SACRAMENTO RIVER FALL CHINOOK AND KLAMATH RIVER FALL CHINOOK CONSERVATION OBJECTIVES – SCOPING REPORT

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1 Klamath River Fall Chinook

1.1 Overview

At one point, the Klamath River was the third largest salmon producing river on the West Coast, and the removal of four dams within the Klamath River basin holds a significant promise for salmon recovery. It is estimated that more than 400 miles of additional habitat will be accessible for salmon and other native fish within the basin, and there are several habitat restoration projects that will benefit salmon in areas opened up by dam removal. According to a report produced by National Marine Fisheries Service (NMFS), the Klamath River project is the largest dam removal project in the world. This is a historic undertaking and one to be celebrated. Collaboration with tribal, federal, state agencies, and other entities has been key to getting this project where it is today, and the Pacific Fishery Management Council (PFMC, Council) will have a role to play in rebuilding salmon populations through sustainable fishery management.

In 2018 Klamath River Fall Chinook (KRFC) were categorized as overfished and a rebuilding plan was adopted in 2019. In the Rebuilding Plan, the Salmon Technical Team (STT) recommended a review of the conservation objective for KRFC. The 2023 assessment showed no change in the stock status and KRFC remain categorized as overfished. At the November 2022 Council meeting, the STT report and the Scientific and Statistical Committee (SSC) report indicated continued support for a review of the current conservation objective for KRFC. The SSC noted that developing new objectives should not require a lengthy process or period of time and that the necessary information to do so exists or can be developed. The STT added that the development of new interim measures should be tied to the dam removal timeline and the point when volitional passage is expected, meaning any interim measures should be adopted for implementation no later than the spring of 2024. The imminent removal of the dams has brought this issue to the forefront, however it is not new to the Council given this was also a recommendation provided in the Pacific Fishery Management Council Salmon Fishery Management Plan Impacts to Southern Resident Killer Whales in 2020, and prior to that as a recommendation from the Habitat Committee.

It is estimated that it will take at least eight to ten years for salmon to populate and utilize this new habitat such that stock-recruitment analysis will be possible and a new KRFC conservation objective can be developed, according to a letter from California Fish and Game Commission to the Council in April 2023. There is uncertainty regarding how the KRFC population will respond to the freshwater habitat post dam removal, especially in the years immediately following dam removal. A major uncertainty is in the quality of the newly available habitat immediately following dam removal, and how salmon will utilize and respond to its availability as it improves and repopulation progresses.

Given the magnitude of change and the uncertainty involved, a prudent approach to reviewing the KRFC conservation objective would be to allow for flexible, or adaptive, management measures especially as the system is transitioning since it may not be possible to predict what the appropriate conservation objective may be, and as mentioned before, identifying a new long-term objective will take time and a few generations of salmon escapement at a minimum. The management measures for KRFC will likely need to evolve and respond to these changes in a way that balances conservation and harvest needs for the resource and its users.

The Pacific Salmon Fishery Management Plan (FMP) is structured to meet conservation objectives (spawning escapement goals) by implementing fishery harvest rules (typically defined by harvest control rules, HCRs) annually. The challenge will be to appropriately pair the management response with how the salmon are responding to the new river environments over time. The management measures for KRFC in the FMP are adaptive in the sense that the level of harvest depends on the level of abundance, and the spawning escapement targeted can be higher (more conservative) than the specified conservation objective if deemed warranted.

The current conservation spawner escapement objective (S_{MSY}) and HCR are based upon, and limited by, the available habitat with dams in place, so it seems reasonable to consider that expansion of the habitat will necessitate an increase in the spawner escapement objective. This is true for both the purposes of repopulation of the newly available habitat near term, and the long-term sustainable management of KRFC once the stock has become established and a new S_{MSY} can be derived.

The FMP defines the current conservation objective for KRFC, but an interim objective or management framework that deviates from the FMP may need to be identified as the salmon respond to the altered freshwater environment, and at least initially, these deviations may be more conservative than those prescribed in the FMP. It is also likely that new technical work will need to be developed to help determine appropriate spawning escapement and harvest levels for KRFC. It is worth acknowledging that if a component of the current management measures is changed, it may have a cascading effect. For example, a change in the conservation objective may result in a need to evaluate and potentially change the harvest control rule.

Excerpts from the FMP relative to conservation objectives and harvest control rules, and Excerpts from the 2022 Review of Ocean Salmon Fisheries report and 2023 Preseason Report III report showing escapement data are provided at the end of this report.

1.2 Coordinating Entities

To develop a coordinated approach to KRFC management following dam removal, partnerships with agencies and entities both inside and outside of the Council will be essential. These include:

- Pacific Fishery Management Council
- Hoopa Valley Tribe
- Yurok Tribe
- National Marine Fisheries Service
- US Fish and Wildlife Service
- California Department of Fish and Wildlife
- Oregon Department of Fish and Wildlife

In addition, the Klamath River Technical Team (KRTT) will continue to be a key resource for KRFC data and cohort reconstructions, as essential KRFC data are annually produced by the KRTT and would likely be needed for any additional analysis.

