# Preface to the Final Environmental Assessment for 2023 Ocean Salmon Fisheries Management Measures

(RIN 0648-BL66)

The development of annual management measures for West Coast salmon fisheries is a well-documented and public process. Alternatives for annual management measures are developed at the March meeting of the Pacific Fishery Management Council (Council). At this meeting, the previous year's fisheries are reviewed, and alternatives are developed for the current year's fisheries after considering projected stock abundances, conservation objectives in the Fishery Management Plan (FMP), and compliance with the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and other relevant laws, as well as international agreements under the Pacific Salmon Treaty (PST). Public meetings are held in Washington, Oregon, and California in late March to give the public the opportunity to provide comments on the alternatives. In addition, the Council invited written comments to be submitted through the online portal and at its March and April meetings. The Council meets again in April to consider public and agency input on the alternatives and to develop and adopt a preferred alternative. Environmental impacts of the preferred alternative are within the range of impacts analyzed for the preliminary alternatives, although new fisheries data developed between March and April, especially regarding fisheries north of Cape Falcon, may require modification of the range of impacts.

During this process, the Council and the National Marine Fisheries Service (NMFS) develop a series of documents that describe the development and analysis of the alternatives. These documents collectively form the basis for the Environmental Assessment (EA) for NMFS' analysis of the proposed action of adopting the ocean salmon fisheries specifications and management measures for the upcoming fishing season under the National Environmental Policy Act (NEPA). This Preface is provided to guide the reader through the three documents that, collectively, form the EA that informed adoption of management measures for the May 16, 2023–May 15, 2024 fishing season (referred to for ease of reference as the 2023 management measures) (see Table 1, below). These documents are available to the public on the Council's website (www.pcouncil.org):

> Preseason Report I (PRE I): Stock Abundance Analysis and Environmental Assessment Part 1 for 2023 Ocean Salmon Fishery Regulations (March 2023).
>
> *PRE I describes Purpose and Need, Affected Environment, and the no-action alternative.*
>
> Preseason Report II (PRE II): Proposed Alternatives and Environmental Assessment Part 2 for 2023 Ocean Salmon Fishery Regulations (March 2023).
>
> *PRE II describes the analysis of the action alternatives.*
>
> Preseason Report III (PRE III): Analysis of Council Adopted Management Measures for 2023 Ocean Salmon Fisheries (April 2023).
>
> *PRE III describes the final preferred alternative adopted by the Council.*

A fourth document, also available on the Council's website, is referenced in the EA and provides some aspects of the affected environment, especially related to salmon stocks:

Review of 2022 Ocean Salmon Fisheries (February 2023).

This final EA includes edits and information added after review of the initial documents and in response to public comments. Therefore, this final EA will have differences from the Preseason Report documents previously published on the Council's website.

Table 1. Directory of NEPA elements in the Environmental Assessment for 2023 Ocean Salmon Fisheries Management Measures (RIN 0648-BL66).

| **NEPA Element** | **Location** |
|---|---|
| Purpose and Need | PRE I: Introduction |
| | |
| Affected Environment | PRE I and PRE II |
| Description of the Affected Environment | PRE I: Chapters I – IV and PRE II: Chapter 8 |
| | |
| Alternatives | PRE I, PRE II, and PRE III |
| Description of No-action alternative | PRE I: Chapter V |
| Description of Action alternatives | PRE II: Chapter 7, Tables 1 – 4; PRE III: Chapter 9, Tables 1 - 4 |
| | |
| Analysis of Impacts (Environmental Effects) | PRE I and PRE II |
| Analysis of the No-action Alternative | PRE I: Chapter V |
| Target (FMP) Stocks, ESA Listed Species | PRE II: Chapter 8.1, Tables 5-8 |
| Socioeconomics | PRE II: Chapter 8.2, Tables 9-10, Figures 1-2 |
| Non-target, Non-ESA Listed Species | PRE II: Chapter 8.3 |
| Non-ESA Listed Marine Mammals | PRE II: Chapter 8.4 |
| ESA Listed Species (other than salmon) | PRE II: Chapter 8.5<br>PRE III: Chapter 11 |
| Seabirds | PRE II: Chapter 8.6 |
| Biodiversity and Ecosystem Function | PRE II: Chapter 8.7 |
| Ocean and Coastal Habitats | PRE II: Chapter 8.8 |
| Public Health and Safety | PRE II: Chapter 8.9 |
| Short Term and Long Term Impacts | PRE II: Chapter 8.10 |
| | |
| Final Preferred Alternative | PRE III |
| Description | PRE III: Tables 1 – 4 |
| Socioeconomic Impacts | PRE III: Chapter 10, Tables 9-10 |
| Environmental Effects | PRE III: Chapter 11, Tables 5-7, and 11-12 |
| | |
| Compliance with other Applicable Law | Addendum |
| Finding of No Significant Impact (FONSI) | Addendum |

# PRESEASON REPORT I

## STOCK ABUNDANCE ANALYSIS AND ENVIRONMENTAL ASSESSMENT PART 1 FOR 2023 OCEAN SALMON FISHERY REGULATIONS

**REGULATION IDENTIFIER NUMBER 0648-BL66**

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384
(503) 820-2280
www.pcouncil.org

MARCH 2023

# ACKNOWLEDGMENTS

## SALMON TECHNICAL TEAM

**DR. MICHAEL O'FARRELL, CHAIR**
National Marine Fisheries Service, Santa Cruz, California

**MR. JON CAREY, VICE CHAIR**
National Marine Fisheries Service, Lacey, Washington

**DR. STEVE HAESEKER**
U.S. Fish and Wildlife Service, Vancouver, Washington

**DR. RICH ZABEL**
National Marine Fisheries Service, Seattle, Washington

**MS. GRACE EASTERBROOK** (*alternate for Ms. Kandice Morgenstern*)
California Department of Fish and Wildlife, Eureka, California

**MS. CASSANDRA LEEMAN** *(alternate for Ms. Emily Shallow)*
Oregon Department of Fish and Wildlife, Salem, Oregon

**MS. STEPHANIE THURNER** *(alternate for Ms. Ashton Harp)*
Northwest Indian Fisheries Commission, Olympia, Washington

**MR. KYLE VAN DE GRAAF** (*alternate for Ms. Wendy Beeghley)*
Washington Department of Fish and Wildlife, Montesano, Washington

## PACIFIC FISHERY MANAGEMENT COUNCIL STAFF

**MS. ROBIN EHLKE**

The Salmon Technical Team and the Council staff express their thanks for the expert assistance provided by Ms. Ranelle Reber, Ms. Erica Weyland, and Ms. Danielle Williams, Washington Department of Fish and Wildlife; Mr. Ian Pritchard, Mr. Lane Jackson, and Ms. Audrey Dean, California Department of Fish and Wildlife and numerous other tribal and agency personnel in completing this report.

This document may be cited in the following manner:
Pacific Fishery Management Council. 2023. *Preseason Report I: Stock Abundance Analysis and Environmental Assessment Part 1 for 2023 Ocean Salmon Fishery Regulations.* (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.


A report of the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number FNA20NMF4410011.

# TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ABC | acceptable biological catch |
| ACL | annual catch limit |
| BY | brood year |
| CCC | central California coast (coho) |
| CDFW | California Department of Fish and Wildlife |
| CoTC | Coho Technical Committee (of the PSC) |
| Council | Pacific Fishery Management Council |
| CRFMP | Columbia River Fishery Management Plan |
| CWT | coded-wire tag |
| EA | Environmental Assessment |
| EEZ | exclusive economic zone (from 3-200 miles from shore) |
| EIS | Environmental Impact Statement |
| EMAP | Environmental Monitoring and Assessment Program |
| ESA | Endangered Species Act |
| ESU | evolutionarily significant unit |
| $F_{ABC}$ | exploitation rate associated with ABC |
| $F_{ACL}$ | exploitation rate associated with ACL (= $F_{ABC}$) |
| FMP | fishery management plan |
| $F_{MSY}$ | maximum sustainable yield exploitation rate |
| FNMC | Far-North-Migrating Coastal |
| $F_{OFL}$ | exploitation rate associated with the overfishing limit (= $F_{MSY}$, MFMT) |
| FONSI | Finding of No Significant Impacts |
| FRAM | Fishery Regulatory Assessment Model |
| GAM | generalized additive models |
| ISBM | individual stock-based management |
| JA3 | January age-3 coho |
| Jack CR | Columbia River jacks (coho) |
| Jack OC | Oregon coastal and Klamath River Basin jacks (coho) |
| Jack OPI | Jack CR + Jack OC (coho) |
| KMZ | Klamath management zone (ocean zone between Humbug Mountain and Horse Mountain where management emphasis is on Klamath River fall Chinook) |
| KOHM | Klamath Ocean Harvest Model |
| KRFC | Klamath River fall Chinook |
| KRTT | Klamath River Technical Team |
| LCN | lower Columbia River natural (coho) |
| LCR | lower Columbia River (natural tule Chinook) |
| LRB | lower Columbia River bright (Chinook) |
| LRH | lower Columbia River hatchery (tule fall Chinook returning to hatcheries below Bonneville Dam) |
| LRW | lower Columbia River wild (bright fall Chinook spawning naturally in tributaries below Bonneville Dam) |
| MCB | Mid-Columbia River bright (bright hatchery fall Chinook released below McNary Dam) |
| MFMT | maximum fishing mortality threshold |
| MOC | mid-Oregon coast |
| MSA | Magnuson-Stevens Fishery Conservation and Management Act |
| MSM | mixed stock model |
| MSST | minimum stock size threshold |
| MSY | maximum sustainable yield |
| NA | not available |
| NEPA | National Environmental Policy Act |

## LIST OF ACRONYMS AND ABBREVIATIONS (continued)

| | |
|---|---|
| NMFS | National Marine Fisheries Service |
| NOC | north Oregon coast |
| NPGO | North Pacific Gyre Oscillation |
| NS1G | National Standard 1 Guidelines |
| OA3 | ocean age-3 coho |
| OCN | Oregon coast natural (coho) |
| OCNL | Oregon coast natural lake (coho) |
| OCNR | Oregon coast natural river (coho) |
| ODFW | Oregon Department of Fish and Wildlife |
| OFL | overfishing limit |
| OPI | Oregon Production Index (coho salmon stock index south of Leadbetter Point) |
| OPIH | Oregon Production Index public hatchery |
| OPITT | Oregon Production Index Technical Team |
| OY | Optimum Yield |
| PDO | Pacific Decadal Oscillation |
| PFMC | Pacific Fishery Management Council (Council) |
| PRIH | Private hatchery |
| PSC | Pacific Salmon Commission |
| PST | Pacific Salmon Treaty |
| RER | rebuilding exploitation rate |
| RK | Rogue/Klamath (coho) |
| RMP | Resource Management Plan (for exemption from ESA section 9 take prohibitions under limit 6 of the 4(d) rule) |
| ROPI | Rogue Ocean Production Index (Chinook) |
| SAB | Select Area brights (bright fall Chinook destined for Select Area sites on the lower Columbia River) |
| $S_{ABC}$ | spawning escapement associated with ABC |
| $S_{ACL}$ | spawning escapement associated with ACL (= $S_{ABC}$) |
| SCH | Spring Creek Hatchery (tule fall Chinook returning to SCH) |
| SHM | Sacramento Harvest Model |
| SI | Sacramento Index |
| SJF | Strait of Juan de Fuca |
| $S_{MSY}$ | MSY spawning escapement |
| $S_{OFL}$ | spawning escapement associated with the overfishing limit (= $S_{MSY}$) |
| SOC | south Oregon Coast |
| SONC | southern Oregon/northern California (Chinook) |
| SONCC | southern Oregon/northern California coast (coho) |
| SRFC | Sacramento River fall Chinook |
| SRS | Stratified Random Sampling |
| SRWC | Sacramento River winter Chinook |
| STEP | Salmon Trout Enhancement Program |
| STT | Salmon Technical Team (formerly the Salmon Plan Development Team) |
| TAC | Technical Advisory Committee (*U.S. v. Oregon*) |
| URB | Upriver bright (naturally spawning bright fall Chinook primarily migrating past McNary Dam) |
| VSI | visual stock identification |
| WCVI | West Coast Vancouver Island |
| WDFW | Washington Department of Fish and Wildlife |

## INTRODUCTION

This is the second report in an annual series of four reports prepared by the Salmon Technical Team (STT) of the Pacific Fishery Management Council (Council) to document and help guide ocean salmon fishery management off the coasts of Washington, Oregon, and California. This report focuses on Chinook, coho, and pink salmon stocks that have been important in determining Council fisheries in recent years, and on species listed under the Endangered Species Act (ESA) with established National Marine Fisheries Service (NMFS) ESA consultation standards (i.e., recommendations and requirements developed under ESA § 4(d) or 7(a)(2)). This report was formally reviewed at the Council's March 2023 meeting. This report provides 2023 salmon stock abundance forecasts, and an analysis of the impact of 2022 management measures or regulatory procedures on the projected 2023 abundance. This analysis provided perspective for developing the May 16, 2023–May 15, 2024 management measures (referred to for short as the 2023 management measures, given that the majority of the season occurs in 2023).

This report constitutes the first part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2023 ocean salmon management measures. An EA is used to determine whether an action being considered by a Federal agency has significant impacts. This part of the EA includes a statement of the purpose and need, a summary description of the affected environment, a description of the No-Action Alternative, and an analysis of the No-Action Alternative's effects on the salmon stocks included in the Council's Salmon Fishery Management Plan (FMP).

The STT provided two additional reports prior to the beginning of the ocean salmon season to help guide the Council's selection of a final alternative for annual fishery management. These reports (Preseason Report II and Preseason Report III) analyze the impact of the Council's proposed alternatives and adopted fishery management recommendations, respectively. Preseason Report II constitutes the second part of the EA and includes additional description of the affected environment relevant to the alternative management measures considered for 2023 ocean salmon fisheries, a description of the alternatives, and an analysis of the environmental consequences of the alternatives. Preseason Report II also analyzes the potential impacts of a reasonable range of alternatives, which informed the final fishery management measures included in Preseason Report III. Preseason Report III describes and analyzes the effects of the Council's final proposed action, including cumulative effects. Together, these parts of the EA provide the necessary components to determine if a finding of no significant impact (FONSI) or Environmental Impact Statement (EIS) is warranted.

Chapter I provides a summary of stock abundance forecasts. Chapters II and III provide detailed stock-by-stock analyses of abundance, a description of prediction methodologies, and accuracy of past abundance forecasts for Chinook and coho salmon, respectively. Chapter IV summarizes abundance and forecast information for pink salmon. Chapter V provides an assessment of 2022 regulations applied to 2023 abundance forecasts. Appendices provide supplementary information as follows: Appendix A provides a summary of Council stocks and their management objectives; Appendix B contains the Council's current harvest allocation schedules; and Appendix C contains pertinent data for Oregon Production Index (OPI) area coho. For NEPA purposes, Chapters I-IV of this document describe the affected environment, and Chapter V provides a description and analysis of the No-Action Alternative.

### *PURPOSE AND NEED*

The purpose of this action, development, and implementation of ocean salmon fishery management measures for the 2023, is to allow fisheries to harvest surplus production of healthy natural and hatchery salmon stocks within the constraints specified under the Salmon FMP, the Pacific Salmon Treaty (PST), and requirements developed by NMFS under ESA sections 4 and 7 for ESA-listed species (referred to in the FMP as "consultation standards"). In achieving this purpose, management measures must take into

account the allocation of harvest among different user groups and port areas. Without this action, the 2022 management measures would remain in effect, which do not consider changes in abundance of stocks in the mixed stock ocean salmon fisheries or new or modified consultation standards. Therefore, this action is needed to ensure constraining stocks are not overharvested, and that harvest of abundant stocks can be optimized and achieve the most overall benefit to the nation.

The Salmon FMP also establishes nine more general harvest-related objectives:

1. Establish ocean exploitation rates for commercial and recreational salmon fisheries that are consistent with requirements for stock conservation objectives and annual catch limits (ACLs), specified ESA consultation standards, or Council-adopted rebuilding plans.

2. Fulfill obligations to provide opportunity for tribal Indian harvest of salmon as provided in treaties with the United States, as mandated by applicable decisions of the Federal courts, and as specified in the October 4, 1993 opinion of the Solicitor, Department of Interior, with regard to federally-recognized Indian fishing rights of Klamath River Tribes.

3. Maintain ocean salmon fishing seasons supporting the continuance of established recreational and commercial fisheries, while meeting salmon harvest allocation objectives among ocean and inside recreational and commercial fisheries that are fair and equitable, and in which fishing interests shall equitably share the obligations of fulfilling any treaty or other legal requirements for harvest opportunities.

4. Minimize fishery mortalities for those fish not landed from all ocean salmon fisheries as consistent with achieving optimum yield (OY) and bycatch management specifications.

5. Manage and regulate fisheries so that the OY encompasses the quantity and value of food produced, the recreational value, and the social and economic values of the fisheries.

6. Develop fair and creative approaches to managing fishing effort; and evaluate and apply effort management systems as appropriate to achieve these management objectives.

7. Support the enhancement of salmon stock abundance in conjunction with fishing effort management programs to facilitate economically viable and socially acceptable commercial, recreational, and tribal seasons.

