ESA in 2005. In 2014, the Council recommended a harvest management matrix for managing impacts to LCR coho salmon. NMFS completed a biological opinion concluding that Council fisheries managed using this matrix are not likely to jeopardize LCR coho salmon.

Under the matrix, the total exploitation rate limit for LCR coho salmon is set each year based on measures of parental escapement and marine survival (Table 5). The total exploitation rate on LCR coho salmon in all marine area fisheries and fisheries in the mainstem Columbia River below Bonneville Dam must not exceed the year-specific exploitation rate limit.

**Table 5. Harvest management matrix for LCR coho showing allowable fishery exploitation rates based on parental escapement and marine survival index.**

Parental Escapement (rate of full seeding)		Marine Survival Index (based on return of jacks per hatchery smolt)					Allowable exploitation rate
		Very Low (≤ 0.06%)	Low (≤ 0.08%)	Medium (≤ 0.17%)	High (≤ 0.40%)	Very High (> 0.40%)	
Normal	≥ 0.30	10%	15%	18%	23%	30%	Allowable exploitation rate
Very Low	< 0.30	≤ 10%	≤ 15%	≤ 18%	≤ 23%	≤ 30%	

**Guidance:** For the 2022 season, parent escapement is in the normal category. The marine survival index is in the high category. Therefore, Council salmon fisheries in 2022 should be managed such that the total exploitation rate in all salmon fisheries on LCR coho salmon below Bonneville Dam does not exceed 23 percent.

## Southern Oregon/Northern California Coastal Coho Salmon ESU

**Background:** The SONCC coho salmon ESU has been listed as threatened under the ESA since 1997. The first biological opinion on the effects of ocean fisheries on the ESU as managed under the FMP was completed in 1999. The Rogue/Klamath coho hatchery stock is used as an indicator of fishery impacts on SONCC coho salmon in the FRAM model. In March 2020, NMFS and the Hoopa Valley Tribe reached a stipulated agreement to stay litigation filed by the Tribe alleging failure by the agency to reinitiate consultation on the effects of Council-managed fisheries on the ESU. The stipulated agreement provided a timeline by which NMFS would confer with the Council on completion of a new SONCC coho salmon harvest control rule, and a timeline for ESA consultation, as warranted, on the effects of the control rule. In April 2020, consistent with the stay of litigation, the Council formed an ad hoc workgroup to develop a harvest control rule for Council consideration. The workgroup assessed

the effects of a range of harvest control rules on six populations or population units within the SONCC coho salmon ESU for which there were sufficient data to conduct the analyses.

At its January 2022 meeting, the Council adopted a new harvest control rule informed by the analyses of the ad hoc workgroup and recommended amendment of the FMP to incorporate the new control rules. The new harvest control rule includes total exploitation rate limits of (1) 16 percent for the Trinity population unit (Upper Trinity River, Lower Trinity River, South Fork Trinity River; and, (2) 15 percent for each of the remaining individual populations within the ESU as represented by the Rogue River, the Scott River, the Shasta River, Freshwater Creek and Bogus Creek. These exploitation rate limits include all ocean and inland sources of fishery mortality on age-3 adult SONCC coho salmon, including landed and non-landed mortality. Coho-directed fisheries and coho retention in Chinook-directed fisheries remain prohibited in the Exclusive Economic Zone off of California. NMFS reinitiated consultation in December 2021 and anticipates completing a new biological opinion on the effect of ocean salmon fisheries under the FMP on the SONCC coho salmon ESU, including the new harvest control rule, prior to implementing the 2022 ocean salmon management measures.

**Guidance:** Salmon fisheries in 2022 should be managed consistent with the harvest control rule adopted at the January 2022 Council meeting, as described above, as this information is based on the best information available to NMFS at this time. However, it is possible that new information may arise in the course of completing our consultation that may refine our guidance. Should that occur, we will make every effort to provide that information to the Council and co-managers as quickly as possible, as we expect to complete a new biological opinion on the new harvest control rule prior to the Council's final action at the 2022 April Council meeting.

### **Central California Coastal (CCC) Coho Salmon ESU**

**Background:** The CCC coho salmon ESU was listed as threatened under the ESA in 1996 and relisted as endangered in 2005. NMFS completed a biological opinion addressing the effects of the fishery on CCC coho salmon in 1999. Information on past harvest or non-retention mortality rates is lacking for CCC coho salmon. In the absence of more specific information, a prohibition on directed fishing for coho and retention of coho salmon in Chinook salmon-directed fisheries off of California has been implemented consistent with the 1999 opinion.