1.3 Types of Collaboration

As KRFC respond to the transitional freshwater environment after dam removal, the Council will need to continue to make informed decisions on appropriate KRFC management measures. The FMP outlines the appropriate steps, but additional technical expertise may be needed to help evaluate any extenuating risks and potentially develop recommendations for the Council in its decision-making process.

Coordination of different agencies working together to achieve this common goal will be key to this process. There are several types of coordination activities that could occur. Within the PFMC arena, the activities that may be appropriate for this context include:

1. Ad-hoc Committee: This type of committee is typically formed to address a specific topic and is most often used by the Council. Ad-hoc committees typically consist of a wide range of experts from multiple agencies and may include stakeholders. Sometimes ad-hoc committees are formed as 'technical' workgroups to help inform the Council's policy decisions.

2. Joint Task Force: This type of group can be a smaller 'focus group' formed address a particular task. A Joint Task Force could be used to resolve a single issue or conduct a workshop to 'brainstorm' ideas on how to approach large topics that are multi-faceted.

3. Memoranda of Understanding (MOUs): Agencies can enter into MOUs to establish clear guidelines for how they will work together. These documents can help ensure that agencies understand their respective roles and responsibilities and that there is a shared understanding of the objectives they are trying to achieve.

4. Information sharing: Agencies can share information with each other to ensure that everyone has access to the same data and can make informed decisions. This approach can help avoid duplication of effort and ensure that resources are used effectively. This approach can help avoid duplication of effort and ensure that resources are used effectively and is commonly practiced within the Council arena.

1.4 KRFC Summary

A review of the current conservation objective for KRFC was recommended by both the STT and the SSC. Further, the imminent removal of four dams on the Klamath River has accelerated the need to review the management objectives for KRFC and the dam removal timeline is not flexible. A management approach that responds to the changing Klamath River system and KRFC population dynamics should be identified at least in the interim until the system stabilizes, which is expected to take at least a decade.

Adjustments to the current management measures for KRFC outlined in the FMP may need to occur prior to the 2024 fishery and new tools for KRFC management will likely be needed in advance of volitional passage of KRFC into the newly available habitat in the fall of that year. As noted, the FMP prescribes management measures for KRFC and does allow for more prudent measures to be employed as needed. This aspect may be a viable tool in the near term as data is collected and technical tools are developed that will help determine the appropriate management

strategies for the long term. However, the Council should identify a process that can project as best as possible what the most appropriate management measure are for KRFC during the period immediately following dam removal when conditions will be more volatile, and for the long term after the habitat and salmon populations have stabilized.

Coordination and adaptation through adjustment to model time series, annual methodology review, and transparent data sharing is also a core part of the annual salmon management process and long-term success in sustainable fishery management by the Council. The frequency and means by which the Council may need to adjust the management measures for KRFC during this interim period remains to be defined and will be a function of the selected management approach near term and the resource response post dam removal. This will take a commitment from the agencies to provide staff to collaborate on ideas to address the anticipated change and uncertainty, and work towards providing technical analysis, policy considerations, and recommendations for Council consideration.

1.5 Potential Pathways Forward

Continue to implement the current FMP management objectives for KRFC. This approach may be suitable as long as any deviations are more conservative from the prescribed management measures in the FMP and warranted based on the available information.

Consider developing an ad-hoc technical workgroup with the immediate task of outlining the steps and expertise required to identify the framework for interim management measures for use until a long-term conservation objective and HCR can be developed. Technical aspects such as adjustments to current models, development of new models and or exploitation rate matrices may also be needed to capture the changes.

A workgroup should include members from the coordinating agencies and entities noted in section 1.2. The Klamath River Technical Team (KRTT) will continue to be a key resource for KRFC data and cohort reconstructions, as the workgroup will likely rely on the data that is annually produced in the early winter months by KRTT. Commitment from the appropriate entities to ensure stable and consistent staffing of this team is critical.

2 Sacramento River Fall Chinook

2.1 Overview

In 2018 Sacramento River Fall Chinook (SRFC) were declared overfished and subsequently determined to be rebuilt in 2021. The spawning escapement of SRFC has not maintained an upward trend since 2021, and continued low returns could see the stock fall once again into an overfished status. Multiple factors likely play a role in the status of SRFC, including poor ocean environment, drought, water management, poor freshwater conditions (temperature, flow, etc.).