8. Achieve long-term coordination with the member states of the Council, Indian tribes with federally-recognized fishing rights, Canada, the North Pacific Fishery Management Council, Alaska, and other management entities which are responsible for salmon habitat or production. Manage consistent with the PST and other international treaty obligations.

9. In recommending seasons, to the extent practicable, promote the safety of human life at sea.

These objectives, along with the consultation standards established under the ESA, provide "sideboards" for setting management measures necessary to implement the Salmon FMP, which conforms to the terms and requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the 10 National Standards set forth in the MSA.

Implementation of 2023 management measures will allow fisheries to harvest surplus production of healthy natural and hatchery salmon stocks within the constraints specified under the Salmon FMP and consultation standards established for ESA-listed salmon stocks and consistent with the MSA.

The MSA includes requirements to end and prevent overfishing through specification of overfishing limits (OFL), acceptable biological catch (ABC), ACLs and accountability measures (AMs). Because OFLs, ABCs, and ACLs are based on annual abundance forecasts, Preseason Report I also specifies OFLs, ABCs, and ACLs for 2023 fisheries.

# CHAPTER I: DESCRIPTION OF THE AFFECTED ENVIRONMENT

The action area for this proposed action is the exclusive economic zone (EEZ) of the United States, 3 to 200 nautical miles, off the West Coast of the U.S. (California, Oregon, and Washington).

The affected environment relevant to establishing the 2023 ocean salmon fishery management measures consists of the following components:

- Target Species – Non-ESA-listed Chinook, coho, and pink salmon
- ESA-listed salmon species that are incidentally caught in the ocean salmon fisheries
- Socioeconomic aspects of coastal communities, federally-recognized Tribes, and states
- Other non-target fish species – Pacific Halibut, groundfish
- Marine mammals – pinnipeds, killer whales
- Seabirds
- Biodiversity and ecosystem function
- Ocean and coastal habitats, ESA critical habitat, and Essential Fish Habitat (EFH)
- Public health or safety
- Unique characteristics of the geographic area
- Cultural, scientific, or historical resources such as those eligible for listing in the National Register of Historic Places

A description of the historical baseline for the components of the affected environment is presented in the Review of 2022 Ocean Salmon Fisheries (PFMC 2023). The current status (2023 ocean abundance forecasts) of the environmental components expected to be affected by the 2023 ocean salmon fisheries regulation alternatives (FMP salmon stocks, including those listed under the ESA) are described in this report (Part 1 of the 2023 salmon EA). The *Review of 2022 Ocean Salmon Fisheries* (PFMC 2023) provides an historical description of the salmon fishery-affected environment, including stock status and socioeconomic impacts, and represents the current status of the socioeconomic component of the affected environment.

The No-Action Alternative was assessed in the 2022 NEPA process for ocean salmon regulations (Preseason Reports II and III; PFMC 2022b and 2022c). In those analyses, proposed management measures were determined to have no significant impacts the affected environment.

The 2023 No-Action Alternative is the same as the 2022 action, therefore it is expected to have no significant impacts in the absence of large changes to the affected environment. This document, therefore, does not reanalyze the No-Action Alternative's impact on most components of the affected environment. This document does, however, include analysis of the impacts of the No-Action Alternative on salmon stocks identified in the FMP, the component of the environment for which conditions have changed such that the effects in 2023 are different.

The component of the affected environment that is described in this document consists only of the salmon stocks identified in the FMP (Appendix A). The 2023 forecast abundance of the FMP salmon stocks represents this component of the affected environment. The surviving stock after fishery-related mortality is generally referred to as spawning escapement (S), and the proportion of the stock that succumbs to fishing-related mortality is generally referred to as the exploitation rate (F). These are the metrics that constitute conservation objectives for FMP stocks, and by which effects of the alternatives to this part of the affected environment are evaluated. Thus, application of management measures (alternatives) to the abundance forecasts (affected environment) results in projected exploitation rates and spawning escapements (effects).

A description of the other components of the affected environment considered for 2023 ocean salmon fishery regulation alternatives, including socioeconomic components, and updated additional information on the biological components of the environment, will be presented in Preseason Report II, to be issued after the March Council meeting.

## 1.1 ABUNDANCE FORECASTS

Abundance forecasts for 2023 are summarized for key Chinook and coho salmon stocks in Tables I-1 and I-2, respectively. A cursory comparison of preseason forecast and postseason abundance estimates for selected stocks is presented in Figures II-2, 3, 4 and III-1. More detailed analyses of this subject are covered in Chapters II (Chinook) and III (coho). Information on pink salmon abundance and forecasts is contained in Chapter IV. Council Salmon FMP conservation objectives are presented in Appendix A; allocation objectives are presented in Appendix B.

In addition to the key stocks with abundance forecasts listed in Tables I-1 and I-2, Council management decisions for the 2023 ocean salmon fishing seasons may be constrained by other stocks, such as those listed under the ESA or subject to Pacific Salmon Commission (PSC) agreements, which may not have abundance forecasts made, or do not have abundance forecasts available in time for inclusion in this report. These include the following Evolutionarily Significant Units (ESUs): Central Valley Spring Chinook, California Coastal Chinook, Lower Columbia River (LCR) natural Chinook (tule component), Snake River Fall Chinook; Central California Coast coho, Southern Oregon/Northern California Coast coho, and Interior Fraser (including Thompson River) coho.

## 1.2 ACCEPTABLE BIOLOGICAL CATCH, ANNUAL CATCH LIMITS, AND OVERFISHING LIMITS

The Salmon FMP includes specification of ABC, ACLs, OFLs, and Scientific and Statistical Committee (SSC) recommendations for ABC.

Currently, ABC and ACLs specifications are required for three salmon stocks; Sacramento River fall Chinook (SRFC), which serve as an indicator stock for the Central Valley Fall Chinook complex, Klamath River fall Chinook (KRFC), which serve as an indicator stock for the Southern Oregon/Northern California Chinook complex, and Willapa Bay natural coho. Other stocks in the FMP are not required to have ACLs either because they were components of these two stock complexes, were ESA-listed, were hatchery stocks, or were managed under an international agreement.

ABCs and ACLs are not specified for stocks that are managed under an international agreement as there is a statutory exception in the MSA to the requirement for ACLs, and the National Standard 1 Guidelines (NS1Gs) state that ABCs are not required if stocks meet this international exception. The NS1Gs allow the flexibility to consider alternative approaches for specifying ACLs for stocks with unusual life history characteristics like Pacific salmon, and particularly for species listed under the ESA and hatchery stocks. For hatchery stocks, broodstock goals serve as conservation objectives rather than specifying ACLs. For ESA-listed stocks, biological opinions and associated consultation standards describe necessary controls to ensure their long-term conservation.

Preseason OFLs are determined for all non-ESA-listed and non-hatchery stocks with an estimate of $F_{MSY}$ (or Maximum Fishing Mortality Threshold, MFMT) and sufficient information available to make abundance forecasts.

### 1.2.1 Acceptable Biological Catch

For salmon, ABC is defined in terms of spawner escapement ($S_{ABC}$), which is determined annually based on stock abundance in spawner equivalent units (N) and the exploitation rate $F_{ABC}$.

$S_{ABC}=N \times (1 - F_{ABC})$

The ABC control rule defines $F_{ABC}$ as a fixed exploitation rate reduced from $F_{MSY}$ to account for scientific uncertainty. The degree of the reduction in F between $F_{ABC}$ and $F_{MSY}$ depends on whether $F_{MSY}$ is directly estimated (tier 1 stock) or a proxy value is used (tier 2 stock). For tier 1 stocks, $F_{ABC}$ equals $F_{MSY}$ reduced by five percent. For tier 2 stocks, $F_{ABC}$ equals $F_{MSY}$ reduced by ten percent.

Tier-1: $F_{ABC} = F_{MSY} \times 0.95$.
Tier-2: $F_{ABC} = F_{MSY} \times 0.90$.

### 1.2.2 Annual Catch Limit

ACLs are also defined in terms of spawner escapement ($S_{ACL}$) based on N and the corresponding exploitation rate ($F_{ACL}$), where the exploitation rate is a fixed value that does not change on an annual basis.

$F_{ACL}$ is equivalent to $F_{ABC}$ and

$S_{ACL} = N \times (1-F_{ACL})$,

which results in $S_{ACL} = S_{ABC}$ for each management year.

During the annual preseason salmon management process, $S_{ACL}$ is estimated using the fixed $F_{ACL}$ exploitation rate and the preseason forecast of N. Thus, fishery management measures must result in an expected spawning escapement greater than or equal to this preseason estimate of $S_{ACL}$.

### 1.2.3 Overfishing Limit

For salmon, OFL is defined in terms of spawner escapement ($S_{OFL}$), which is consistent with the common practice of using spawner escapement to assess stock status for salmon. $S_{OFL}$ is determined annually based on stock abundance, in spawner equivalent units (N) and the exploitation rate $F_{OFL}$.

$F_{OFL}$ is defined as being equal to $F_{MSY}$ (or MFMT) and

$S_{OFL} = N \times (1 - F_{MSY})$.

## *1.3 STATUS DETERMINATION CRITERIA*

The FMP includes status determination criteria (SDC) for overfishing, approaching an overfished condition, overfished, not overfished/rebuilding, and rebuilt. These criteria are:

- Overfishing occurs when a single year exploitation rate exceeds the maximum fishing mortality threshold (MFMT), which is based on the maximum sustainable yield exploitation rate ($F_{MSY}$);
- Approaching an overfished condition occurs when the geometric mean of the two most recent postseason estimates of spawning escapement, and the current preseason forecast of spawning escapement, is less than the minimum stock size threshold (MSST);
- Overfished status occurs when the most recent 3-year geometric mean spawning escapement is less than the MSST;
- Not overfished/rebuilding status occurs when a stock has been classified as overfished and has not yet been rebuilt, and the most recent 3-year geometric mean spawning escapement is greater than the MSST but less than $S_{MSY}$;

- A stock is rebuilt when the most recent 3-year geometric mean spawning escapement exceeds $S_{MSY}$.

Comparison of stock status to criteria for overfishing, overfished, not overfished/rebuilding, and rebuilt were reported in the annual SAFE document, Review of 2022 Ocean Salmon Fisheries (PFMC 2023). Approaching an overfished condition relies on current year preseason forecasts and Council adopted fishing regulations for the upcoming season in order to calculate projected spawning escapement. In this report, because the actual regulations for the upcoming season are not yet known, the calculations are based on preseason forecasts and Council-adopted regulations from the year prior. Thus, the stock status in this report is described as being *at risk* of approaching an overfished condition. Once the regulations for the upcoming season are adopted and spawning escapement is projected, the status description will be updated and provided in the Preseason-III report. All SDC rely on the most recent estimates available, which in some cases may be a year or more in the past because of incomplete broods or data availability; however, some status descriptions reported in the SAFE document may be updated if more recent spawning escapement or exploitation rate estimates become available between the time the SAFE document and this document are published.

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 1 of 3)

| Production Source and Stock or Stock Group | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Methodology for 2023 Prediction and Source |
|---|---|---|---|---|---|---|---|
| **Sacramento River** | | | | | | | |
| Fall (Sacramento Index) | 229.4 | 379.6 | 473.2 | 271.0 | 396.5 | 169.8 | Log-log regression of the Sacramento Index on jack escapement from the previous year, accounting for lag-1 autocorrelated errors. STT. |
| Winter (age-3 absent fishing) | 1.6 | 1.9 | 3.1 | 9.1 | 6.0 | 4.5 | Stochastic life cycle model applied to natural- and hatchery-origin production. STT. |
| **Klamath River** (Ocean Abundance) | | | | | | | |
| Fall | 359.2 | 274.2 | 186.6 | 181.5 | 200.1 | 103.8 | Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. STT. |
| **Oregon Coast** | | | | | | | |
| North and South/Local Migrating | -- | -- | -- | -- | -- | -- | None. |
| **Columbia River** (Ocean Escapement) | | | | | | | |
| Cowlitz Spring | 5.2 | 1.3 | 1.4 | 1.8 | 4.1 | 9.0 | Cowlitz, Kalama, and Lewis: Age-specific linear regressions of |
| Kalama Spring | 1.5 | 1.4 | 1.0 | 2.2 | 2.0 | 2.4 | cohort returns in previous run years. WDFW. |
| Lewis Spring | 3.7 | 1.5 | 1.4 | 2.4 | 2.4 | 4.7 | |
| Sandy Spring | 5.3 | 5.5 | 5.2 | 5.3 | 5.6 | 7.8 | Recent 3-year average. ODFW. |
| Willamette Spring | 53.8 | 40.2 | 40.8 | 50.1 | 51.2 | 71.0 | Age-specific linear regressions of cohort returns in previous run years. ODFW. Forecast includes adult fish only. |
| Upriver Spring [a/] | 166.7 | 99.3 | 81.7 | 75.2 | 122.9 | 198.6 | Columbia River Upriver Spring and Summer Chinook: AIC-weighted |
| Upriver Summer[b/] | 67.3 | 35.9 | 38.3 | 77.6 | 57.5 | 84.8 | average of age-specific cohort ratios and sibling regression models. Columbia River TAC subgroup and WDFW. |
| LRW Fall | 7.6 | 13.7 | 19.7 | 20.0 | 10.8 | 8.6 | Columbia River Fall Chinook: AIC-weighted average of age-specific |
| LRH Fall | 62.4 | 54.5 | 51.0 | 73.1 | 73.0 | 77.1 | cohort ratios and sibling regression models. Columbia River TAC |
| SCH Fall | 50.1 | 46.0 | 46.2 | 46.8 | 91.2 | 136.1 | subgroup and WDFW. |
| MCB Fall | 36.4 | 56.7 | 71.8 | 77.4 | 70.2 | 48.3 | |
| URB Fall | 200.1 | 158.4 | 233.4 | 354.2 | 230.4 | 272.4 | |

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 2 of 3)

| Production Source and Stock or Stock Group | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Methodology for 2023 Prediction and Source |
|---|---|---|---|---|---|---|---|---|
| **Washington Coast** | | | | | | | | |
| Willapa Bay Fall | Natural | 3.8 | 4.3 | 2.9 | 3.9 | 3.1 | 2.8 | Sibling and environmental relationships from recent year returns. |
| | Hatchery | 40.3 | 23.6 | 28.3 | 30.5 | 30.1 | 27.5 | Relationships between brood year survival and number of spawners. |
| Grays Harbor Fall | Natural | 16.4 | 18.0 | 15.0 | 15.5 | 17.9 | 15.0 | Combination of geometric mean of recent year returns and linear relationships of sibling recruits per spawner. |
| | Hatchery | 4.8 | 7.7 | 6.9 | 7.6 | 8.6 | 5.9 | Combination of recent year smolt return rates and log linear regressions of sibling returns per smolt. |
| Quinault Spring/Summer | Natural | NA | NA | NA | NA | NA | NA | |
| | Hatchery | 4.8 | NA | NA | NA | NA | NA | |
| Quinault Fall | Natural | 5.2 | 5.3 | 4.2 | 6.0 | 3.2 | 4.0 | Recent 5-year mean return rates, applied to brood year natural spawning escapements of age 3-6 returns. |
| | Hatchery | 3.1 | 2.7 | 4.5 | 4.9 | 5.6 | 7.6 | Recent 5-year mean terminal return rates (return/smolt release) for age 3-6 adult returns. |
| Queets Spring/Sum | Natural | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 | Recent 5-year (2018-2022) mean terminal run size. |
| Queets Fall | Natural | 3.3 | 3.4 | 4.1 | 4.3 | 5.3 | 4.3 | Recent 5-year return/spawner rates. |
| | Hatchery | 0.6 | 0.8 | 0.7 | 0.6 | 0.5 | 0.8 | Recent year rates (return/smolt release) adjusted by brood performance. |
| Hoh Spring/Summer | Natural | 1.1 | 1.0 | 0.8 | 1.0 | 0.7 | 1.0 | Spring/Summer: 5-year mean recruit/spawner rates. |
| Hoh Fall | Natural | 2.6 | 2.5 | 2.6 | 2.6 | 3.4 | 2.6 | Fall: Recent 3-year mean recruit/spawner adjusted by previous performance. |
| Quillayute Spring | Hatchery | 2.1 | 2.1 | 2.4 | 2.6 | 3.0 | 2.8 | Spring: Recent 2-year mean returns per smolt. |
| Quillayute Sum/Fall | Natural | 8.0 | 7.9 | 9.8 | 9.6 | 8.8 | 11.3 | Summer/Fall: Recent 5-year mean for all ages. Fall: Recent 3-year mean return/spawner. |
| Hoko[c/] | Natural | 1.5 | 2.8 | 2.6 | 1.3 | 0.9 | 2.8 | Escapement without fishing, includes supplemental. Sibling regressions using data from return years 1989-2022. |
| *North Coast Totals* | | | | | | | | |
| *Spring/Summer* | *Natural* | *1.6* | *1.7* | *1.4* | *1.5* | *1.3* | *1.4* | |
| *Fall* | *Natural* | *19.1* | *19.2* | *20.6* | *22.5* | *20.7* | *22.1* | |
| *Spring/Summer* | *Hatchery* | *2.1* | *2.1* | *2.4* | *2.6* | *3.0* | *2.8* | |
| *Fall* | *Hatchery* | *3.7* | *3.5* | *5.2* | *5.5* | *6.1* | *8.4* | |