CCC coho salmon is one of eight species identified in NMFS' "Species in the Spotlight" initiative because the ESU is at high risk of extinction. For more information about actions for its conservation and recovery, please refer to its Species in the Spotlight Priority Action Plan.<sup>7</sup>

**Guidance:** Salmon fisheries in 2022 should be managed consistent with the consultation standard prohibiting directed fishing for coho and retention of coho salmon in Chinook salmon-directed fisheries off California.

## **ESA-listed Chum Salmon Species**

### **Hood Canal Summer-run Chum Salmon ESU**

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<sup>7</sup> Species in the Spotlight: priority actions, 2016-2020. Central California coast coho salmon, *Oncorhynchus kisutch*. Available: <https://repository.library.noaa.gov/view/noaa/17439> (website accessed January 29, 2021).

**Background:** Chum salmon are not targeted, and are rarely caught, in Council salmon fisheries. However, the FMP requires fisheries to be managed consistent with NMFS' ESA standards for listed species, which includes the Hood Canal summer-run chum salmon ESU. In 2001 NMFS approved the Summer Chum Salmon Conservation Initiative under Limit 6 of its ESA 4(d) Rule. The Initiative describes the harvest actions that must be taken to protect listed Hood Canal summer-run chum salmon both in Washington fisheries managed under the jurisdiction of the Council and Puget Sound fisheries managed by the state and tribal fishery managers.<sup>8</sup>

Under the terms of the Initiative, chum salmon must be released in non-treaty sport and troll fisheries in Washington catch Area 4 from August 1 through September 30. The Conservation Initiative does not require release of chum salmon in tribal fisheries in catch Area 4 during the same period, but does recommend that release provisions be implemented. As in previous years, tribal managers will discuss implementation of these provisions during the North of Falcon planning process.

**Guidance:** Council fisheries in 2022 should be managed consistent with the terms of the Summer Chum Salmon Conservation Initiative.

### **Columbia River Chum Salmon ESU**

**Background:** The Columbia River chum salmon ESU has been listed as threatened under the ESA since 1999. In a 2001 biological opinion, NMFS determined Columbia River chum salmon are rarely caught in Council salmon fisheries and that Council salmon fisheries were not likely to jeopardize Columbia River chum salmon.

**Guidance:** Management constraints in the 2022 ocean salmon fisheries for the protection of listed Columbia River chum salmon beyond those required to address other stocks and species are not considered necessary.

### **ESA-listed Sockeye Salmon Species**

#### **Snake River Sockeye Salmon and Ozette Lake Sockeye Salmon ESUs**

**Background:** Sockeye salmon are rarely caught in Council salmon fisheries. In previous biological opinions, NMFS determined that Council fisheries were not likely to adversely affect SR or Ozette Lake sockeye salmon.

**Guidance:** No specific management measures to address these sockeye ESUs are necessary to avoid effects not considered in those opinions.

### **ESA-listed Steelhead Species**

**Background:** One Distinct Population Segment (DPS) of steelhead is currently listed as endangered, and ten DPSs are listed as threatened in Washington, Oregon, Idaho, and California. All eleven ESA-listed DPSs have been considered in NMFS' biological opinions on the effects of Council fisheries.

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<sup>8</sup> Washington Department of Fish and Wildlife and Point No Point Treaty Tribes. 2000. Summer Chum Salmon Conservation Initiative: An Implementation Plan to Recover Summer Chum in the Hood Canal and Strait of Juan de Fuca Region. Dated April 2000. 797 p. Available: <https://wdfw.wa.gov/sites/default/files/publications/00155/wdfw00155.pdf> (website accessed January 29, 2021).

Steelhead are rarely caught in ocean fisheries and retention of steelhead in non-treaty commercial ocean fisheries is currently prohibited. The biological opinions do not require any specific measures to limit fishery impacts to steelhead. However, historically, the Council and states have prohibited the retention of steelhead in ocean recreational fisheries, to minimize the effects of the fisheries on ESA-listed steelhead.