A review of the current conservation objective for SRFC has been recommended over the course of time by various Council advisory bodies, including the SSC and the STT. Improvements to other fishery management tools have also been recommended for SRFC including the development of an age-structured stock assessment using cohort reconstruction methods, development of an age-structured abundance forecast, and development of an age-structured harvest model for SRFC

similar to the Klamath Ocean Harvest Model. Additionally, the forecast abundance model and the harvest model have performed poorly for several years. Some progress has been made on the review of the conservation objective; however, work has been hindered by more pressing and immediate salmon issues, staff workload, and budget constraints. Addressing any one of these topics will require time and effort from multiple entities, and understanding exactly what is needed to accomplish each task may be the next reasonable step forward.

In April 2022, a review of the basis behind the SRFC conservation objective was included as a topic for the salmon methodology review conducted in October 2022. This topic was considered a 'first step' in the work needed to evaluate the SRFC conservation objective. The review detailed the origins of the current SRFC conservation objective, which was established in the 1980s using data from the 1950s through the 1980s. The review found that the conservation objective was difficult to reproduce using historical documents and available data.

At the November 2022 Council meeting, the STT report and the SSC report indicated support for elevating and prioritizing work toward developing a new conservation objective for SRFC, given the conservation concerns and importance of this stock to salmon fisheries south of Cape Falcon. Additional components of SRFC management were also discussed, such as development of cohort reconstruction models that incorporate age structure.

In April 2023 the Council discussed the topic further and agreed that taking a detailed look at information that is currently used, reviewing any new material available, and identifying data gaps may be the most logical next step forward in evaluating the conservation objective for SRFC. That information would be considered in updating the conservation objective and any potential implications to the current SRFC harvest control rule.

Excerpts from the FMP relative to conservation objectives and harvest control rules, and Excerpts from the 2022 Review of Ocean Salmon Fisheries report and 2023 Preseason Report III report showing escapement data are provided at the end of this report.

2.2 Coordinating Entities

Partnerships with agencies and entities that affect SRFC management include:

- Pacific Fishery Management Council
- National Marine Fisheries Service
- US Fish and Wildlife Service
- Oregon Department of Fish and Wildlife
- California Department of Fish and Wildlife

2.3 Types of Collaboration

Coordination of different agencies working together to achieve this common goal will be key to this process. There are several types of coordination activities that could occur. Within the PFMC arena, the activities that may be appropriate for this context include:

1. Ad-hoc Committee: This type of committee is typically formed to address a specific topic and is most often used by the Council. Ad-hoc committees typically consist of a wide range of experts from multiple agencies and may include stakeholders. Sometimes ad-hoc

committees are formed as 'technical' workgroups to help inform the Council's policy decisions.

2. Joint Task Force: This type of group can be a smaller 'focus group' formed address a particular task. A Joint Task Force could be used to resolve a single issue or conduct a workshop to 'brainstorm' ideas on how to approach large topics that are multi-faceted.
3. Memoranda of Understanding (MOUs): Agencies can enter into MOUs to establish clear guidelines for how they will work together. These documents can help ensure that agencies understand their respective roles and responsibilities and that there is a shared understanding of the objectives they are trying to achieve.
4. Information sharing: Agencies can share information with each other to ensure that everyone has access to the same data and can make informed decisions. This approach can help avoid duplication of effort and ensure that resources are used effectively. This approach can help avoid duplication of effort and ensure that resources are used effectively and is commonly practiced within the Council arena.

2.4 SRFC Summary

The abundance of SRFC has not increased following being declared rebuilt in 2021. The poor forecasted return for 2023 contributed to the closure of most Chinook fishing opportunities along the west coast south of Cape Falcon, Oregon. Recommendations to review the conservation objective for SRFC to develop or improve other management tools have been made to the Council and some progress has been made; however, this dedicated work on these items has been hindered by more pressing and immediate salmon issues, staff workload, and budget constraints.

Assessing SRFC management using a holistic approach could start with developing an inventory, or a list of items to be addressed and potential ideas on how to work through each topic. Using this stepwise approach may help the Council to plan and coordinate activities overtime to address the issue. It will take a short-term commitment from the agencies to provide staff to collaborate on what is needed to address each topic, and a longer-term commitment for various staff to ultimately provide the technical data and analysis needed for Council decision-making process.

2.5 Potential Pathways forward

The first step was the work completed by the SSC and STT investigating the basis and data used to develop the current SRFC objective and harvest control rule. Additional work will be needed for a holistic look at the management measures used for SRFC, including the conservation objective review.

Using the Joint Task Force concept, a workshop could be planned that would bring pertinent agencies and scientists together to collectively identifies the issues, existing data, data gaps, potential for future improvement, and a general timeframe to complete each task. The Council would want to provide clear direction for the goals a workshop, and have a report provided summarizing the outcome of the workshop. This could be considered one more step in advancing SRFC management, and the Council could plan for future work on SRFC based on a workshop report.

An ad-hoc workgroup could be formed to assess the SRFC conservation objective and other management tools. The ad-hoc workgroup could conduct a workshop as described above and also conduct data analysis based on the workshop outcome and Council direction, or a workgroup could be formed in response to the workshop outcome to conduct data analysis. In addition, the workgroup could be assigned to develop a range of alternative conservation objectives and assess the ramifications to the SRFC harvest control rule for Council consideration.