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 3 of 3)

| Production Source and Stock or Stock Group | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Methodology for 2023 Prediction and Source |
|---|---|---|---|---|---|---|---|---|
| **Puget Sound summer/fall**[d/] | | | | | | | | |
| Nooksack/Samish | Hatchery | 24.6 | 21.3 | 18.2 | 18.9 | 28.1 | 41.2 | Three year average return rate. |
| East Sound Bay | Hatchery | 0.7 | 0.3 | 0.3 | 0.6 | 0.4 | 0.2 | Three year average return rate. |
| Skagit | Natural | 13.3 | 13.6 | 12.9 | 10.5 | 12.5 | 12.2 | Natural: Hierarchical Bayesian model to estimate the spawner-recruit dynamics. Hatchery: One year ahead forecasts generated using Chinook run sizes and GAM and ARIMA models. |
| | Hatchery | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.5 | |
| Stillaguamish[e/] | Natural | 1.6 | 0.9 | 0.9 | 0.9 | 0.9 | 1.2 | Natural plus hatchery. Multiple regression environmental model (Environmental Model to Predict Adult Returns, EMPAR). |
| Snohomish[e/] | Natural | 3.5 | 3.2 | 3.0 | 2.9 | 2.4 | 3.4 | Natural fingerling: Multiple regression environmental model (EMPAR). Natural yearling: Naïve models using the ForecastR tool (Vélez-Espino et al. 2018; https://solv-code.shinyapps.io/forecastr/). |
| | Hatchery | 6.5 | 7.0 | 6.8 | 6.1 | 6.0 | 7.5 | Average brood survival by age and juvenile rearing type (yearling and sub-yearling), of recent 3 complete brood returns (2015 - 2017), |
| Tulalip[e/] | Hatchery | 7.5 | 12.5 | 6.0 | 5.8 | 7.7 | 5.5 | Multiple regression environmental model (EMPAR). |
| South Puget Sound | Natural | 4.8 | 8.4 | 5.8 | 7.0 | 6.9 | 7.0 | Natural: Lake Washington; 4-yr avg recruit per spawner for age 3, 4-yr avg sibling ratios for ages 4 & 5. Green; 3-yr average return rates. Puyallup; climate relationship for age 3, 5-yr average return per spawner for ages 4-5. Nisqually; smolt to adult power for age 3, sibling relationship age 4, 3-yr smolt to adult age 5. Hatchery: Variety of recent year average return rates or sibling relationships. |
| | Hatchery | 123.6 | 99.9 | 100.7 | 78.8 | 90.3 | 90.4 | |
| Hood Canal | Natural | 3.9 | 1.2 | 4.6 | 5.7 | 5.4 | 3.2 | Includes hatchery strays to spawning grounds in Skokomish River. Proportioned using Hood Canal terminal run reconstruction-based relative contribution of the individual management units for 2018-2022 return years. Area 12B returns derived by applying an average proportion of natural origin recruits returning to area 12B for 2018-2022. |
| | Hatchery | 57.6 | 66.0 | 67.6 | 64.1 | 51.9 | 53.6 | Brood 2018 fingerling lbs released from WDFW facilities in 2019, multiplied by the average of post-season estimated terminal area return rates for the last 5 years (2018-2022). |
| Strait of Juan de Fuca Including Dungeness spring run | Natural | 6.0 | 8.3 | 5.0 | 5.5 | 5.0 | 3.7 | Natural and hatchery. Dungeness and Elwha hatchery estimated by all year mean return/release rates. Dungeness wild estimated by smolts times all year mean return rate. Elwha wild estimated using 12 year hatchery/wild breakouts from otolith and CWT. |

a/ Since 2005, the upriver spring Chinook run includes Snake River summer Chinook.
b/ Since 2005, the upriver summer Chinook run includes only upper Columbia summer Chinook, and not Snake River summer Chinook.
c/ Expected spawning escapement without fishing.
d/ Unless otherwise noted, Puget Sounds forecasts are in units of terminal run size.
e/ Includes a mixture of runsize types including escapement without fishing and terminal run. 2023 values are terminal runsize.

TABLE I-2. Preseason adult coho salmon stock forecasts in thousands of fish. (Page 1 of 2)

| Production Source and Stock or Stock Group | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Methodology for 2023 Prediction and Source |
|---|---|---|---|---|---|---|---|---|
| **OPI Area Total Abundance** (California, Oregon Coasts, and Columbia River) | | 349.0 | 1,009.6 | 268.7 | 1,732.9 | 1,225.9 | 1,135.7 | Abundance of all OPI components based on cohort reconstruction including all fishery impacts using Mixed Stock Model (MSM); prior to 2008 only fishery impacts south of Leadbetter Point were used (traditional OPI accounting). OPITT, see Chapter III for details. |
| OPI Public | Hatchery | 294.1 | 933.5 | 185.7 | 1607.9 | 1003.5 | 896.9 | OPIH: Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2022 adults. Columbia/Coastal proportions based on jacks; Columbia early/late proportions based on jacks; Coastal N/S proportions based on smolts. |
| Columbia River Early | | 164.7 | 545.0 | 130.7 | 1014.0 | 592.5 | 481.8 | |
| Columbia River Late | | 121.5 | 360.6 | 50.3 | 576.0 | 404.7 | 404.3 | |
| Coastal N. of Cape Blanco | | 3.3 | 12.0 | 2.4 | 6.4 | 1.9 | 3.0 | |
| Coastal S. of Cape Blanco | | 4.6 | 15.9 | 2.3 | 11.5 | 4.4 | 7.8 | |
| Lower Columbia River | Natural | 21.9 | 36.9 | 24.8 | 39.2 | 65.7 | 45.5 | Oregon: recent three year average return; Washington: natural smolt production multiplied by 2020 brood marine survival rate. Abundance is subset of early/late hatchery abundance above. |
| Oregon Coast (OCN) | Natural | 54.9 | 76.1 | 83.0 | 125.0 | 222.4 | 238.8 | Rivers: Generalized additive model (GAM) relating ocean recruits to parental spawners and marine environmental variables. See text in Chapter III for details. Lakes: recent three year average abundance. |
| **Washington Coast** | | | | | | | | |
| Willapa | Natural | 20.6 | 63.4 | 17.9 | 19.0 | 35.8 | 42.7 | Washington Coast stocks: A variety of methods were used for 2022, primarily based on smolt production and survival. See text in Chapter III for details. |
| | Hatchery | 44.5 | 94.0 | 51.8 | 61.6 | 74.7 | 111.0 | |
| Grays Harbor | Natural | 42.4 | 71.5 | 50.0 | 44.8 | 120.4 | 102.8 | |
| | Hatchery | 51.4 | 64.3 | 42.3 | 31.7 | 78.3 | 111.4 | |
| Quinault | Natural | 25.4 | 13.9 | 17.5 | 15.0 | 19.4 | 23.6 | |
| | Hatchery | 29.6 | 26.9 | 27.0 | 24.6 | 42.7 | 30.6 | |
| Queets | Natural | 7.0 | 11.1 | 7.8 | 3.9 | 18.2 | 12.4 | |
| | Hatchery | 10.8 | 13.2 | 10.9 | 11.8 | 22.2 | 14.9 | |
| Hoh | Natural | 5.8 | 7.0 | 4.2 | 3.0 | 4.7 | 6.5 | |

TABLE I-2. Preseason adult coho salmon stock forecasts in thousands of fish. (Page 2 of 2)

| Production Source and Stock or Stock Group | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Methodology for 2023 Prediction and Source |
|---|---|---|---|---|---|---|---|---|
| Quillayute Fall | Natural | 10.6 | 14.7 | 9.2 | 7.5 | 12.5 | 13.5 | For all Washington Coast stocks: A variety of methods were used for 2022, primarily based on smolt production and survival. See text in Chapter III for details. |
| | Hatchery | 16.5 | 17.0 | 13.0 | 15.1 | 20.3 | 19.1 | |
| Quillayute Summer | Natural | 2.7 | 1.2 | 0.8 | 0.3 | 0.9 | 1.6 | |
| | Hatchery | 3.3 | 3.4 | 3.4 | 3.4 | 4.6 | 3.9 | |
| North Coast Independent Tributaries | Natural | 4.1 | 8.1 | 5.1 | 4.7 | 18.0 | 13.5 | |
| | Hatchery | 7.9 | 12.5 | 1.3 | 0.1 | 0.1 | 11.8 | |
| *WA Coast Total* | *Natural* | *118.7* | *191.0* | *112.4* | *98.4* | *229.8* | *216.6* | |
| | *Hatchery* | *164.1* | *231.3* | *149.6* | *148.2* | *243.0* | *302.7* | |
| **Puget Sound** | | | | | | | | |
| Strait of Juan de Fuca | Natural | 7.2 | 8.8 | 7.5 | 6.7 | 7.3 | 15.6 | For all Puget Sound stocks: A variety of methods were used for 2022, primarily based on smolt production and survival. See text in Chapter III and Joint WDFW and tribal annual reports on Puget Sound Coho Salmon Forecast Methodology for details. |
| | Hatchery | 10.6 | 16.8 | 20.6 | 12.5 | 12.7 | 21.8 | |
| Nooksack-Samish | Natural | 20.6 | 25.1 | 15.4 | 35.3 | 36.0 | 29.5 | |
| | Hatchery | 61.3 | 59.8 | 42.5 | 54.6 | 73.8 | 49.2 | |
| Skagit | Natural | 59.2 | 57.9 | 31.0 | 58.4 | 80.4 | 43.1 | |
| | Hatchery | 13.1 | 9.9 | 18.2 | 22.0 | 21.3 | 21.1 | |
| Stillaguamish | Natural | 19.0 | 23.8 | 19.5 | 26.8 | 24.9 | 30.2 | |
| | Hatchery | 0.0 | 2.2 | 2.3 | 4.0 | 1.9 | 1.7 | |
| Snohomish | Natural | 65.9 | 62.6 | 39.0 | 60.0 | 64.2 | 76.5 | |
| | Hatchery | 38.3 | 43.7 | 26.6 | 29.9 | 22.6 | 64.0 | |
| South Sound | Natural | 15.0 | 30.4 | 7.3 | 27.5 | 31.0 | 58.3 | |
| | Hatchery | 103.0 | 180.4 | 164.0 | 192.7 | 208.5 | 218.8 | |
| Hood Canal | Natural | 59.5 | 40.1 | 35.0 | 28.8 | 20.2 | 37.9 | |
| | Hatchery | 84.5 | 87.9 | 72.2 | 55.7 | 61.4 | 74.8 | |
| *Puget Sound Total* | *Natural* | *246.4* | *248.8* | *154.6* | *243.5* | *264.0* | *291.2* | |
| | *Hatchery* | *310.8* | *400.7* | *346.3* | *371.4* | *402.3* | *451.4* | |

# CHAPTER II: AFFECTED ENVIRONMENT - CHINOOK SALMON ASSESSMENT

## *2.1 CHINOOK STOCKS SOUTH OF CAPE FALCON*

### 2.1.1 Sacramento River Fall Chinook

The SRFC stock comprises a large proportion of the Chinook spawners returning to Central Valley streams and hatcheries. SRFC is designated as the indicator stock for the Central Valley fall Chinook stock complex, which was established under FMP Amendment 16 to facilitate setting and assessing compliance with ABC and ACLs, as required by the 2006 revision of the MSA. The Sacramento Index (SI) is the aggregate-age index of adult SRFC ocean abundance.

#### *Predictor Description*

The SI is the sum of (1) adult SRFC ocean fishery harvest south of Cape Falcon, OR between September 1 and August 31, (2) adult SRFC impacts from non-retention ocean fisheries when they occur, (3) the recreational harvest of adult SRFC in the Sacramento River Basin, and (4) the SRFC adult spawner escapement (Table II-1, Figure II-1).

The SI forecasting approach uses jack escapement estimates to predict the SI and accounts for autocorrelated errors. In practice, this means that if, in the previous year, the modeled SI value was larger than the SI postseason estimate for that year, the current year forecast is adjusted downward to account for that error. Conversely, if the modeled SI value in the previous year was less than the postseason estimate of the SI for that year, the current year SI forecast would be adjusted upward to compensate for that error.

The forecast of the log-transformed SI was made using the model

$$\log \mathrm{SI}_t = \beta_0 + \beta_1 \log \mathrm{J}_{t-1} + \rho\varepsilon_{t-1} ,$$

where $\log \mathrm{SI}_t$ and $\log \mathrm{J}_{t-1}$ are log-transformed SI and jack escapement values, respectively; $t$ is the year for which the SI is being forecast; $\beta_0$ is the intercept; $\beta_1$ is the slope; $\rho$ is the autocorrelation coefficient; and $\varepsilon_{t-1}$ is the difference between the modeled value of the log SI for year $t$-1 and the postseason estimate of log SI in year $t$-1. The $\log \mathrm{SI}_t$ is then back-transformed to the arithmetic scale

$$\mathrm{SI}_t = \mathrm{e}^{\log \mathrm{SI}_t}.$$

In prior years the SI forecast was expressed as a mean by the addition of a bias correction factor ($0.5\sigma^2$) to the $\log \mathrm{SI}_t$ when transforming to the arithmetic scale ($\sigma^2$ is the variance of the normally distributed error component of the fitted model, referred to as the "innovation" variance). Beginning in 2023 the SI forecast will be expressed as the arithmetic scale median, reflecting a methodology change made following the 2023 Salmon Methodology Review.

A more detailed description of the general forecast approach can be found in Appendix E of the 2014 Preseason Report I (PFMC 2014).

#### *Predictor Performance*

The performance of past SI forecasts is displayed graphically in Figure II-4. For 2022, the preseason forecast of the SI (396,458) was 158 percent of the postseason estimate (251,191).

A control rule, adopted as part of Amendment 16 to the salmon FMP, is used annually to specify the maximum allowable exploitation rate on SRFC (Appendix A, Figure A-1). The allowable exploitation rate is determined by the predicted number of potential adult spawners in the absence of fisheries, which is defined for SRFC as the forecast SI. The FMP allows for any ocean and river harvest allocation that meets the exploitation rate constraints defined by the control rule. The regulations adopted in 2022 were expected to result in 198,694 hatchery and natural area adult spawners and an exploitation rate of 49.9 percent. Postseason estimates of these quantities were 61,851 hatchery and natural area adult spawners and an exploitation rate of 75.4 percent (Table II-1).

### *Stock Forecast and Status*

Sacramento Index forecast model parameters were estimated from SI data for years 1983-2022 and jack escapement data for years 1982-2021. A total of 6,996 SRFC jacks were estimated to have escaped to Sacramento River basin hatcheries and natural spawning areas in 2022. This jack escapement and the estimated parameters

$\beta_o = 7.457462,$
$\beta_1 = 0.554893,$
$\rho = 0.7526451,$
$\epsilon_{t-1} = -0.4355333,$
$\sigma^2 = 0.1403361,$

result in a 2023 SI forecast of 169,767.

Figure II-2 graphically displays the 2023 SI forecast. The model fit (line in Figure II-2) was higher than the 2022 postseason estimate of the SI. As a result, the 2023 SI forecast value is adjusted downward from the fitted model.

The forecast SI applied to the SRFC control rule (Appendix A, Figure A-1) results in an allowable exploitation rate of 28.1 percent which produces, in expectation, 122,000 hatchery and natural area adult spawners. Therefore, fisheries impacting SRFC must be crafted to achieve, in expectation, a minimum of 122,000 adult spawners in 2023.

### *OFL, ABC, and ACL*

The OFL, ABC, and ACL are defined in terms of spawner escapement ($S_{OFL}$, $S_{ABC}$, and $S_{ACL}$), and are calculated using potential spawner abundance forecasts and established exploitation rates. For SRFC, $F_{MSY}$ = 0.78, the proxy value for Tier-2 Chinook stocks that do not have estimates of this rate derived from a stock-specific spawner-recruit analysis. The OFL for SRFC is $S_{OFL}$ = 169,767 × (1-0.78) = 37,349. Because SRFC is a Tier-2 stock, $F_{ABC} = F_{MSY} \times 0.90 = 0.70$, and $F_{ACL} = F_{ABC}$. The ABC for SRFC is $S_{ABC}$ = 169,767 × (1-0.70) = 50,930, with $S_{ACL} = S_{ABC}$. These preseason estimates will be recalculated with postseason abundance estimates (when available) to assess ACL and OFL compliance.

## 2.1.2 Sacramento River Winter Chinook

ESA-listed endangered Sacramento River winter Chinook salmon (SRWC) are harvested incidentally in ocean fisheries, primarily off the central California coast. A two-part consultation standard for endangered SRWC was first implemented in 2012, and later updated in 2018.

The first component of the consultation standard is the season and size limit provisions that have been in place since the 2004 Biological Opinion. These provisions state that the recreational salmon fishery between Point Arena and Pigeon Point shall open no earlier than the first Saturday in April and close no later than the second Sunday in November. The recreational salmon fishery between Pigeon Point and the

U.S.– Mexico Border shall open no earlier than the first Saturday in April and close no later than the first Sunday in October. The minimum size limit shall be at least 20 inches total length. The commercial salmon fishery between Point Arena and the U.S.–Mexico border shall open no earlier than May 1 and close no later than September 30, with the exception of an October fishery conducted Monday through Friday between Point Reyes and Point San Pedro, which shall end no later than October 15. The minimum size limit shall be at least 26 inches total length.