**Guidance:** Having considered currently available information, we do not believe reinitiation of any of the existing biological opinions addressing effects to steelhead is required. The Council and states should continue to prohibit the retention of steelhead in ocean fisheries and we encourage the same in treaty tribal fisheries to minimize the effect of whatever catch may occur.

## ESA-listed SRKW DPS

**Background:** The SRKW DPS was listed as endangered under the ESA in 2005. In 2021, NMFS approved the Council’s Salmon FMP Amendment 21, which added provisions to limit the effects of the fishery on Chinook salmon prey availability for SRKWs, after concluding in a biological opinion that fisheries managed consistent with the FMP as revised through Amendment 21 would not likely jeopardize SRKW or adversely modify their critical habitat. That biological opinion is available here: <https://repository.library.noaa.gov/view/noaa/29545>).

Amendment 21 to the FMP identifies a low abundance threshold of Chinook salmon in North of Falcon (NOF) waters below which the Council would implement additional management measures in the ocean salmon fishery, coupled with commitments from the states to implement control zone closures in state waters through state regulatory processes. The low abundance threshold is calculated using the FRAM model as informed by Chinook salmon stock distributions provided by the Shelton model. We understand that both models have recently been updated (Shelton et al. 2021: <https://doi.org/10.1111/faf.12530>). Section 6.6.8 of the FMP addresses the possibility of updated information requiring a recalculation of the threshold: *“If a technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, a modification of the estimated value of the TSI starting abundance estimates for the seven lowest years is necessary to be consistent with the best available scientific information, the Council may adopt an updated value for the threshold, which will be reported in the preseason process.”*

NMFS remains committed to working with the Council, states, tribes and our other partners to take actions to address all of the primary threats to SRKWs, including prey availability, vessel noise and disturbance, and pollutants, in order to improve conditions for the whales. We recognize that prey availability is only one element that has contributed to the current condition of SRKWs and fisheries are only one source of potential risk.

**Guidance:** During its March meeting, the Council should follow the process outlined in the FMP through Amendment 21 (section 6.6.8 of the FMP) to (1) to discuss and determine whether a review of the best scientific information available indicates that a modification of the Chinook salmon low abundance threshold is necessary (e.g., updates to the FRAM or Shelton et al. models, see attached Shelton et al. 2021 paper) and (2) estimate and report the pre-fishing (October 1) adult Chinook salmon abundance<sup>9</sup> based on 2022 forecasts for each of the five spatial areas defined by the ad hoc SRKW

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<sup>9</sup> Based on an arithmetic mean of the October 1 starting cohort sizes (time step 1 of the Fishery Regulation Assessment Model) for the specific years identified in section 6.6.8 of the FMP.

Workgroup: NOF, Salish Sea, southwest West Coast Vancouver Island, Oregon coastal waters, and California coastal waters. The Council should compare the 2022 abundance estimate for the NOF area to the recommended low abundance threshold. If the 2022 abundance estimate for NOF is less than the low abundance threshold, the Council should implement the management measures as described by the FMP through Amendment 21. We also acknowledge the states' commitment as stated in the FMP (section 6.6.8) to implement management measures in state waters through state regulatory processes when the projected abundance is below the threshold. In addition to the evaluation of the Chinook salmon low abundance threshold, NMFS will use the pre-fishing abundance estimates across all five spatial areas, provided by the Council, in ongoing monitoring of available Chinook salmon abundance as it relates to available prey and SRKW spatial distribution.

## **Conclusion**

NMFS West Coast Region expects the Council salmon fisheries in the coastal waters of the EEZ in 2022 will meet the conservation objectives for salmon stocks managed under the FMP and be responsive to the abundance of salmon stocks including the guidance described in the preceding sections.

We look forward to working with the Council to develop 2022 ocean salmon fishery management measures consistent with the conservation and management objectives of the FMP, the Magnuson-Stevens Fishery Management and Conservation Act, and the ESA. We are committed to working with the Council to address the issues outlined in this letter. To discuss this guidance further, please contact Ryan Wulff, Assistant Regional Administrator for Sustainable Fisheries at 916-930-3733 or [Ryan.Wulff@noaa.gov](mailto:Ryan.Wulff@noaa.gov).

Sincerely,



Barry A. Thom  
Regional Administrator

cc: Merrick Burden, Executive Director, Pacific Fishery Management Council  
Ryan Wulff, Assistant Regional Administrator for Sustainable Fisheries, NMFS WCR