EXCERPTS FROM CURRENT FMP:

3.2 SALMON STOCK CONSERVATION OBJECTIVES

"To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination"

Magnuson-Stevens Act, National Standard 3

To achieve OY, prevent overfishing, and assure rebuilding of salmon stocks whose abundance has been depressed to an overfished level, this plan establishes conservation objectives to perpetuate the coastwide aggregate of salmon stocks covered by the plan (Chapter 1). The Council's stock conservation objectives (to be achieved annually) and other pertinent stock management information are contained in Table 3-1. Specific objectives are listed for natural and hatchery stocks that are part of the Council's preseason fishery alternative development process (Chapter 9), including all relevant stocks listed under the Federal ESA. The objectives may be applicable to a single stock independently or to an indicator stock or stocks for a stock complex. Stocks that are not included in the preseason analyses may lack specific conservation objectives because the stock is not significantly impacted by ocean fisheries or insufficient information is available to assess ocean fishery impacts directly. In the latter case, the stock will be included in a stock complex and the conservation objective for an indicator stock will provide for the conservation of closely related stocks unless, or until, more specific management information can be developed.

3.2.1 Basis

The Council's conservation objectives for natural stocks may (1) be based on estimates for achieving MSY or an MSY proxy, or (2) represent special data gathering or rebuilding strategies to approach MSY and to eventually develop MSY objectives. The objectives have generally been developed through extensive analysis by the fishery management entities with direct management authority for the stock, or through joint efforts coordinated through the Council, or with other state, tribal, or federal entities. Most of the objectives for stocks north of Cape Falcon have been included in U.S. District Court orders. Under those orders for Washington coastal and Puget Sound stocks (Hoh v. Baldrige No. 81-742 [R] C and U.S. v. Washington, 626 F. Supp. 1405 [1985]), the treaty tribes and WDFW may agree to annual spawner targets or other objectives that differ from the FMP objectives. Details of the conservation objectives in effect at the time the initial framework FMP was approved are available in PFMC (1984), in individual amendment documents (see Table 1 in the Introduction), and as referenced in Table 3-1. Updated conservation objectives and ESA consultation standards are available in Appendix A of the most recent Preseason Report I, and Table 5 of the most recent Preseason Report III produced each year by the STT (PFMC 2021d).

The Council's conservation objectives are generally expressed in terms of an annual fishery or spawning escapement estimated to be optimum for producing MSY over the long-term. The escapement objective may be (1) a specific number or a range for the desired number of adult spawners (spawner escapement), (2) a specific number or range for the desired escapement of a

stock from the ocean or at another particular location, such as a dam, that may be expected to result in the target number of spawners, or (3) based on the exploitation rate that would produce MSY over the long-term. Objectives may be expressed as fixed or stepped exploitation or harvest rates and may include spawner floors or substantially reduced harvest rates at low abundance levels, or as special requirements provided in the Pacific Salmon Treaty or NMFS consultation standards for stocks listed under the ESA.

3.2.2 Changes or Additions

Conservation objectives generally are fixed quantities intended to provide the necessary guidance during the course of the annual preseason planning process to establish salmon fishing seasons that achieve OY. Changes or additions to conservation objectives may be made either through a plan amendment or notice and comment rulemaking if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification. Insofar as possible, proposed changes for natural stocks will only be reviewed and approved within the schedule established for salmon estimation methodology reviews completed prior to the preseason planning process. The Council may change conservation objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities. Federal court-ordered changes in conservation objectives will also be accommodated without a plan amendment. The applicable annual objectives of Council-adopted rebuilding programs and the requirements of consultation standards promulgated by NMFS under the ESA may be employed without plan amendment to assure timely implementation. All of these changes will be documented during the Council's preseason planning process.

The Council considers established conservation objectives to be stable and a technical review of biological data must provide substantial evidence that a modification is necessary. The Council's approach to conservation objectives purposely discourages frequent changes for short-term economic or social reasons at the expense of long-term benefits from the resource. However, periodic review and revision of established objectives is anticipated as additional data become available for a stock or stock complex.

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III.