The second component of the consultation standard is specified by a control rule that limits the maximum age-3 impact rate (allowable as a preseason forecast) for the area south of Point Arena, California (Appendix A, Figure A-3). The control rule specifies the maximum allowable age-3 impact rate on the basis of a forecast of the SRWC age-3 escapement in the absence of fisheries.

### *Predictor Description*

The forecast of the age-3 escapement absent fishing (abundance) is based on a SRWC life cycle model that is stratified by age, sex, and origin (hatchery and natural). Juvenile survival rates spanning outmigration in freshwater and early ocean residence are applied to hatchery- and natural-origin juvenile production estimates. The age-3 escapement absent fishing is then forecasted by applying age- and sex-specific maturation rates and the age-3 natural mortality rate. The forecast is stochastic and thus the age-3 escapement absent fishing is represented by a distribution. The median of this distribution is applied to the control rule to specify the maximum allowable age-3 impact rate. A complete description of the abundance forecasting approach can be found in O'Farrell et al. (2016). The abundance forecasting approach used here is the Base model described in the aforementioned report.

### *Predictor Performance*

The forecast of SRWC age-3 escapement absent fishing was implemented for the first time in 2018. Postseason estimates are not available.

### *Stock Forecast and Status*

The forecast of SRWC age-3 escapement absent fishing is 4,540, with 39 percent of the forecast comprised of natural-origin fish. Over years 2018-2022, the average proportion natural for the SRWC forecast was 76 percent. Application of the control rule results in a maximum age-3 impact rate of 20.0 percent for the area south of Point Arena in 2023 (Table II-2).

.

## 2.1.3 Klamath River Fall Chinook

### *Predictor Description*

For KRFC, linear regressions are used to relate September 1 ocean abundance estimates of age-3, age-4, and age-5 fish to that year's river run size estimates of age-2, age-3, and age-4 fish, respectively (Table II-3). Historical abundance estimates were derived from a cohort analysis of coded wire tag (CWT) information. The y-intercept of the regressions is constrained to zero, which gives the biologically reasonable expectation that a river run size of zero predicts an ocean abundance remainder of zero for the same cohort. The abundance of age-2 fish is not forecasted because no precursor to age-2 fish of that brood is available. Ocean fisheries harvest nominal numbers of age-2 KRFC.

The KRFC age-specific abundance forecasts have been made using all complete (or nearly complete) brood years since the 1979 brood. However, recent work suggests that using a more contemporary set of brood years to inform abundance forecasts resulted in better forecast performance. In particular, a recent investigation of this issue found that limiting data to a moving window of the 10 most recent complete (or nearly complete) brood years resulted in the best performance among the alternatives considered. A memo

summarizing and augmenting that work was presented to the Klamath River Technical Team (KRTT) at their January 2023 meeting (see Appendix D of this report). KRTT members supported use of the 10 brood year moving window for forecasting KRFC in 2023. The forecasts presented in this report are therefore based on the 10 brood year moving window data range.

### *Predictor Performance*

The performance of past KRFC forecasts is displayed in Table II-4 and in Figure II-4. For 2022, the preseason forecast of the KRFC total adult abundance (200,117) was 99 percent of the postseason estimate (201,426).

Management of KRFC harvest since 1986 has attempted to achieve specific harvest rates on fully-vulnerable age-4 and age-5 fish in ocean and river fisheries (Table II-5). The Council has used a combination of quotas and time/area restrictions in ocean fisheries in an attempt to meet the harvest rate objective set each year. Since 1992, fisheries have been managed to achieve 50/50 allocation between tribal and non-tribal fisheries. Tribal and recreational river fisheries have been managed on the basis of adult Chinook quotas.

The FMP describes a control rule used annually to specify the maximum allowable exploitation rate on KRFC (Appendix A, Figure A-2). The allowable exploitation rate is determined by the predicted number of potential spawners, which is defined as the natural area adult escapement expected in the absence of fisheries. The FMP allows for any ocean and river harvest allocation that meets the exploitation rate constraints defined by the control rule.

The 2022 salmon fishery regulations were expected to result in 38,180 natural-area spawning adults and an age-4 ocean harvest rate of 10.0 percent. Postseason estimates of these quantities were 22,051 natural-area adult spawners and an age-4 ocean harvest rate of 38.2 percent (Table II-5 and Table II-6).

### *Stock Forecast and Status*

The 2023 forecast for the ocean abundance of KRFC as of September 1, 2022 (preseason) is 75,256 age-3 fish, 27,198 age-4 fish, and 1,339 age-5 fish.

Late-season commercial ocean fisheries in 2022 (September through November) were estimated to have harvested zero KRFC. Late-season recreational fisheries were estimated to have harvested 68 KRFC, all of which were age-4. This fall harvest equates to a 0.25 percent age-4 ocean harvest rate, which will be deducted from the ocean fishery's allocation in determining the 2023 allowable ocean harvest.

The forecast of potential spawner abundance is derived from the ocean abundance forecasts, ocean natural mortality rates, age-specific maturation rates, stray rates, and the proportion of escapement expected to spawn in natural areas. The 2023 KRFC potential spawner abundance forecast is 26,238 natural-area adults. This potential spawner abundance forecast applied to the KRFC control rule results in an allowable exploitation rate of 10.0 percent, which produces, in expectation, 23,614 natural-area adult spawners. Therefore, fisheries impacting KRFC must be crafted to achieve, in expectation, a minimum of 23,614 natural-area adult spawners in 2023.

### *OFL, ABC, and ACL*

The OFL, ABC, and ACL are defined in terms of spawner escapement ($S_{OFL}$, $S_{ABC}$, and $S_{ACL}$), and are calculated using potential spawner abundance forecasts and established exploitation rates. For KRFC, $F_{MSY}$ = 0.71, the value estimated from a stock-specific spawner-recruit analysis (STT 2005). The OFL for KRFC is = 26,238 × (1-0.71) = 7,609. Because KRFC is a Tier-1 stock, $F_{ABC} = F_{MSY} \times 0.95 = 0.68$, and $F_{ACL}$ =

$F_{ABC}$. The ABC for KRFC is $S_{ABC} = 26{,}238 \times (1\text{-}0.68) = 8{,}396$, with $S_{ACL} = S_{ABC}$. These preseason estimates will be recalculated with postseason abundance estimates (when available) to assess ACL and OFL compliance.

### 2.1.4 Other California Coastal Chinook Stocks

Other California coastal streams that support fall Chinook stocks which contribute to ocean fisheries off Oregon and California include the Smith, Mad, Eel, Mattole, and Russian Rivers, and Redwood Creek. Except for the Smith River, these populations are included in the California coastal Chinook ESU, which is listed as threatened under the ESA. Current information is insufficient to forecast the ocean abundance of these stocks; however, the NMFS ESA consultation standard restricts the KRFC age-4 ocean harvest rate to no more than 16.0 percent, as estimated postseason, to limit impacts on these stocks. In 2022, the age-4 ocean harvest rate was estimated to be 38.2 percent. The Klamath River spring, Smith River, Rogue River, Umpqua River, and other Oregon Chinook stocks south of the Elk River are components of the Southern Oregon/Northern California (SONC) Chinook complex, and as such, specification of ACLs is deferred to KRFC, the indicator stock for the SONC Chinook complex.

### 2.1.5 Oregon Coast Chinook Stocks

Oregon coast Chinook stocks are categorized into three major subgroups based on ocean migration patterns: the North Oregon Coast (NOC) Chinook aggregate, the Mid Oregon Coast (MOC) Chinook aggregate, and the South Oregon Coast (SOC) Chinook aggregate. Although their ocean harvest distributions overlap somewhat, they have been labeled as far-north, north, or south/local migrating, respectively.

#### *Far-North and North Migrating Chinook (NOC and MOC groups)*

Far-north and north migrating Chinook stocks include spring and fall stocks north of and including the Elk River, with the exception of Umpqua River spring Chinook. Based on CWT analysis, the populations from ten major NOC river systems from the Nehalem through the Siuslaw Rivers are harvested primarily in ocean fisheries off British Columbia and Southeast Alaska, and to a much lesser degree in Council area and terminal area (state waters) fisheries off Washington and Oregon. CWT analysis indicates populations from five major MOC systems, from the Coos through the Elk Rivers, are harvested primarily in ocean fisheries off British Columbia, Washington, Oregon, and in terminal area fisheries. Minor catches occur in California fisheries, and variable catches have been observed in southeast Alaska troll fisheries.

NOC and MOC Chinook stocks are components of the Far-North-Migrating Coastal (FNMC) Chinook complex, which is an exception to the ACL requirements of the MSA because they are managed under an international agreement (the PST); therefore, specification of ACLs is not necessary for stocks in the FNMC complex.

#### *Predictor Description*

Quantitative abundance predictions are made for all three of the coastal Chinook groups (NOC, MOC, and SOC). Once available, forecast data for the NOC and MOC are incorporated into Chinook FRAM and used in the annual development of Council area fishery regulations. These forecasts are also used in the PSC management process and to inform terminal area management actions. Quantitative forecasts of abundance are based on sibling regression analyses from individual basins' escapement assessment data and scale sampling, which occur coastwide.

Natural spawner escapement is assessed yearly from the Nehalem through Sixes Rivers. Peak spawning counts of adults are obtained from standard index areas on these rivers and monitored to assess stock trends and reported in the annual Review of Ocean Salmon Fisheries (PFMC 2023, Chapter II, Table II-5, and Figure II-3). Natural fall Chinook stocks from both the NOC and MOC dominate production from this

subgroup. Also present in lesser numbers are naturally-produced spring Chinook stocks from several rivers, and hatchery fall and/or spring Chinook released in the Trask, Nestucca, Salmon, and Elk rivers.

Basin-specific forecasts contribute an additive total to the overall aggregate forecasts and are derived in conjunction with annual PSC Chinook model input and calibration activities; however, they were not available at publication time.

### *Predictor Performance*

Predictors for NOC and MOC stocks are evaluated annually by the PSC's Chinook Technical Committee.

### *Stock Forecast and Status*

#### 2.1.5.1.1 North Oregon Coast

Since 1977, the Salmon River Hatchery production has been tagged for use primarily as a PSC indicator stock for the NOC stock component. Because these fish are primarily harvested in fisheries north of the Council management area, the STT has not reviewed the procedure by which this indicator stock is used in estimating annual stock status. The 2022 NOC density from standard survey areas (Nehalem R. through the Siuslaw R.) was an increase from 2021 (PFMC 2022, Appendix B, Table B-11).

Based on the density index of total spawners, the generalized expectation for NOC stocks in 2023 is slightly above the recent five years' average density of 105 spawners per mile. Specifically, the 2022 spawner density in standard survey areas for the NOC averaged 106 spawners per mile, the second highest since 2017.

#### 2.1.5.1.2 Mid Oregon Coast

Since 1977, the Elk River Hatchery production has been tagged for potential use as a PSC indicator stock for the MOC stock aggregate. Beginning in 2019, Elk River Hatchery production was included as a PSC indicator stock. Age-specific ocean abundance forecasts for 2023 are not currently available but are being developed. The STT has not undertaken a review of the methods used by Oregon Department of Fish and Wildlife (ODFW) staff in developing these abundance forecasts; however, the PSC has, and those findings and recommendations are published in the PSC Technical Report No. 35.

The 2022 MOC density from standard survey areas (Coos and Coquille basins) averaged 94 adult spawners per mile, an increase from 2021 (PFMC 2023, Appendix B, Table B-11). Fall Chinook escapement goals are currently under development for the South Umpqua and Coquille basins of the MOC

### *South/Local Migrating Chinook (SOC group)*

South/local migrating Chinook stocks include Rogue River spring and fall Chinook, fall Chinook from smaller rivers south of the Elk River, and Umpqua River spring Chinook. These stocks are important contributors to ocean fisheries off Oregon and northern California. Umpqua River spring Chinook contribute to a lesser degree to fisheries off Washington, British Columbia, and southeast Alaska.

SOC stocks are components of the Southern Oregon/Northern California (SONC) Chinook complex, and as such, specification of ACLs is deferred to KRFC, the indicator stock for the SONC complex.

#### 2.1.5.1.3 Rogue River Fall Chinook

Rogue River fall Chinook contribute to ocean fisheries principally as age-3 through age-5 fish. Mature fish enter the river each year from mid-July through October, with the peak of the run occurring during August and September.

### *Predictor Description*

Carcass recoveries in Rogue River index surveys covering a large proportion of the total spawning area were available for 1977-2004. Using Klamath Ocean Harvest Model (KOHM) methodology, these carcass numbers, allocated into age-classes from scale data, were used to estimate the Rogue Ocean Population Index (ROPI) for age-3 to age-5 fish. A linear regression was developed using the escapement estimates (all ages) in year *t* based on seining at Huntley Park (1976-2004) to predict the ROPI in year *t*+1 (1977-2005).

Beginning in 2015, a revised predictor was used which relies on the Huntley Park escapement estimate and dispenses with the use of the carcass counts. Linear regressions are used to relate May 1 ocean abundance estimates of age-3, age-4, age-5, and age-6 Rogue fall Chinook to the previous year's river run size estimates of age-2, age-3, age-4, and age-5 fish, respectively. Historical May 1 ocean abundance estimates were derived from a cohort analysis of 1988-2006 brood years. May 1 (t) ocean abundances were converted to September 1 (t-1) forecasts by dividing the May (t) number by the assumed September 1 (t-1) through May 1 (t) survival rate of 0.5 age-3, 0.8 age-4, 0.8 age-5, and 0.8 age-6. River run size estimates are derived from a flow-based expansion of standardized seine catches of fall Chinook at Huntley Park (RM 8). The y-intercept of the regressions is constrained to zero.

The 2022 Huntley Park escapement estimate and the resulting 2023 ROPI forecast of 218,300 consists of age-3 (185,800), age-4 (26,900) and age-5-6 (5,600) fish.

### *Predictor Performance*

The ROPI is based on cohort reconstruction methods with index values predicted from regression equations. Because postseason estimates of the ROPI are not available, it is not possible to assess predictor performance.

### *Stock Forecast and Status*

The 2023 ROPI is the smallest value since 2016 (Table II-7).

### *Other SOC Stocks*

Umpqua and Rogue spring Chinook contribute to ocean fisheries primarily as age-3 fish. Mature Chinook enter the rivers primarily during April and May and generally prior to annual ocean fisheries.

Natural fall Chinook stocks from river systems south of the Elk River and spring Chinook stocks from the Rogue and Umpqua rivers dominate production from this subgroup. Substantial releases of hatchery spring Chinook occur in both the Rogue and Umpqua rivers, although also present in lesser numbers are hatchery fall Chinook, primarily from the Chetco River.

These stocks are minor contributors to general season mixed-stock ocean fisheries. Standard fall Chinook spawning index escapement data were available for the smaller SOC rivers (Winchuck, Chetco, and Pistol rivers). These had been used for assessment of the conservation objective for the SOC stocks prior to 2015. The 2022 average density from standard survey areas was 19 adult spawners per mile, a slight decrease from 2021 (PFMC 2023 Appendix B, Table B-8). Beginning in 2015, for the SOC Chinook stock complex, the conservation objective is assessed using the escapement estimate of naturally produced fall Chinook at Huntley Park on the Rogue River (PFMC 2023, Appendix B, Table B-10, Chapter II, Table II-5, and Figure II-3).

## 2.2 CHINOOK STOCKS NORTH OF CAPE FALCON

### 2.2.1 Columbia River Chinook

Columbia River fall Chinook stocks form the largest contributing stock group to Council Chinook fisheries north of Cape Falcon. Abundance of these stocks is a major factor in determining impacts of fisheries on weak natural stocks critical to Council area management, particularly the natural tule component of the ESA-listed LCR Chinook ESU. Abundance predictions are made for five major fall stock units characterized as being hatchery or natural production and originating above or below Bonneville Dam. The upriver brights (URB) and lower river wild (LRW) are primarily naturally-produced stocks, although the upriver brights do have a substantial hatchery component. The lower river hatchery (LRH) tule, Spring Creek Hatchery (SCH) tule, and Mid-Columbia Bright (MCB) are primarily hatchery-produced stocks. The MCB include the Lower River Bright (LRB) stock as a small naturally-produced component. LRB spawn in the mainstem Columbia River near Beacon Rock and are believed to have originated from MCB hatchery strays. The tule populations generally mature at an earlier age than the bright fall populations and do not migrate as far north. Minor fall populations include the Select Area Bright (SAB), a populations originally from the Rogue River.

Upper Columbia River summer Chinook also contribute to Council area fisheries, although like URB and LRW, most ocean impacts occur in British Columbia (B.C.) and Southeast Alaska (SEAK) fisheries. Upper Columbia River summer Chinook have both natural and hatchery components and originate in areas upstream from Rock Island Dam.

URB and upper Columbia summer Chinook are exempt from the ACL requirements of the MSA because they are managed under an international agreement (the PST); therefore, specification of ACLs is not necessary for these two stocks. ESA consultation standards serve the purpose of ACLs for ESA-listed stocks like LRW Chinook. Broodstock goals serve the purpose of ACLs for hatchery-origin stocks like LRH, SCH, and MCB.

#### *Predictor Description*

Preseason forecasts of Columbia River fall and summer Chinook stock abundance, used by the STT to assess the Council's adopted fishery regulations, are based on age-specific and stock-specific forecasts of annual ocean escapement (returns to the Columbia River). These forecasts are developed by WDFW and a subgroup of the *U.S. v Oregon* Technical Advisory Committee (TAC). Columbia River return forecast methodologies used for Council management are identical to those used for planning Columbia River fall season fisheries, although minor updates to Council estimates of inriver run size may occur prior to finalization of the inriver fishery plans, based on the results of planned ocean fisheries.

The 2023 return of summer and each fall Chinook stock group is forecasted using relationships between successive age groups within a cohort. The database for these relationships was constructed by combining age-specific estimates of escapement and inriver fishery catches for years since 1964 (except for MCB, which started in the 1980s). Typically, only the more recent broods are used in the current predictions. Fall Chinook stock identification in the Columbia River mixed-stock fisheries is determined by sampling catch and escapement for CWTs and visual stock identification (VSI). Age composition estimates are based on CWT data and scale reading of fishery and escapement samples, where available. These stock and age data for Columbia River fall Chinook are the basis for the return data presented in the *Review of 2022 Ocean Salmon Fisheries* (Appendix B, Tables B-15 through B-20). The 2022 returns for summer Chinook and the five fall Chinook stocks listed in this report may differ somewhat from those provided in the *Review of 2022 Ocean Salmon Fisheries* (PFMC 2023), since ocean escapement estimates may have been updated after that report was printed.

Summer and fall Chinook ocean escapement forecasts developed for the March Council meeting do not take into account variations in marine harvest. The STT combines the initial inriver run size (ocean escapement; Table II-8) with expected Council area fishery harvest levels and stock distribution patterns to produce adjusted ocean escapement forecasts based on the proposed ocean fishing regulations. These revised forecasts are available at the end of the Council preseason planning process in April and are used for preseason fishery modeling in the Columbia River.

### *Predictor Performance*

Performance of the preliminary inriver run size estimation methodology can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table II-8; Figure II-4). For 2022, the March preliminary preseason forecasts as a percentage of the postseason estimates are 91 percent for URB, 116 percent for LRW, 83 percent for LRH, 35 percent for SCH, 115 percent for MCB, and 73 percent for upper Columbia summer Chinook.

### *Stock Forecasts and Status*

LRW fall Chinook: The preliminary forecast for 2023 ocean escapement of LRW fall Chinook is 8,600 adults, about 45 percent of the recent 10-year average return of 19,100. The forecast is about 92 percent of last year's actual return of 9,375. The spawning escapement goal of 5,700 in the North Fork Lewis River is expected to be achieved this year.

LRH fall Chinook: The 2023 preliminary forecast for ocean escapement of LRH fall Chinook is 77,100 adults, about 88 percent of last year's return of 87,542 and 94 percent of the recent 10-year average return of 82,000. Based on this abundance forecast, the total allowable LCR natural tule exploitation rate for 2023 fisheries is no greater than 38.0 percent under the matrix developed by the Tule Chinook Workgroup in 2011, which is used by NMFS in developing ESA guidance for this stock (Appendix A Table A-6).

SCH fall Chinook: The 2023 preliminary forecast for ocean escapement of SCH fall Chinook is 136,100 adults, about 53 percent of last year's return of 258,271 and 149 percent of the 10-year average of 91,200.

MCB fall Chinook: The 2023 preliminary forecast for ocean escapement of MCB fall Chinook is 48,300 adults, about 75 percent of last year's return of 64,622 and about 43 percent of the recent 10-year average of 107,600.

Summer Chinook: The 2023 preliminary forecast for ocean escapement of summer Chinook is 84,800 adults, about 108 percent of last year's return of 78,494 and about 120 percent of the recent 10-year average of 70,900. This ocean escapement forecast should provide opportunity for both ocean and in-river fisheries while exceeding the FMP $S_{MSY}$ conservation objective of 12,143 escapement above Rock Island Dam.

URB fall Chinook: The 2023 preliminary forecast for ocean escapement of URB fall Chinook is 272,400 adults, about 107 percent of last year's return of 254,880 and about 66 percent of the recent 10-year average of 412,300. This forecasted ocean escapement should allow for moderate ocean and in-river fisheries while achieving the FMP $S_{MSY}$ conservation objective of 39,625 natural area spawners in the Hanford Reach, Yakima River, and areas above Priest Rapids Dam.

Snake River wild fall Chinook: The 2023 preliminary forecast for ocean escapement of ESA-listed Snake River wild fall Chinook is 13,300 adults.

## 2.2.2 Washington Coast Chinook

Washington Coast Chinook consist of spring, summer, and fall stocks from Willapa Bay through the Hoko River. Based on limited CWT analysis, these populations are harvested primarily in ocean fisheries off

British Columbia and Southeast Alaska, and to a lesser degree in Council-area fisheries off Washington and Oregon.

Washington Coast Chinook stocks are components of the FNMC Chinook complex, which is an exception to the ACL requirements of the MSA because it is managed under an international agreement (the PST); therefore, specification of ACLs is not necessary for stocks in the FNMC complex.

### *Predictor Description and Past Performance*

Council fisheries have negligible impacts on Washington Coast Chinook stocks and information to assess past performance is unavailable. However, abundance estimates are provided for Washington Coastal fall stocks in subsequent preseason fishery impact assessment reports prepared by the STT (e.g., Preseason Report III).

### *Stock Forecasts and Status*

The 2023 Willapa Bay natural fall Chinook terminal run size forecast is 2,833, which is below the FMP $S_{MSY}$ conservation objective of 3,393. The hatchery fall Chinook terminal run size forecast is 27,488.

The 2023 Grays Harbor spring Chinook terminal run size forecast is 1,232, which is below the FMP $S_{MSY}$ conservation objective of 1,400. The natural fall Chinook terminal run size forecast is 15,006, which is above the FMP $S_{MSY}$ conservation objective of 13,326. The fall hatchery terminal run size forecast is 5,922.

The 2023 Quinault River natural fall Chinook terminal run size forecast is 3,966. The fall hatchery terminal run size forecast is 7,612.

The 2023 Queets River spring Chinook terminal run size forecast is 383. The FMP $S_{MSY}$ conservation objective is 700. The natural fall Chinook terminal run size forecast is 4,269, which is above the FMP $S_{MSY}$ conservation objective of 2,500. The fall hatchery terminal run size forecast is 793.

The 2023 Hoh River natural spring/summer Chinook spawning escapement forecast is 1,045, which is above the FMP $S_{MSY}$ conservation objective of 900. The natural fall Chinook forecast is 2,599, which is above the FMP $S_{MSY}$ conservation objective of 1,200.

The 2023 Quillayute River hatchery spring Chinook ocean escapement forecast is 2,812. The natural summer Chinook forecast is 1,314, which is above the FMP $S_{MSY}$ conservation objective of 1,200 summer Chinook. The fall Chinook forecast is 9,946, which is above the FMP $S_{MSY}$ conservation objectives of 3,000 fall Chinook.

The 2023 Hoko River forecast is for an escapement without fishing of 2,808, which is above the FMP $S_{MSY}$ conservation objective of 850.

## 2.2.3 Puget Sound Chinook

Puget Sound Chinook stocks include all fall, summer, and spring stocks originating from U.S. tributaries in Puget Sound and the eastern Strait of Juan de Fuca (east of Salt Creek, inclusive). Puget Sound consists of numerous natural Chinook stocks of small to medium-sized populations and substantial hatchery production. The Puget Sound ESU was listed under the ESA as threatened in March 1999.

Council-area fishery impacts to Puget Sound Chinook stocks are generally very low, on the order of five percent or less. NMFS issued a biological opinion in 2004 concluding that Council-area fisheries were not likely to jeopardize listed Puget Sound Chinook and exempting these fisheries from the ESA section 9 take prohibition as long as they are consistent with the terms and conditions in the opinion's incidental take

statement. This opinion does not cover the state-managed Puget Sound fisheries. In recent years, the comanagers have developed annual fishery management plans for Puget Sound and NMFS has issued one-year biological opinions for these plans exempting them from ESA section 9 take prohibitions. These opinions take into account the combined impacts of ocean and Puget Sound fisheries. Puget Sound stocks contribute to fisheries off B.C., are present to a lesser degree off SEAK, and are impacted to a minor degree by Council-area ocean fisheries. Because Council-area fishery impacts to Puget Sound Chinook stocks are minor, ocean regulations are not generally used to manage these stocks.

### *Predictor Description*

Methodologies for estimates are described in the annual Puget Sound management reports (starting in 1993, reports are available by Puget Sound management unit, not by individual species). Forecasts for Puget Sound stocks generally assume production is dominated by age-4 adults. The STT has not undertaken a review of the methods employed by state and tribal staffs in preparing these abundance forecasts. Run-size expectations for various Puget Sound stock management units are listed in Table I-1.

### *Predictor Performance*

Performance of the preliminary inriver run size estimation methodology can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates. Table II-9 compares preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook.

### *Stock Forecasts and Status*

ACLs are undefined in the FMP for ESA-listed stocks like Puget Sound Chinook and are deferred to ESA consultation standards.

### *Spring Chinook*

Puget Sound Spring Chinook abundances remain depressed.

### *Summer/Fall Chinook*

The 2023 preliminary natural Chinook return forecast is 30,700 (includes supplemental hatchery forecasts) and the preliminary hatchery Chinook return forecast is 198,900. The 2022 preseason natural Chinook return forecast was 33,200 (includes supplemental hatchery forecasts) and the hatchery Chinook return forecast was 185,000.

Since ESA listing and development of the Resource Management Plan (RMP), fishery management for Puget Sound Chinook has changed from an escapement goal basis to the use of stock-specific exploitation rates and "critical abundance thresholds." This new approach is evaluated on an annual basis through the RMP.

## *2.3 STOCK STATUS DETERMINATION UPDATES*

Sacramento River fall Chinook and Klamath River fall Chinook were found to meet the criteria for being classified as overfished in the PFMC *Review of 2017 Ocean Salmon Fisheries*, released in February 2018. NMFS subsequently published an overfished designation for both stocks in June 2018, and rebuilding plans were developed for both and adopted by the Council in 2019. Queets River spring/summer Chinook were found to meet the criteria for being classified as overfished in the PFMC *Review of 2022 Ocean Salmon Fisheries*, released in February 2023.

Sacramento River fall Chinook was determined to be rebuilt in 2021. Based on the most recent three-year geometric mean escapement (2019-2021) published in the PFMC *Review of 2021 Ocean Salmon Fisheries*, Klamath River fall Chinook continues to meet the criteria for overfished status.

## 2.4 SELECTIVE FISHERY CONSIDERATIONS FOR CHINOOK

As the North of Falcon region has moved forward with mass marking of hatchery Chinook salmon stocks, the first mark-selective fishery for Chinook salmon in Council waters was implemented in June 2010 in the recreational fishery north of Cape Falcon. In 2011 and 2012, the mark-selective fishery in June was 8 and 15 days, respectively. In 2013 and 2014, the North of Falcon mark-selective recreational fishery started in mid-May in Neah Bay and La Push subareas, then opened in all areas in late May or June. In 2015, the mark selective Chinook quota was 10,000 fish in the mid-May to mid-June fishery. Since 2015, no mark-selective fisheries for Chinook in Council waters have occurred. For 2023 preseason planning, selective fishing options for non-Indian fisheries may be under consideration in the ocean area from Cape Falcon, Oregon to the U.S./Canada border. Observed mark rates in previous mark-selective fisheries north of Cape Falcon ranged from 53 to 71 percent. Similar mark rates are expected in this area for 2023.

TABLE II-1. Harvest and abundance indices for adult Sacramento River fall Chinook (SRFC) in thousands of fish. (Page 1 of 2)

| | SRFC Ocean Harvest South of Cape Falcon[a/] | | | | River | Spawning Escapement | | | Sacramento | Exploitation |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Troll | Sport | Non-Ret[b/] | Total | Harvest | Natural | Hatchery | Total | Index (SI)[c/] | Rate (%)[d/] |
| 1983 | 246.6 | 86.3 | 0.0 | 332.9 | 18.0 | 91.7 | 18.6 | 110.2 | 461.1 | 76 |
| 1984 | 266.2 | 87.0 | 0.0 | 353.1 | 25.9 | 120.2 | 38.7 | 159.0 | 538.1 | 70 |
| 1985 | 355.5 | 158.9 | 0.0 | 514.4 | 39.1 | 210.1 | 29.3 | 239.3 | 792.8 | 70 |
| 1986 | 619.0 | 137.5 | 0.0 | 756.4 | 39.2 | 218.3 | 21.8 | 240.1 | 1,035.7 | 77 |
| 1987 | 686.1 | 173.1 | 0.0 | 859.2 | 31.8 | 175.2 | 19.8 | 195.1 | 1,086.1 | 82 |
| 1988 | 1,163.2 | 188.3 | 0.0 | 1,351.5 | 37.1 | 200.7 | 26.8 | 227.5 | 1,616.1 | 86 |
| 1989 | 602.8 | 157.1 | 0.0 | 759.9 | 24.9 | 127.6 | 24.9 | 152.6 | 937.3 | 84 |
| 1990 | 507.3 | 150.4 | 0.0 | 657.8 | 17.2 | 83.3 | 21.7 | 105.1 | 780.0 | 87 |
| 1991 | 300.1 | 89.6 | 0.0 | 389.7 | 26.0 [e/] | 92.8 | 26.0 | 118.9 | 534.6 | 78 |
| 1992 | 233.3 | 69.4 | 0.0 | 302.8 | 13.3 [e/] | 59.9 | 21.7 | 81.5 | 397.6 | 79 |
| 1993 | 342.8 | 115.3 | 0.0 | 458.1 | 27.7 [e/] | 112.8 | 24.6 | 137.4 | 623.2 | 78 |
| 1994 | 303.5 | 168.8 | 0.0 | 472.3 | 28.9 [e/] | 135.0 | 30.6 | 165.6 | 666.7 | 75 |
| 1995 | 730.7 | 390.4 | 0.0 | 1,121.0 | 48.2 | 253.8 | 41.5 | 295.3 | 1,464.6 | 80 |
| 1996 | 426.8 | 157.0 | 0.0 | 583.8 | 49.2 | 269.1 | 32.5 | 301.6 | 934.7 | 68 |
| 1997 | 579.7 | 210.3 | 0.0 | 790.0 | 56.3 | 281.6 | 63.3 | 344.8 | 1,191.1 | 71 |
| 1998 | 292.3 | 114.0 | 0.0 | 406.3 | 69.8 [e/] | 176.0 | 69.9 | 245.9 | 722.1 | 66 |
| 1999 | 289.1 | 76.2 | 0.0 | 365.3 | 68.9 [e/] | 357.6 | 42.2 | 399.8 | 834.0 | 52 |
| 2000 | 421.8 | 152.8 | 0.0 | 574.6 | 59.5 [e/] | 370.0 | 47.6 | 417.5 | 1,051.6 | 60 |
| 2001 | 284.4 | 93.4 | 0.0 | 377.9 | 97.4 | 539.4 | 57.4 | 596.8 | 1,072.0 | 44 |
| 2002 | 447.7 | 184.0 | 0.0 | 631.7 | 89.2 [e/] | 684.2 | 85.6 | 769.9 | 1,490.8 | 48 |
| 2003 | 501.6 | 106.4 | 0.0 | 608.0 | 85.4 | 414.6 | 108.4 | 523.0 | 1,216.3 | 57 |
| 2004 | 621.8 | 212.6 | 0.0 | 834.5 | 46.8 | 206.2 | 80.7 | 286.9 | 1,168.2 | 75 |
| 2005 | 367.9 | 127.0 | 0.0 | 494.9 | 64.6 | 214.9 | 181.1 | 396.0 | 955.5 | 59 |
| 2006 | 149.9 | 107.7 | 0.0 | 257.7 | 44.9 | 196.5 | 78.5 | 275.0 | 577.6 | 52 |
| 2007 | 119.9 | 32.0 | 0.0 | 152.0 | 14.3 [e/] | 70.1 | 21.3 | 91.4 | 257.7 | 65 |
| 2008 | 3.2 | 0.9 | 0.0 | 4.1 | 0.1 [e/] | 47.3 | 18.0 | 65.4 | 69.6 | 6 |
| 2009 | 0.0 | 0.2 | 0.1 | 0.3 | 0.0 [e/] | 24.9 | 15.9 | 40.9 | 41.1 | 1 |
| 2010 | 11.2 | 11.4 | 0.3 | 22.8 | 2.7 [e/] | 91.1 | 33.2 | 124.3 | 149.8 | 17 |