CHINOOK					
Stocks In the Fishery	**Conservation Objective**	S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Sacramento River Fall Indicator stock for the Central Valley fall (CVF) Chinook stock complex.	122,000-180,000 natural and hatchery adult spawners (MSY proxy adopted 1984). This objective is intended to provide adequate escapement of natural and hatchery production for Sacramento and San Joaquin fall and late-fall stocks based on habitat conditions and average run-sizes as follows: Sacramento River 1953-1960; San Joaquin River 1972-1977 (ASETF 1979; PFMC 1984; SRFCRT 1994). The objective is less than the estimated basin capacity of 240,000 spawners (Hallock 1977), but greater than the 118,000 spawners for maximum production estimated on a basin by basin basis before Oroville and Nimbus Dams (Reisenbichler 1986).	122,000	91,500	78% Proxy (SAC 2011a)	Based on F_{ABC} and annual ocean abundance. F_{ABC} is F_{MSY} reduced by Tier 2 (10%) uncertainty
Klamath River Fall Indicator stock for the Southern Oregon Northern California (SONC) Chinook stock complex.	At least 32% of potential adult natural spawners, but no fewer than 40,700 naturally spawning adults in any one year. Brood escapement rate must average at least 32% over the long-term, but an individual brood may vary from this range to achieve the required tribal/nontribal annual allocation. Natural area spawners to maximize catch estimated at 40,700 adults (STT 2005).	40,700	30,525	71% (STT 2005)	Based on F_{ABC} and annual ocean abundance. F_{ABC} is F_{MSY} reduced by Tier 1 (5%) uncertainty

3.3.6 Specific Control Rules for Stocks, Indicator Stocks, and Complexes

3.3.6.1 Klamath River Fall Chinook, Sacramento River Fall Chinook

Klamath River fall Chinook and Sacramento River fall Chinook have the same form of control rule, which is defined in terms of the reference points F_{ABC}, MSST, S_{MSY}, and two levels of *de minimis* exploitation rates, F = 0.10 and F = 0.25. The maximum allowable exploitation rate, F, in a given year, depends on the pre-fishery ocean abundance in spawner equivalent units, N. At high abundance the rule caps the exploitation rate at F_{ABC}, at moderate abundance the rule specifies an F that results in S_{MSY} spawners, and at low abundance (i.e. when expected escapement is below S_{MSY}) the rule allows for *de minimis* exploitation rates as shown in Figure 3-1 with the abundance breakpoints defined as

$$A = MSST / 2$$

$$B = (MSST + S_{MSY}) / 2$$

$$C = S_{MSY} / (1 - 0.25)$$

$$D = S_{MSY} / (1 - F_{ABC}) .$$

For N between 0 and A, F increases linearly from 0 at N = 0, to 0.10 at N = A. For N between A and MSST, F is equal to 0.10. For N between MSST and B, F increases linearly from 0.10 at N = MSST, to 0.25 at N = B. For N between B and C, F is equal to 0.25. For N between C and D, F is the value that results in S_{MSY} spawners. For N greater than D, F is equal to F_{ABC}. The control rule may thus be summarized as follows.

$$F = \begin{cases} 0.10 \times (N / A), & \text{if } 0 \leq N \leq A; \\ 0.10, & \text{if } A < N \leq MSST; \\ 0.10 + (0.15 \times ((N - MSST) / (B - MSST))), & \text{if } MSST < N \leq B; \\ 0.25, & \text{if } B < N \leq C; \\ (N - S_{MSY}) / N, & \text{if } C < N \leq D; \\ F_{ABC}, & \text{if } D < N. \end{cases}$$

The control rule describes maximum allowable exploitation rates at any given level of abundance. The Council may recommend lower exploitation rates as needed to address uncertainties or other year specific circumstances. When recommending an allowable *de minimis* exploitation rate in a given year, the Council shall also consider the following circumstances:

- 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 in an approaching overfished condition;
- Whether the stock is currently overfished;
- Other considerations as appropriate.