TABLE II-1. Harvest and abundance indices for adult Sacramento River fall Chinook (SRFC) in thousands of fish. (Page 2 of 2)

| | SRFC Ocean Harvest South of Cape Falcon[a/] | | | | River | Spawning Escapement | | | Sacramento | Exploitation |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Troll | Sport | Non-Ret[b/] | Total | Harvest | Natural | Hatchery | Total | Index (SI)[c/] | Rate (%)[d/] |
| 2011 | 46.7 | 22.8 | 0.0 | 69.5 | 18.2 [e/] | 77.9 | 41.5 | 119.3 | 207.0 | 42 |
| 2012 | 183.1 | 93.4 | 0.3 | 276.7 | 65.8 [e/] | 166.2 | 119.2 | 285.4 | 627.9 | 55 |
| 2013 | 290.7 | 114.3 | 0.0 | 404.9 | 57.5 [e/] | 305.6 | 101.2 | 406.8 | 869.3 | 53 |
| 2014 | 240.6 | 62.4 | 0.0 | 303.0 | 35.7 [e/] | 168.7 | 43.8 | 212.5 | 551.2 | 61 |
| 2015 | 100.1 | 24.5 | 0.0 | 124.6 | 16.9 [e/] | 74.5 | 39.0 | 113.5 | 254.9 | 55 |
| 2016 | 62.9 | 28.9 | 0.0 | 91.8 | 23.9 [e/] | 56.3 | 33.4 | 89.7 | 205.3 | 56 |
| 2017 | 38.7 | 31.9 | 0.0 | 70.7 | 22.1 [e/] | 17.9 | 26.5 | 44.3 | 137.1 | 68 |
| 2018 | 53.7 | 45.0 | 0.0 | 98.6 | 16.3 [e/] | 71.7 | 33.8 | 105.5 | 220.4 | 52 |
| 2019 | 248.6 | 74.4 | 0.0 | 323.0 | 20.3 [e/] | 121.6 | 42.1 | 163.8 | 507.1 | 68 |
| 2020 | 154.9 | 44.6 | 0.0 | 199.5 | 14.9 [e/] | 100.2 | 37.9 | 138.1 | 352.5 | 61 |
| 2021 | 165.8 | 41.7 | 0.0 | 207.4 | 10.8 [e/] | 72.8 | 32.8 | 104.5 | 322.7 | 68 |
| 2022[f/] | 134.9 | 49.5 | 0.0 | 184.5 | 4.9 [e/] | 32.7 | 29.1 | 61.9 | 251.2 | 75 |

a/ Ocean harvest for the period September 1 (t-1) through August 31 (t).

b/ Mortalities estimated from non-retention ocean fisheries (e.g., coho-only fisheries, non-retention GSI sampling). In 2008, there were 37 estimated mortalities as a result of non-retention fisheries that have been rounded to 0 in this table.

c/ The SI is the sum of (1) SRFC ocean fishery harvest south of Cape Falcon between September 1 and August 31, (2) SRFC impacts from non-retention ocean fisheries when they occur, (3) the recreational harvest of SRFC in the Sacramento River Basin, and (4) the SRFC spawner escapement.

d/ Total ocean harvest, non-retention ocean fishery mortalities, and river harvest of SRFC as a percentage of the SI.

e/ Estimates derived from CDFW Sacramento River Basin angler survey. Estimates not marked with a footnote are inferred from escapement data and the mean river harvest rate estimate.

f/ Preliminary.

TABLE II-2. Sacramento River winter Chinook escapement, allowable age-3 impact rates, and management performance.

| | | 3-yr. | | Age-3 impact rate south of Point Arena, CA | | |
|---|---|---|---|---|---|---|
| | | Geometric Mean | Abundance | Maximum | Preseason | Postseason |
| Year | Escapement[a/] | Escapement[b/] | Forecast[c/] | Allowable (%)[d/] | Forecast (%) | Estimate (%) |
| 2000 | -- | -- | - | - | - | 21.4 |
| 2001 | 8,224 | -- | - | - | - | 23.3 |
| 2002 | 7,464 | -- | - | - | - | 21.8 |
| 2003 | 8,218 | -- | - | - | - | 10.3 |
| 2004 | 7,869 | 7,960 | - | - | - | 24.8 |
| 2005 | 15,839 | 7,844 | - | - | - | 17.2 |
| 2006 | 17,290 | 10,080 | - | - | - | 15.1 |
| 2007 | 2,541 | 12,917 | - | - | - | 17.8 |
| 2008 | 2,830 | 8,862 | - | - | - | 0.0 |
| 2009 | 4,537 | 4,991 | - | - | - | 0.0 |
| 2010 | 1,596 | 3,195 | - | - | - | e/ |
| 2011 | 824 | 2,737 | - | - | - | 28.3 |
| 2012 | 2,671 | 1,814 | - | 13.7 | 13.7 | 12.6 |
| 2013 | 6,084 | 1,520 | - | 12.9 | 12.9 | 18.8 |
| 2014 | 3,015 | 2,375 | - | 15.4 | 15.4 | 15.8 |
| 2015 | 3,439 | 3,659 | - | 19.0 | 17.5 | e/ |
| 2016 | 1,546 | 3,981 | - | 19.9 | 12.8 | 10.7 |
| 2017 | 975 | 2,521 | - | 15.8 | 12.2 | 17.6 |
| 2018 | 2,638 | 1,731 | 1,594 | 14.4 | 8.5 | 13.9 |
| 2019 | 8,129 | 1,584 | 1,924 | 15.7 | 14.8 | 10.0 |
| 2020 | 10,516 | 2,755 | 3,077 | 20.0 | 16.2 | 13.1 |
| 2021 | 6,038 | 5,421 | 9,063 | 20.0 | 14.7 | 19.3 [f/] |
| 2022 | NA | 8,596 | 5,971 | 20.0 | 15.2 | NA [g/] |
| 2023 | NA | 7,784 | 4,540 | 20.0 | NA | NA |

a/ Escapement includes jacks and adults spawning in natural areas and fish used for broodstock at Livingston Stone and Coleman National Fish hatcheries.

b/ Geometric mean of escapement for the three prior years (e.g., 2017 GM computed from 2014-2016 escapement).

c/ Abundance forecast is defined as the predicted age-3 escapement in the absence of fisheries.

d/ Allowable impact rates from 2012-2017 were determined by a control rule utilizing the three-year geometric mean of escapement. Beginning in 2018, allowable impact rates were determined by a new control rule utilizing the abundance forecast.

e/ Insufficient data for postseason estimate.

f/ Preliminary. Incomplete cohort data (age-4 escapement unavailable).

g/ Not estimated. Incomplete cohort data (age-3 and age-4 escapement unavailable).

TABLE II-3. Klamath River fall Chinook ocean abundance (thousands), harvest rate, and river run size estimates (thousands) by age. (Page 1 of 2).

| | Ocean Abundance Sept. 1 (t-1) | | | Annual Ocean Harvest Rate Sept. 1 (t-1) - Aug. 31 (t) | | Klamath Basin River Run (t) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year (t) | Age-3 | Age-4 | Total | Age-3 | Age-4 | Age-2 | Age-3 | Age-4 | Age-5 | Total Adults |
| 1981 | 493.2 | 57.0 | 550.2 | 0.21 | 0.53 | 28.2 | 64.1 | 14.4 | 1.8 | 80.3 |
| 1982 | 561.1 | 133.4 | 694.5 | 0.30 | 0.52 | 39.4 | 30.1 | 33.9 | 2.6 | 66.6 |
| 1983 | 313.3 | 114.2 | 427.5 | 0.19 | 0.60 | 3.8 | 35.9 | 20.7 | 0.9 | 57.5 |
| 1984 | 157.3 | 82.8 | 240.1 | 0.08 | 0.38 | 8.3 | 21.7 | 24.4 | 1.1 | 47.2 |
| 1985 | 374.8 | 56.9 | 431.7 | 0.11 | 0.24 | 69.4 | 32.9 | 25.7 | 5.8 | 64.4 |
| 1986 | 1,304.4 | 140.8 | 1,445.2 | 0.18 | 0.46 | 44.6 | 162.9 | 29.8 | 2.3 | 195.0 |
| 1987 | 781.1 | 341.9 | 1,123.0 | 0.16 | 0.43 | 19.1 | 89.7 | 112.6 | 6.8 | 209.1 |
| 1988 | 756.3 | 234.8 | 991.0 | 0.20 | 0.39 | 24.1 | 101.2 | 86.5 | 3.9 | 191.6 |
| 1989 | 369.8 | 177.2 | 547.1 | 0.15 | 0.36 | 9.1 | 50.4 | 69.6 | 4.3 | 124.3 |
| 1990 | 176.1 | 104.0 | 280.1 | 0.30 | 0.55 | 4.4 | 11.6 | 22.9 | 1.3 | 35.9 |
| 1991 | 69.4 | 37.2 | 106.6 | 0.03 | 0.18 | 1.8 | 10.0 | 21.6 | 1.1 | 32.7 |
| 1992 | 39.5 | 28.2 | 67.7 | 0.02 | 0.07 | 13.7 | 6.9 | 18.8 | 1.0 | 26.7 |
| 1993 | 168.5 | 15.0 | 183.5 | 0.05 | 0.16 | 7.6 | 48.3 | 8.2 | 0.7 | 57.2 |
| 1994 | 119.9 | 41.7 | 161.7 | 0.03 | 0.09 | 14.4 | 37.0 | 26.0 | 1.0 | 64.0 |
| 1995 | 787.3 | 28.7 | 816.0 | 0.04 | 0.14 | 22.8 | 201.9 | 18.3 | 2.6 | 222.8 |
| 1996 | 192.3 | 226.3 | 418.6 | 0.05 | 0.16 | 9.5 | 38.8 | 136.7 | 0.3 | 175.8 |
| 1997 | 140.2 | 62.8 | 203.0 | 0.01 | 0.06 | 8.0 | 35.0 | 44.2 | 4.6 | 83.7 |
| 1998 | 154.8 | 44.7 | 199.5 | 0.00 | 0.09 | 4.6 | 59.2 | 29.7 | 1.7 | 90.6 |
| 1999 | 129.1 | 30.5 | 159.5 | 0.02 | 0.09 | 19.2 | 29.2 | 20.5 | 1.3 | 51.0 |
| 2000 | 617.1 | 44.2 | 661.3 | 0.06 | 0.10 | 10.2 | 187.1 | 30.5 | 0.5 | 218.1 |
| 2001 | 356.1 | 133.8 | 489.9 | 0.03 | 0.09 | 11.3 | 99.1 | 88.2 | 0.1 | 187.3 |
| 2002 | 513.6 | 98.9 | 612.5 | 0.02 | 0.15 | 9.2 | 94.6 | 62.5 | 3.7 | 160.8 |
| 2003 | 401.1 | 192.2 | 593.3 | 0.08 | 0.21 | 3.8 | 94.3 | 96.8 | 0.9 | 191.9 |
| 2004 | 159.4 | 105.2 | 264.7 | 0.12 | 0.35 | 9.6 | 33.1 | 40.5 | 5.3 | 78.9 |
| 2005 | 190.0 | 38.1 | 228.1 | 0.02 | 0.20 | 2.3 | 43.8 | 17.5 | 3.9 | 65.2 |
| 2006 | 90.7 | 63.4 | 154.1 | 0.01 | 0.10 | 26.9 | 18.5 | 41.6 | 1.3 | 61.4 |
| 2007 | 376.9 | 33.7 | 410.6 | 0.06 | 0.21 | 1.7 | 113.7 | 16.8 | 1.6 | 132.1 |
| 2008 | 68.0 | 81.4 | 149.4 | 0.00 | 0.10 | 25.2 | 18.6 | 50.2 | 1.7 | 70.6 |
| 2009 | 240.8 | 21.1 | 261.9 | 0.00 | 0.00 | 11.9 | 78.6 | 16.4 | 5.6 | 100.6 |
| 2010 | 192.8 | 62.1 | 254.8 | 0.01 | 0.04 | 16.6 | 46.1 | 44.3 | 0.4 | 90.9 |

TABLE II-3. Klamath River fall Chinook ocean abundance (thousands), harvest rate, and river run size estimates (thousands) by age. (Page 2 of 2).

| | Ocean Abundance Sept. 1 (t-1) | | | Annual Ocean Harvest Rate Sept. 1 (t-1) - Aug. 31 (t) | | Klamath Basin River Run (t) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year (t) | Age-3 | Age-4 | Total | Age-3 | Age-4 | Age-2 | Age-3 | Age-4 | Age-5 | Total Adults |
| 2011 | 240.2 | 64.6 | 304.8 | 0.03 | 0.08 | 84.9 | 59.0 | 41.0 | 2.0 | 102.0 |
| 2012 | 799.4 | 74.3 | 873.7 | 0.03 | 0.08 | 21.4 | 243.9 | 49.3 | 2.1 | 295.3 |
| 2013 | 438.4 | 194.4 | 632.9 | 0.04 | 0.20 | 14.4 | 55.2 | 108.8 | 1.1 | 165.0 |
| 2014 | 216.5 | 180.7 | 397.2 | 0.03 | 0.17 | 22.3 | 57.8 | 98.7 | 3.9 | 160.4 |
| 2015 | 110.5 | 61.0 | 171.5 | 0.02 | 0.22 | 6.1 | 36.7 | 34.0 | 7.1 | 77.8 |
| 2016 | 32.7 | 24.8 | 57.4 | 0.01 | 0.09 | 2.8 | 8.6 | 15.5 | 0.5 | 24.6 |
| 2017 | 63.2 | 9.8 | 73.1 | 0.02 | 0.04 | 20.3 | 24.4 | 7.3 | 1.6 | 33.2 |
| 2018 | 193.7 | 10.5 | 204.2 | 0.06 | 0.24 | 10.9 | 85.5 | 5.6 | 0.0 | 91.1 |
| 2019 | 81.8 | 15.7 | 97.5 | 0.04 | 0.36 | 10.0 | 30.2 | 6.8 | 0.1 | 37.1 |
| 2020 | 128.4 | 14.2 | 142.7 | 0.01[a/] | 0.23 | 9.1 | 37.8 | 7.6 | 0.0 | 45.4 |
| 2021 | 142.7[a/] | 35.4 | 178.1 | 0.05[a/] | 0.28 | 10.4 | 36.3 | 17.7 | 0.2 | 54.2 |
| 2022 | 162.5[b/] | 38.4[a/] | 200.9 | ----[c/] | 0.38 | 7.6 | 32.2 | 14.3 | 0.2 | 46.7 |

a/ Preliminary: incomplete cohort data (age-5 unavailable).

b/ Preliminary: incomplete cohort data (age-4 and age-5 unavailable).

c/ Not estimated: incomplete cohort data (age-4 and age-5 unavailable).

TABLE II-4. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 1 of 4)

| Year (t) | Preseason Forecast[a/] Sept. 1 (t-1) | Postseason Estimate Sept. 1 (t-1) | Pre/Postseason |
|---|---|---|---|
| | **Age-3** | | |
| 1985 | 113,000 | 374,822 | 0.30 |
| 1986 | 426,000[b/] | 1,304,409 | 0.33 |
| 1987 | 511,800 | 781,122 | 0.66 |
| 1988 | 370,800 | 756,261 | 0.49 |
| 1989 | 450,600 | 369,828 | 1.22 |
| 1990 | 479,000 | 176,122 | 2.72 |
| 1991 | 176,200 | 69,424 | 2.54 |
| 1992 | 50,000 | 39,502 | 1.27 |
| 1993 | 294,400 | 168,473 | 1.75 |
| 1994 | 138,000 | 119,915 | 1.15 |
| 1995 | 269,000 | 787,309 | 0.34 |
| 1996 | 479,800 | 192,272 | 2.50 |
| 1997 | 224,600 | 140,153 | 1.60 |
| 1998 | 176,000 | 154,799 | 1.14 |
| 1999 | 84,800 | 129,066 | 0.66 |
| 2000 | 349,600 | 617,097 | 0.57 |
| 2001 | 187,200 | 356,128 | 0.53 |
| 2002 | 209,000 | 513,604 | 0.41 |
| 2003 | 171,300 | 401,112 | 0.43 |
| 2004 | 72,100 | 159,446 | 0.45 |
| 2005 | 185,700 | 189,977 | 0.98 |
| 2006 | 44,100 | 90,666 | 0.49 |
| 2007 | 515,400 | 376,940 | 1.37 |
| 2008 | 31,600 | 68,015 | 0.46 |
| 2009 | 474,900 | 240,787 | 1.97 |
| 2010 | 223,400 | 192,750 | 1.16 |
| 2011 | 304,600 | 240,222 | 1.27 |
| 2012 | 1,567,600 | 799,446 | 1.96 |
| 2013 | 390,700 | 438,443 | 0.89 |
| 2014 | 219,800 | 216,493 | 1.02 |
| 2015 | 342,200 | 110,506 | 3.10 |
| 2016 | 93,400 | 32,670 | 2.86 |
| 2017 | 42,000 | 63,235 | 0.66 |
| 2018 | 330,000 | 193,685 | 1.70 |
| 2019 | 167,500 | 81,818 | 2.05 |
| 2020 | 149,600 | 128,444 | 1.16 |
| 2021 | 135,600 | 142,717 | 0.95 |
| 2022[c/] | 155,000 | 162,466 | 0.95 |
| 2023 | 75,300 | -- | -- |