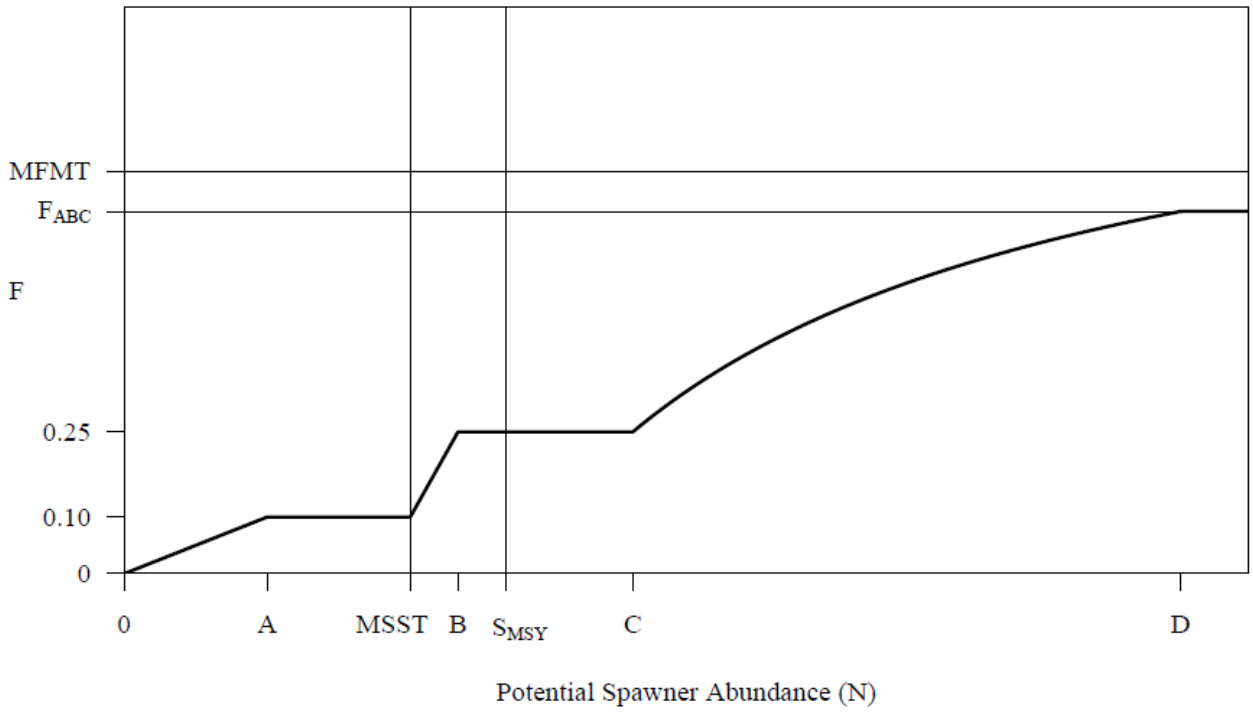

FIGURE 3-1. Control rule for Sacramento River and Klamath River fall Chinook. Abundance is pre-fishery ocean abundance in spawner equivalent units, and F is the exploitation rate. Reference points in the control rule are defined in the text.

EXCERTS FROM 2022 REVIEW OF OCEAN SALMON FISHERIES

TABLE II-1. Sacramento River natural and hatchery adult fall Chinook escapement in numbers of fish.

Year or	Upper River[a/]			Lower River			Total		
Average	Hatchery	Natural[b/]	Subtotal	Hatchery	Natural[b/]	Subtotal	Hatchery	Natural[b/]	Grand Total
1981-85	11,557	57,913	69,470	16,917	81,880	98,797	28,475	139,793	168,268
1986-90	11,507	87,396	98,903	11,521	73,633	85,154	23,028	161,029	184,057
1991-95	11,948	60,151	72,099	16,951	70,691	87,642	28,899	130,842	159,741
1996-00	29,965	153,777	183,742	21,137	137,071	158,207	51,102	290,848	341,949
2001-05	72,122	197,215 [c/]	269,337	30,520	214,652	245,172	102,643	411,867	514,510
2006	56,819	89,933	146,752	21,722	106,556	128,278	78,541	196,489	275,030
2007	11,543	36,079	47,622	9,759	33,993	43,752	21,302	70,072	91,374
2008	10,181	36,274	46,455	7,867	11,042	18,909	18,048	47,316	65,364
2009	5,433	12,277	17,710	10,492	12,671	23,163	15,925	24,948	40,873
2010	8,666	25,688	34,354	24,484	65,438	89,922	33,150	91,126	124,276
2011	19,312	20,466	39,778	22,176	57,388	79,564	41,488	77,854	119,342
2012	77,318	67,190	144,508	41,878	99,043	140,921	119,196	166,233	285,429
2013	67,758	90,119	157,877	33,453	215,516	248,969	101,211	305,635	406,846
2014	17,937	80,407	98,344	25,872	88,260	114,132	43,809	168,667	212,476
2015	13,861	40,696	54,557	25,103	33,808	58,911	38,964	74,504	113,468
2016	8,306	10,563	18,869	25,096	45,734	70,830	33,402	56,297	89,699
2017	1,316	1,526	2,842	25,162	16,325	41,487	26,478	17,851	44,329
2018	8,207	18,317	26,524	25,570	53,372	78,942	33,777	71,689	105,466
2019	13,065	53,706	66,771	29,073	67,923	96,996	42,138	121,629	163,767
2020	12,478	36,447	48,925	25,444	63,722	89,166	37,922	100,169	138,091
2021	14,556	51,822	66,378	18,259	20,947	39,206	32,815	72,769	105,584
2022[d/]	8,918	8,993	17,911	20,220	23,719	43,939	29,138	32,712	61,850
Goal[e/]									122,000

a/ Above the Feather River; 1971-1985 estimates include Tehama-Colusa Spawning Channel.

b/ Fish spawning in natural areas are the result of hatchery and natural production; estimates generally based on carcass surveys.

c/ Estimation methodology for 2002 was changed due to an extremely high Battle Creek escapement.

d/ Preliminary.

e/ Sacramento River fall Chinook S_{MSY}.

TABLE II-2. Klamath River adult inriver fall Chinook run size, spawning escapement, recreational catch, Indian gillnet harvest, and non-landed fishing mortalities in numbers of fish and percent of the total inriver run size.

Year or	Spawning Escapement				Inriver Recreational Catch		Indian Net Catch		Non-landed Fishing Mortality		Inriver Run Size
Average	Hatchery	Natural	Total	Percent	Numbers	Percent	Numbers	Percent	Numbers	Percent	Numbers
1981-85	11,746	27,667	39,413	63%	5,096	8%	17,128	27%	1,593	2%	63,230
1986-90	25,106	70,785	95,891	63%	15,145	10%	36,669	25%	3,498	2%	151,203
1991-95	18,084	47,932	66,016	74%	3,094	5%	10,574	19%	983	2%	80,666
1996-00	35,970	54,229	90,199	72%	6,817	6%	24,565	20%	2,275	2%	123,856
2001-05[a/]	38,952	56,346	95,298	70%	7,659	5%	25,414	19%	2,366	2%	136,848
2006	19,522	30,163	49,685	81%	62	0%	10,283	17%	1,344	2%	61,374
2007	35,050	60,670	95,720	72%	6,312	5%	27,573	21%	2,526	2%	132,131
2008	13,552	30,850	44,402	63%	1,919	3%	22,259	32%	1,974	3%	70,554
2009	19,614	44,409	64,023	64%	5,651	6%	28,387	28%	2,583	3%	100,644
2010	18,052	37,225	55,277	61%	3,035	3%	29,887	33%	2,661	3%	90,860
2011	22,337	46,763	69,100	68%	4,147	4%	26,353	26%	2,377	2%	101,977
2012	55,939	121,543	177,482	60%	13,876	5%	95,386	32%	8,578	3%	295,322
2013	17,148	59,156	76,304	46%	19,800	12%	63,036	38%	5,885	4%	165,025
2014	31,276	95,104	126,380	79%	5,386	3%	25,967	16%	2,392	1%	160,396 [b/]
2015	11,085	28,112	39,197	50%	7,842	10%	28,048	36%	2,611	3%	77,821 [b/]
2016	3,578	13,937	17,515	71%	1,310	5%	5,160	21%	486	2%	24,582 [b/]
2017	11,213	19,904	31,117	94%	71	0%	1,880	6%	164	0%	33,232
2018	18,567	52,352	70,919	78%	4,110	5%	14,769	16%	1,262	1%	91,060
2019	5,178	20,022	25,200	68%	5,376	14%	5,989	16%	511	1%	37,084 [b/]
2020	8,331	26,185	34,516	76%	5,123	11%	5,212	11%	558	1%	45,409
2021	12,850	29,942	42,792	79%	2,265	4%	8,066	15%	717	1%	53,954 [b/]
2022[c/]	13,235	22,050	35,285	76%	2,461	5%	8,035	17%	744	2%	46,639 [b/]
Goal		≥40,700[d/e/]									

a/ Inriver run size includes a USFWS estimate of 30,550 fish (19% of the run) that died prior to spawning in September 2002.

b/ Total inriver run includes fish collected from the Klamath and Trinity rivers by the Yurok and Hoopa Valley tribes, respectively, to test for the presence of the parasite Ichthyophthirius multifiliis during the following years: 2014 - 272 adults; 2015 - 123 adults; 2016 - 111 adults, 2019 - 8 adults, 2021 - 113 adults and 6 jacks.

c/ Preliminary.

d/ In December 2011, Amendment 16 to the Salmon Fishery Management Plan was approved, which replaced the 35,000 spawning escapement floor with an SMSY management objective of 40,700 natural area adult spawners. The 35,000 spawner floor was in effect from 1989-2007 and in 2011. In 2008-2010, fisheries were managed for a natural area spawning escapement of 40,700 adults under requirements of a rebuilding plan.

e/ Annual escapement goals may be more or less than SMSY in some years due to meeting SACL requirements and de minimis fishing provisions.

EXCERTS FROM 2023 PRESEASON REPORT III

Table 12. Stock status relative to overfished and overfishing criteria. A stock is approaching an overfished condition if the 3-year geometric mean of the most recent two years and the forecasted spawning escapement is less than the minimum stock size threshold (MSST); a stock would experience overfishing if the total annual exploitation rate exceeds the maximum fishing mortality threshold (MFMT). Occurrences of stocks approaching an overfished condition, or experiencing overfishing, are indicated in **bold**. 2023 spawning escapement and exploitation rate estimates are based on 2023 preseason abundance forecasts and 2023 Council regulations.