TABLE II-4. Comparisons of preseason forecasts and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 2 of 4)

| Year (t) | Preseason Forecast[a/] Sept. 1 (t-1) | Postseason Estimate Sept. 1 (t-1) | Pre/Postseason |
|---|---|---|---|
| | **Age-4** | | |
| 1985 | 56,900 | 56,908 | 1.00 |
| 1986 | 66,300 | 140,823 | 0.47 |
| 1987 | 206,100 | 341,875 | 0.60 |
| 1988 | 186,400 | 234,751 | 0.79 |
| 1989 | 215,500 | 177,245 | 1.22 |
| 1990 | 50,100 | 103,951 | 0.48 |
| 1991 | 44,600 | 37,171 | 1.20 |
| 1992 | 44,800 | 28,169 | 1.59 |
| 1993 | 39,100 | 15,037 | 2.60 |
| 1994 | 86,100 | 41,736 | 2.06 |
| 1995 | 47,000 | 28,726 | 1.64 |
| 1996 | 268,500 | 226,282 | 1.19 |
| 1997 | 53,900 | 62,820 | 0.86 |
| 1998 | 46,000 | 44,733 | 1.03 |
| 1999 | 78,800 | 30,456 | 2.59 |
| 2000 | 38,900 | 44,176 | 0.88 |
| 2001 | 247,000 | 133,801 | 1.85 |
| 2002 | 143,800 | 98,927 | 1.45 |
| 2003 | 132,400 | 192,180 | 0.69 |
| 2004 | 134,500 | 105,246 | 1.28 |
| 2005 | 48,900 | 38,079 | 1.28 |
| 2006 | 63,700 | 63,384 | 1.00 |
| 2007 | 26,100 | 33,650 | 0.78 |
| 2008 | 157,200 | 81,411 | 1.93 |
| 2009 | 25,200 | 21,131 | 1.19 |
| 2010 | 106,300 | 62,089 | 1.71 |
| 2011 | 61,600 | 64,570 | 0.95 |
| 2012 | 79,600 | 74,300 | 1.07 |
| 2013 | 331,200 | 194,407 | 1.70 |
| 2014 | 67,400 | 180,669 | 0.37 |
| 2015 | 71,100 | 60,979 | 1.17 |
| 2016 | 45,100 | 24,777 | 1.82 |
| 2017 | 10,600 | 9,821 | 1.08 |
| 2018 | 28,400 | 10,531 | 2.70 |
| 2019 | 106,100 | 15,660 | 6.78 |
| 2020 | 36,200 | 14,237 | 2.54 |
| 2021 | 45,100 | 35,419 | 1.27 |
| 2022[c/] | 43,200 | 38,427 | 1.12 |
| 2023 | 27,200 | | |

TABLE II-4. Comparisons of preseason forecasts and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 3 of 4)

| Year (t) | Preseason Forecast[a/] Sept. 1 (t-1) | Postseason Estimate Sept. 1 (t-1) | Pre/Postseason |
|---|---|---|---|
| | **Age-5** | | |
| 1985 | NA | 11,113 | NA |
| 1986 | NA | 6,376 | NA |
| 1987 | 5,300 | 19,414 | 0.27 |
| 1988 | 13,300 | 14,632 | 0.91 |
| 1989 | 10,100 | 9,612 | 1.05 |
| 1990 | 7,600 | 7,767 | 0.98 |
| 1991 | 1,500 | 2,774 | 0.54 |
| 1992 | 1,300 | 1,444 | 0.90 |
| 1993 | 1,100 | 1,759 | 0.63 |
| 1994 | 500 | 1,468 | 0.34 |
| 1995 | 2,000 | 3,805 | 0.53 |
| 1996 | 1,100 | 788 | 1.40 |
| 1997 | 7,900 | 9,004 | 0.88 |
| 1998 | 3,300 | 2,382 | 1.39 |
| 1999 | 2,000 | 2,106 | 0.95 |
| 2000 | 1,400 | 1,051 | 1.33 |
| 2001 | 1,300 | 258 | 5.04 |
| 2002 | 9,700 | 6,933 | 1.40 |
| 2003 | 6,500 | 1,915 | 3.39 |
| 2004 | 9,700 | 17,184 | 0.56 |
| 2005 | 5,200 | 6,859 | 0.76 |
| 2006 | 2,200 | 5,236 | 0.42 |
| 2007 | 4,700 | 2,911 | 1.61 |
| 2008 | 1,900 | 2,900 | 0.66 |
| 2009 | 5,600 | 7,059 | 0.79 |
| 2010 | 1,800 | 517 | 3.48 |
| 2011 | 5,000 | 2,753 | 1.82 |
| 2012 | 4,600 | 5,110 | 0.90 |
| 2013 | 5,700 | 3,945 | 1.44 |
| 2014 | 12,100 | 7,625 | 1.59 |
| 2015 | 10,400 | 13,283 | 0.78 |
| 2016 | 3,700 | 1,142 | 3.24 |
| 2017 | 1,700 | 2,024 | 0.84 |
| 2018 | 800 | 50 | 16.00 |
| 2019 | 600 | 220 | 2.73 |
| 2020 | 700 | 24 | 29.17 |
| 2021 | 800 | -- | -- |
| 2022[c/] | 1,900 | 533 | 3.56 |
| 2023 | 1,300 | -- | -- |

TABLE II-4. Comparisons of preseason forecasts and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 4 of 4)

| Year (t) | Preseason Forecast[a/] Sept. 1 (t-1) | Postseason Estimate Sept. 1 (t-1) | Pre/Postseason |
|---|---|---|---|
| | **Total Adults** | | |
| 1985 | 169,900[d/] | 442,843 | 0.38 |
| 1986 | 492,300[d/] | 1,451,608 | 0.34 |
| 1987 | 723,200 | 1,142,411 | 0.63 |
| 1988 | 570,500 | 1,005,644 | 0.57 |
| 1989 | 676,200 | 556,685 | 1.21 |
| 1990 | 536,700 | 287,840 | 1.86 |
| 1991 | 222,300 | 109,369 | 2.03 |
| 1992 | 96,100 | 69,115 | 1.39 |
| 1993 | 334,600 | 185,269 | 1.81 |
| 1994 | 224,600 | 163,119 | 1.38 |
| 1995 | 318,000 | 819,840 | 0.39 |
| 1996 | 749,400 | 419,342 | 1.79 |
| 1997 | 286,400 | 211,977 | 1.35 |
| 1998 | 225,300 | 201,914 | 1.12 |
| 1999 | 165,600 | 161,628 | 1.02 |
| 2000 | 389,900 | 662,324 | 0.59 |
| 2001 | 435,500 | 490,187 | 0.89 |
| 2002 | 362,500 | 619,464 | 0.59 |
| 2003 | 310,200 | 595,207 | 0.52 |
| 2004 | 216,300 | 281,876 | 0.77 |
| 2005 | 239,800 | 234,915 | 1.02 |
| 2006 | 110,000 | 159,286 | 0.69 |
| 2007 | 546,200 | 413,501 | 1.32 |
| 2008 | 190,700 | 152,326 | 1.25 |
| 2009 | 505,700 | 268,977 | 1.88 |
| 2010 | 331,500 | 255,356 | 1.30 |
| 2011 | 371,100 | 307,545 | 1.21 |
| 2012 | 1,651,800 | 878,856 | 1.88 |
| 2013 | 727,700 | 636,795 | 1.14 |
| 2014 | 299,300 | 404,787 | 0.74 |
| 2015 | 423,800 | 184,768 | 2.29 |
| 2016 | 142,200 | 58,589 | 2.43 |
| 2017 | 54,200 | 75,080 | 0.72 |
| 2018 | 359,200 | 204,266 | 1.76 |
| 2019 | 274,200 | 97,698 | 2.81 |
| 2020 | 186,600 | 142,705 | 1.31 |
| 2021 | 181,500 | 178,136 | 1.02 |
| 2022[c/] | 200,100 | 201,426 | 0.99 |
| 2023 | 103,800 | -- | -- |

a/ Original preseason forecasts for years 1985-2001 were for May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the May 1 (t) number by the assumed Sept. 1 (t-1) through May 1 (t) survival rate in those years: 0.5 age-3, 0.8 age-4, 0.8 age-5.

b/ A scalar of 0.75 was applied to the jack count to produce the forecast because, (1) most jacks returned to the Trinity River, and (2) the jack count was outside the database range.

c/ Postseason estimates are preliminary.

d/ Does not include age-5 adults.

TABLE II-5. Summary of management objectives and predictor performance for Klamath River fall Chinook.

| Average or Year (t) | Preseason Ocean Abundance Sept. 1 (t-1) Forecast[a/] | | Postseason Ocean Abundance Sept. 1 (t-1) Estimate | | Preseason Age-4 Harvest Rate Forecast[b/] | | Postseason Age-4 Harvest Rate Estimate[c/] | | Preseason Adult Harvest Forecast | | Postseason Adult Harvest Estimate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Age-3 | Age-4 | Age-3 | Age-4 | Ocean | River | Ocean | River | Ocean | River | Ocean | River |
| 1986-90 | 447,640 | 144,880 | 677,548 | 199,729 | 0.30 | 0.51 | 0.44 | 0.54 | 104,100 | 56,020 | 214,598 | 51,814 |
| 1991-95 | 185,520 | 52,320 | 236,925 | 30,168 | 0.09 | 0.28 | 0.13 | 0.34 | 12,980 | 14,460 | 13,095 | 13,667 |
| 1996-00 | 262,960 | 97,220 | 246,677 | 81,693 | 0.11 | 0.44 | 0.10 | 0.33 | 30,500 | 44,180 | 21,336 | 31,382 |
| 2001 | 187,200 | 247,000 | 356,128 | 133,801 | 0.14 | 0.61 | 0.09 | 0.29 | 45,600 | 105,300 | 21,747 | 50,780 |
| 2002 | 209,000 | 143,800 | 513,604 | 98,927 | 0.13 | 0.57 | 0.15 | 0.26 | 30,000 | 70,900 | 28,896 | 35,069 |
| 2003 | 171,300 | 132,400 | 401,112 | 192,180 | 0.16 | 0.50 | 0.21 | 0.28 | 30,600 | 52,200 | 70,995 | 39,715 |
| 2004 | 72,100 | 134,500 | 159,446 | 105,246 | 0.15 | 0.38 | 0.35 | 0.48 | 26,500 | 35,800 | 64,226 | 29,807 |
| 2005 | 185,700 | 48,900 | 189,977 | 38,079 | 0.08 | 0.16 | 0.20 | 0.19 | 7,100 | 9,600 | 12,807 | 10,001 |
| 2006 | 44,100 | 63,700 | 90,666 | 63,384 | 0.11 | 0.23 | 0.10 | 0.18 | 10,000 | 10,000 | 10,401 | 10,345 |
| 2007 | 515,400 | 26,100 | 376,940 | 33,650 | 0.16 | 0.63 | 0.21 | 0.56 | 30,200 | 51,400 | 30,275 | 33,884 |
| 2008 | 31,600 | 157,200 | 68,015 | 81,411 | 0.02 | 0.43 | 0.10 | 0.38 | 4,500 | 49,500 | 8,716 | 24,180 |
| 2009 | 474,900 | 25,200 | 240,787 | 21,131 | 0.00 | 0.57 | 0.00 | 0.40 | 100 | 61,700 | 53 | 34,040 |
| 2010 | 223,400 | 106,300 | 192,750 | 62,089 | 0.12 | 0.49 | 0.04 | 0.40 | 22,600 | 46,600 | 4,489 | 32,920 |
| 2011 | 304,600 | 61,600 | 240,222 | 64,570 | 0.16 | 0.54 | 0.08 | 0.34 | 26,900 | 42,700 | 12,011 | 30,502 |
| 2012 | 1,567,600 | 79,600 | 799,446 | 74,300 | 0.16 | 0.77 | 0.08 | 0.51 | 92,400 | 227,600 | 34,719 | 109,263 |
| 2013 | 390,700 | 331,200 | 438,443 | 194,407 | 0.16 | 0.62 | 0.20 | 0.51 | 74,800 | 154,800 | 59,511 | 82,835 |
| 2014 | 219,800 | 67,400 | 216,493 | 180,669 | 0.16 | 0.40 | 0.17 | 0.25 | 23,200 | 31,400 | 40,158 | 31,353 |
| 2015 | 342,200 | 71,100 | 110,506 | 60,979 | 0.16 | 0.59 | 0.22 | 0.47 | 29,400 | 57,700 | 20,019 | 35,890 |
| 2016 | 93,400 | 45,100 | 32,670 | 24,777 | 0.08 | 0.19 | 0.09 | 0.31 | 6,300 | 8,500 | 3,025 | 6,470 |
| 2017 | 42,000 | 10,600 | 63,236 | 9,821 | 0.03 | 0.06 | 0.04 | 0.08 | 700 | 900 | 1,783 | 1,951 |
| 2018 | 330,000 | 28,400 | 193,685 | 10,531 | 0.12 | 0.34 | 0.24 | 0.36 | 14,600 | 21,600 | 13,227 | 18,879 |
| 2019 | 167,500 | 106,100 | 81,818 | 15,660 | 0.16 | 0.47 | 0.36 | 0.38 | 24,800 | 40,000 | 8,677 | 11,365 |
| 2020 | 149,600 | 36,200 | 128,444 | 14,237 | 0.09 | 0.22 | 0.23 | 0.37 | 7,300 | 9,900 | 4,679 | 10,335 |
| 2021 | 135,600 | 45,100 | 142,717 | 35,419 | 0.11 | 0.19 | 0.28 | 0.22 | 6,900 | 9,400 | 17,453 | 10,487 |
| 2022[d/] | 155,000 | 43,200 | 162,466 | 38,427 | 0.11 | 0.22 | 0.38 | 0.31 | 7,300 | 11,600 | 24,973 | 10,496 |
| 2023[e/] | 75,300 | 27,200 | - | - | - | - | - | - | - | - | - | - |

a/ Original preseason forecasts for years 1990-2001 were for May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the May 1 (t) number by the assumed Sept. 1 (t-1) through May 1 (t) survival rate in those years: 0.5 age-3, 0.8 age-4, 0.8 age-5.

b/ Ocean harvest rate forecast is the fraction of the predicted ocean abundance expected to be harvested Sept. 1 (t-1) through August 31(t). River harvest rate forecast is the fraction of the predicted river run expected to be harvested in river fisheries. Original ocean harvest rate forecasts for year (t), 1990-2001, were based on a May 1 (t) ocean abundance denominator; converted to Sept. 1 (t-1) abundance denominator by multiplying former values by 0.8

c/ Ocean harvest rate is the fraction of the postseason ocean abundance harvested Sept. 1 (t-1) through August 31 (t). River harvest rate is the fraction of the river run harvested by river fisheries.

d/ Postseason estimates are preliminary for age-3.

e/ Postseason estimates are preliminary for age-3 and age-4.

TABLE II-6. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 1 of 4)

| Year (t) or Average | Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t)) KMZ Troll | KMZ Sport | KMZ Subtotal | North of KMZ | South of KMZ | Subtotal | Ocean Total | River Fisheries (t) Net | River Fisheries (t) Sport | River Fisheries (t) Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **HARVEST (numbers of fish)** | | | | | |
| **Age-3** | | | | | | | | | | |
| 1986-90 | 15,081 | 6,253 | 21,334 | 38,683 | 64,397 | 103,080 | 124,414 | 7,200 | 9,480 | 16,680 |
| 1991-95 | 8 | 689 | 698 | 3,055 | 5,086 | 8,141 | 8,839 | 4,980 | 2,189 | 7,170 |
| 1996-00 | 93 | 740 | 833 | 2,157 | 7,326 | 9,483 | 10,316 | 8,840 | 3,764 | 12,604 |
| 2001 | 113 | 105 | 218 | 2,749 | 6,082 | 8,831 | 9,049 | 17,885 | 7,294 | 25,179 |
| 2002 | 220 | 784 | 1,004 | 1,501 | 9,916 | 11,417 | 12,421 | 11,734 | 6,258 | 17,992 |
| 2003 | 176 | 669 | 845 | 1,921 | 27,586 | 29,507 | 30,352 | 6,996 | 5,061 | 12,057 |
| 2004 | 402 | 970 | 1,372 | 9,710 | 7,324 | 17,034 | 18,406 | 4,679 | 2,051 | 6,730 |
| 2005 | 0 | 568 | 568 | 619 | 2,381 | 3,000 | 3,568 | 4,394 | 1,641 | 6,035 |
| 2006 | 0 | 478 | 478 | 32 | 341 | 373 | 851 | 2,388 | 13 | 2,401 |
| 2007 | 770 | 8,101 | 8,871 | 4,194 | 9,366 | 13,560 | 22,431 | 17,543 | 5,734 | 23,277 |
| 2008 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,225 | 608 | 3,833 |
| 2009 | 0 | 53 | 53 | 0 | 0 | 0 | 53 | 19,820 | 4,715 | 24,535 |
| 2010 | 106 | 28 | 134 | 0 | 1,664 | 1,664 | 1,798 | 13,132 | 1,884 | 15,016 |
| 2011 | 334 | 1,119 | 1,453 | 48 | 4,829 | 4,877 | 6,330 | 13,286 | 2,630 | 15,916 |
| 2012 | 1,116 | 11,350 | 12,466 | 928 | 13,089 | 14,017 | 26,483 | 70,409 | 12,104 | 82,513 |
| 2013 | 390 | 5,574 | 5,964 | 868 | 12,053 | 12,921 | 18,885 | 18,996 | 7,675 | 26,671 |
| 2014 | 0 | 566 | 566 | 4,144 | 1,550 | 5,694 | 6,260 | 3,386 | 1,778 | 5,164 |
| 2015 | 48 | 293 | 341 | 652 | 1,597 | 2,249 | 2,590 | 10,604 | 4,509 | 15,113 |
| 2016 | 0 | 0 | 0 | 14 | 308 | 322 | 322 | 918 | 430 | 1,348 |
| 2017 | 0 | 0 | 0 | 115 | 1,263 | 1,378 | 1,378 | 1,261 | 23 | 1,284 |
| 2018 | 1,511 | 1,628 | 3,139 | 3,960 | 3,577 | 7,537 | 10,676 | 12,954 | 3,931 | 16,885 |
| 2019 | 157 | 371 | 528 | 181 | 2,391 | 2,572 | 3,100 | 4,089 | 4,656 | 8,745 |
| 2020 | 0 | 43 | 43 | 45 | 1,233 | 1,278 | 1,321 | 2,997 | 4,554 | 7,551 |
| 2021[a/] | 0 | 279 | 279 | 777 | 6,634 | 7,411 | 7,690 | 4,648 | 1,803 | 6,451 |
| 2022[a/] | 0 | 538 | 538 | 15 | 9,408 | 9,423 | 9,961 | 3,947 | 1,976 | 5,923 |