	Estimated Adult Spawning Escapement									Total Exploitation Rate						
	2018	2019	2020	2021	2022[a/]	Forecast 2023[b/]	3-yr Geo Mean	MSST	S_{MSY}	2018	2019	2020	2021	2022[a/]	2023[b/]	MFMT
Chinook																
Sacramento Fall	105,466	163,767	138,091	104,483	61,850	164,964	102,155	91,500	122,000	0.52	0.68	0.61	0.68	0.75	0.03	0.78
Klamath River Fall	52,352	20,022	26,185	30,056	22,051	23,614	**25,014**	30,525	40,700	0.32	0.43	0.30	0.38	0.45	0.10	0.71
Southern Oregon[c/]	39,507	18,436	29,387	48,979	17,615	NA	29,378	20,500	34,992	NA	NA	NA	NA	NA	NA	0.54
Central and Northern OR[d/]	92	65	137	85	105	NA	107	30 fish/mi	60 fish/mi	0.66	0.50	0.42	NA	NA	NA	0.78
Upper Columbia Bright - Fall[d/]	58,540	77,880	98,401	86,644	53,961	100,779	77,815	19,182	39,625	0.34	0.38	0.29	NA	NA	NA	0.86
Upper Columbia - Summer[d/]	38,816	41,090	70,654	52,076	64,497	66,932	60,805	6,072	12,143	0.44	0.17	0.30	NA	NA	NA	0.75
Willapa Bay - Fall[e/]	2,847	2,894	3,585	2,966	NA	NA	3,134	1,696	3,393	0.61	0.66	0.51	NA	NA	NA	0.78
Grays Harbor Fall[e/]	20,741	14,880	20,879	13,207	NA	NA	16,009	5,694	13,326	0.63	0.65	0.54	NA	NA	NA	0.78
Grays Harbor Spring	493	983	2,828	2,573	NA	NA	1,927	700	1,400	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall[d/]	2,207	2,663	3,622	3,364	NA	NA	3,190	1,250	2,500	0.66	0.73	0.71	NA	NA	NA	0.87
Queets - Sp/Su	484	322	342	280	NA	NA	**314**	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall[e/]	2,478	1,552	2,273	2,622	NA	NA	2,099	600	1,200	0.56	0.73	0.64	NA	NA	NA	0.90
Hoh Sp/Su	793	766	1,248	817	NA	NA	921	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall[e/]	3,937	7,765	8,672	5,568	6,761	NA	6,886	1,500	3,000	0.72	0.65	0.55	NA	NA	NA	0.87
Quillayute - Sp/Su	990	1,442	942	1,056	1,128	NA	1,039	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa[d/]	2,179	1,815	1,347	2,256	NA	NA	1,767	425	850	0.57	NA[f/]	0.22	NA	NA	NA	0.78
Coho																
Willapa Bay[g/]	17,228	15,115	16,476	31,369	NA	22,066	22,509	8,600	17,200	0.35	0.39	0.33	0.24	NA	0.63	0.74
Grays Harbor[g/]	49,622	30,468	23,814	62,762	NA	50,604	42,290	18,320	24,426	0.22	0.39	0.29	0.23	NA	0.56	0.65
Queets[h/]	2,631	1,700	4,181	5,752	NA	7,406	5,626	4,350	5,800	0.23	0.57	0.22	0.10	NA	0.41	0.65
Hoh	2,463	2,445	2,840	6,396	NA	3,220	3,882	1,890	2,520	0.34	0.57	0.49	0.18	NA	0.51	0.65
Quillayute Fall	6,091	6,852	7,695	9,938	13,000	7,763	10,010	4,725	6,300	0.30	0.37	0.16	0.04	NA	0.43	0.59
Juan de Fuca[i/]	5,470	4,625	8,548	20,837	NA	13,784	13,490	7,000	11,000	0.08	0.12	0.07	0.07	NA	0.12	0.60
Hood Canal	7,512	7,884	17,312	35,178	NA	21,738	23,656	10,750	14,350	0.57	0.46	0.29	0.25	NA	0.43	0.65
Skagit	19,047	14,246	23,808	75,532	NA	28,212	37,019	14,875	25,000	0.49	0.48	0.43	0.33	NA	0.35	0.60
Stillaguamish	23,937	12,887	21,555	38,176	NA	21,673	26,127	6,100	10,000	0.22	0.20	0.13	0.11	NA	0.29	0.50
Snohomish[j/]	58,135	40,314	42,675	97,523	NA	52,206	60,117	31,000	50,000	0.25	0.17	0.11	0.11	NA	0.32	0.60

a/ Preliminary.

b/ Preliminary approximations based on preseason forecasts and Council adopted (preseason) fishing regulations.

c/ MSST 18,440 (20,500 as measured at Huntley Park).

d/ CWT based exploitation rates from PSC-CTC 2022 Exploitation Rate Analysis (TCCHINOOK (23)-01).

e/ Queets River fall Chinook coded-wire-tag (CWT) exploitation rates used as a proxy. Adjustments made to terminal fishery impacts to account for differential harvest rates.

f/ Calculation of a reliable exploitation rate estimate was not possible due to insufficient CWT information.

g/ Willapa Bay and Grays Harbor coho escapement and exploitation rate estimates based on natural area adult spawners.

h/ Categorized as overfished in 2018.

i/ Categorized as overfished in 2018; currently meets the stock status criteria for not overfished - rebuilding.

j/ Categorized as overfished in 2018; currently meets the stock status criteria for rebuilt.