TABLE II-6. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 2 of 4)

| Year (t) or Average | Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t) ) KMZ Troll | KMZ Sport | KMZ Subtotal | North of KMZ | South of KMZ | Subtotal | Ocean Total | River Fisheries (t) Net | River Fisheries (t) Sport | River Fisheries (t) Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **HARVEST (numbers of fish)** | | | | | | | | | | |
| **Age-4** | | | | | | | | | | |
| 1986-90 | 10,282 | 4,358 | 14,640 | 38,450 | 31,653 | 70,103 | 84,743 | 28,720 | 5,500 | 34,220 |
| 1991-95 | 34 | 484 | 519 | 1,438 | 1,807 | 3,245 | 3,764 | 5,072 | 856 | 5,928 |
| 1996-00 | 200 | 1,002 | 1,202 | 3,833 | 5,093 | 8,926 | 10,128 | 15,076 | 2,948 | 18,023 |
| 2001 | 1,312 | 1,604 | 2,916 | 5,819 | 3,926 | 9,745 | 12,661 | 20,759 | 4,819 | 25,578 |
| 2002 | 1,938 | 827 | 2,765 | 2,811 | 9,416 | 12,227 | 14,992 | 11,929 | 4,063 | 15,992 |
| 2003 | 834 | 919 | 1,753 | 7,856 | 30,011 | 37,867 | 39,620 | 22,754 | 4,592 | 27,346 |
| 2004 | 1,429 | 1,234 | 2,663 | 11,645 | 22,132 | 33,777 | 36,440 | 17,623 | 1,751 | 19,374 |
| 2005 | 247 | 317 | 564 | 5,243 | 1,909 | 7,152 | 7,716 | 3,048 | 304 | 3,352 |
| 2006 | 196 | 725 | 921 | 4,192 | 985 | 5,177 | 6,098 | 7,569 | 42 | 7,611 |
| 2007 | 270 | 2,336 | 2,606 | 2,019 | 2,472 | 4,491 | 7,097 | 8,987 | 502 | 9,489 |
| 2008 | 6,378 | 1,105 | 7,483 | 581 | 113 | 694 | 8,177 | 17,891 | 1,260 | 19,151 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,831 | 706 | 6,537 |
| 2010 | 36 | 113 | 149 | 889 | 1,482 | 2,371 | 2,520 | 16,630 | 1,134 | 17,764 |
| 2011 | 417 | 175 | 592 | 1,045 | 3,780 | 4,825 | 5,417 | 12,587 | 1,466 | 14,053 |
| 2012 | 334 | 2,085 | 2,419 | 759 | 2,960 | 3,719 | 6,138 | 23,285 | 1,718 | 25,003 |
| 2013 | 4,277 | 6,236 | 10,513 | 4,054 | 23,994 | 28,048 | 38,561 | 43,671 | 12,043 | 55,714 |
| 2014 | 1,292 | 1,434 | 2,726 | 19,822 | 8,977 | 28,799 | 31,525 | 21,303 | 3,404 | 24,707 |
| 2015 | 273 | 197 | 470 | 5,763 | 7,127 | 12,890 | 13,360 | 13,160 | 2,692 | 15,852 |
| 2016 | 0 | 56 | 56 | 633 | 1,571 | 2,204 | 2,260 | 3,966 | 870 | 4,836 |
| 2017 | 0 | 124 | 124 | 98 | 183 | 281 | 405 | 503 | 43 | 546 |
| 2018 | 637 | 91 | 728 | 927 | 852 | 1,779 | 2,507 | 1,815 | 179 | 1,994 |
| 2019 | 670 | 47 | 717 | 1,075 | 3,779 | 4,854 | 5,571 | 1,860 | 716 | 2,576 |
| 2020 | 53 | 0 | 53 | 228 | 3,064 | 3,292 | 3,345 | 2,209 | 568 | 2,777 |
| 2021[a/] | 0 | 234 | 234 | 838 | 8,692 | 9,530 | 9,764 | 3,353 | 605 | 3,958 |
| 2022[a/] | 0 | 323 | 323 | 637 | 13,708 | 14,345 | 14,668 | 4,003 | 485 | 4,488 |

TABLE II-6. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 3 of 4)

| Year (t) or Average | Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t)) | | | | | | | River Fisheries (t) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | KMZ | | | North of KMZ | South of KMZ | Subtotal | Ocean Total | Net | Sport | Total |
| | Troll | Sport | Subtotal | | | | | | | |
| | | | | | **HARVEST RATE**[b/] | | | | | |
| **Age-3** | | | | | | | | | | |
| 1986-90 | 0.02 | 0.01 | 0.03 | 0.08 | 0.09 | 0.17 | 0.20 | 0.09 | 0.11 | 0.20 |
| 1991-95 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.03 | 0.03 | 0.13 | 0.06 | 0.18 |
| 1996-00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.03 | 0.14 | 0.07 | 0.21 |
| 2001 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.02 | 0.03 | 0.18 | 0.07 | 0.25 |
| 2002 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.02 | 0.12 | 0.07 | 0.19 |
| 2003 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.07 | 0.08 | 0.07 | 0.05 | 0.13 |
| 2004 | 0.00 | 0.01 | 0.01 | 0.06 | 0.05 | 0.11 | 0.12 | 0.14 | 0.06 | 0.20 |
| 2005 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.02 | 0.10 | 0.04 | 0.14 |
| 2006 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.13 | 0.00 | 0.13 |
| 2007 | 0.00 | 0.02 | 0.02 | 0.01 | 0.02 | 0.04 | 0.06 | 0.15 | 0.05 | 0.20 |
| 2008 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.03 | 0.21 |
| 2009 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.06 | 0.31 |
| 2010 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.28 | 0.04 | 0.33 |
| 2011 | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.02 | 0.03 | 0.23 | 0.04 | 0.27 |
| 2012 | 0.00 | 0.01 | 0.02 | 0.00 | 0.02 | 0.02 | 0.03 | 0.29 | 0.05 | 0.34 |
| 2013 | 0.00 | 0.01 | 0.01 | 0.00 | 0.03 | 0.03 | 0.04 | 0.34 | 0.14 | 0.48 |
| 2014 | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 | 0.03 | 0.03 | 0.06 | 0.03 | 0.09 |
| 2015 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.02 | 0.29 | 0.12 | 0.41 |
| 2016 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.11 | 0.05 | 0.16 |
| 2017 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.02 | 0.05 | 0.00 | 0.05 |
| 2018 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.04 | 0.06 | 0.15 | 0.05 | 0.20 |
| 2019 | 0.00 | 0.00 | 0.01 | 0.00 | 0.03 | 0.03 | 0.04 | 0.14 | 0.15 | 0.29 |
| 2020 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.08 | 0.12 | 0.20 |
| 2021[a/] | 0.00 | 0.00 | 0.00 | 0.01 | 0.05 | 0.05 | 0.05 | 0.13 | 0.05 | 0.18 |
| 2022[a/] | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.12 | 0.06 | 0.18 |

TABLE II-6. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 4 of 4)

| Year (t) or Average | Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t)) | | | | | | | River Fisheries (t) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | KMZ | | | North of KMZ | South of KMZ | Subtotal | Ocean Total | Net | Sport | Total |
| | Troll | Sport | Subtotal | | | | | | | |
| | | | | | **HARVEST RATE**[b/] | | | | | |
| **Age-4** | | | | | | | | | | |
| 1986-90 | 0.05 | 0.02 | 0.07 | 0.21 | 0.16 | 0.37 | 0.44 | 0.45 | 0.09 | 0.54 |
| 1991-95 | 0.00 | 0.01 | 0.01 | 0.05 | 0.06 | 0.11 | 0.13 | 0.29 | 0.04 | 0.34 |
| 1996-00 | 0.00 | 0.01 | 0.01 | 0.05 | 0.04 | 0.09 | 0.10 | 0.28 | 0.05 | 0.33 |
| 2001 | 0.01 | 0.01 | 0.02 | 0.04 | 0.03 | 0.07 | 0.09 | 0.24 | 0.05 | 0.29 |
| 2002 | 0.02 | 0.01 | 0.03 | 0.03 | 0.10 | 0.12 | 0.15 | 0.19 | 0.06 | 0.26 |
| 2003 | 0.00 | 0.00 | 0.01 | 0.04 | 0.16 | 0.20 | 0.21 | 0.24 | 0.05 | 0.28 |
| 2004 | 0.01 | 0.01 | 0.03 | 0.11 | 0.21 | 0.32 | 0.35 | 0.43 | 0.04 | 0.48 |
| 2005 | 0.01 | 0.01 | 0.01 | 0.14 | 0.05 | 0.19 | 0.20 | 0.17 | 0.02 | 0.19 |
| 2006 | 0.00 | 0.01 | 0.01 | 0.07 | 0.02 | 0.08 | 0.10 | 0.18 | 0.00 | 0.18 |
| 2007 | 0.01 | 0.07 | 0.08 | 0.06 | 0.07 | 0.13 | 0.21 | 0.53 | 0.03 | 0.56 |
| 2008 | 0.08 | 0.01 | 0.09 | 0.01 | 0.00 | 0.01 | 0.10 | 0.36 | 0.03 | 0.38 |
| 2009 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.04 | 0.40 |
| 2010 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.04 | 0.04 | 0.37 | 0.03 | 0.40 |
| 2011 | 0.01 | 0.00 | 0.01 | 0.02 | 0.06 | 0.07 | 0.08 | 0.31 | 0.04 | 0.34 |
| 2012 | 0.00 | 0.03 | 0.03 | 0.01 | 0.04 | 0.05 | 0.08 | 0.47 | 0.03 | 0.51 |
| 2013 | 0.02 | 0.03 | 0.05 | 0.02 | 0.12 | 0.14 | 0.20 | 0.40 | 0.11 | 0.51 |
| 2014 | 0.01 | 0.01 | 0.02 | 0.11 | 0.05 | 0.16 | 0.17 | 0.22 | 0.03 | 0.25 |
| 2015 | 0.00 | 0.00 | 0.01 | 0.09 | 0.12 | 0.21 | 0.22 | 0.39 | 0.08 | 0.47 |
| 2016 | 0.00 | 0.00 | 0.00 | 0.03 | 0.06 | 0.09 | 0.09 | 0.26 | 0.06 | 0.31 |
| 2017 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.03 | 0.04 | 0.07 | 0.01 | 0.08 |
| 2018 | 0.06 | 0.01 | 0.07 | 0.09 | 0.08 | 0.17 | 0.24 | 0.33 | 0.03 | 0.36 |
| 2019 | 0.04 | 0.00 | 0.05 | 0.07 | 0.24 | 0.31 | 0.36 | 0.27 | 0.10 | 0.38 |
| 2020 | 0.00 | 0.00 | 0.00 | 0.02 | 0.22 | 0.23 | 0.23 | 0.29 | 0.07 | 0.37 |
| 2021 | 0.00 | 0.01 | 0.01 | 0.02 | 0.25 | 0.27 | 0.28 | 0.19 | 0.03 | 0.22 |
| 2022[a/] | 0.00 | 0.01 | 0.01 | 0.02 | 0.36 | 0.37 | 0.38 | 0.28 | 0.03 | 0.31 |

a/ Preliminary (incomplete cohort).

b/ Ocean harvest rates are the fraction of Sept. 1 (t-1) ocean abundance harvested in these fisheries. River harvest rates are the fraction of the river run (t) harvested in these fisheries.

TABLE II-7. Rogue River fall Chinook inriver run and ocean population indices.

| Return | Inriver Run Index in Thousands of Fish[a/] | | | | | Ocean Harvest Rate by Age[b/] | | Rogue Ocean Population Index (ROPI) in Thousands of Fish[c/d/] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Age-2 | Age-3 | Age-4 | Age-5-6 | Total[d/] | Age-3 | Age-4-6 | Age-3 | Age-4 | Age-5-6 | Total |
| 1977-80 | 1.0 | 2.3 | 2.2 | 0.2 | 5.7 | 0.23 | 0.55 | 14.1 | 6.5 | 0.5 | 21.1 |
| 1981-85 | 21.4 | 17.6 | 22.9 | 2.3 | 64.1 | 0.18 | 0.45 | 197.5 | 60.0 | 16.6 | 274.1 |
| 1986-90 | 30.8 | 47.2 | 37.5 | 4.5 | 120.0 | 0.20 | 0.44 | 485.0 | 112.0 | 30.3 | 627.2 |
| 1991-95 | 16.7 | 28.9 | 17.2 | 3.5 | 66.4 | 0.03 | 0.13 | 165.1 | 51.2 | 11.8 | 228.1 |
| 1996-00 | 15.1 | 31.2 | 18.2 | 4.6 | 69.1 | 0.03 | 0.10 | 199.1 | 66.6 | 13.6 | 279.3 |
| 2001 | 27.9 | 29.5 | 33.9 | 16.6 | 107.9 | 0.03 | 0.09 | 164.8 | 146.2 | 18.6 | 329.6 |
| 2002 | 43.8 | 64.1 | 63.1 | 30.6 | 201.6 | 0.02 | 0.15 | 337.9 | 70.0 | 28.4 | 436.3 |
| 2003 | 20.1 | 66.9 | 99.0 | 47.0 | 233.0 | 0.08 | 0.21 | 530.4 | 151.9 | 52.2 | 734.5 |
| 2004 | 20.3 | 30.6 | 69.5 | 35.4 | 155.8 | 0.12 | 0.34 | 243.3 | 158.4 | 82.5 | 484.2 |
| 2005[f/] | 5.0 | 17.7 | 28.7 | 11.6 | 63.0 | 0.02 | 0.20 | 245.2 | 72.6 | 58.2 | 376.0 |
| 2006 | 7.4 | 11.6 | 19.6 | 7.1 | 45.7 | 0.01 | 0.10 | 60.4 | 42.1 | 23.5 | 126.0 |
| 2007 | 3.4 | 15.8 | 16.6 | 12.7 | 48.5 | 0.06 | 0.21 | 89.5 | 27.5 | 15.8 | 132.8 |
| 2008 | 16.2 | 7.6 | 14.1 | 4.2 | 42.1 | 0.00 | 0.10 | 41.3 | 37.6 | 15.4 | 94.3 |
| 2009 | 15.2 | 34.3 | 28.0 | 4.5 | 82.0 | 0.00 | 0.00 | 195.9 | 18.0 | 11.4 | 225.3 |
| 2010 | 15.1 | 23.6 | 26.5 | 2.7 | 67.9 | 0.01 | 0.04 | 183.4 | 81.3 | 21.5 | 286.2 |
| 2011 | 31.9 | 25.1 | 41.1 | 5.5 | 103.6 | 0.03 | 0.08 | 183.2 | 56.0 | 19.9 | 259.1 |
| 2012 | 11.0 | 39.9 | 28.0 | 5.3 | 84.2 | 0.03 | 0.08 | 385.6 | 59.4 | 31.2 | 476.2 |
| 2013 | 24.3 | 17.0 | 66.1 | 3.1 | 110.5 | 0.04 | 0.20 | 133.4 | 94.5 | 21.7 | 249.6 |
| 2014 | 12.5 | 20.5 | 29.2 | 6.7 | 68.9 | 0.03 | 0.17 | 295.5 | 40.5 | 49.0 | 385.0 |
| 2015 | 8.5 | 6.8 | 23.1 | 3.0 | 41.4 | 0.02 | 0.22 | 151.5 | 48.5 | 22.8 | 222.8 |
| 2016 | 17.7 | 8.1 | 17.7 | 2.9 | 46.4 | 0.01 | 0.09 | 102.6 | 16.2 | 17.6 | 136.4 |
| 2017 | 25.0 | 58.6 | 24.4 | 12.7 | 120.7 | 0.02 | 0.04 | 214.0 | 19.2 | 13.6 | 246.8 |
| 2018 | 23.9 | 27.7 | 11.4 | 0.4 | 63.4 | 0.06 | 0.24 | 303.0 | 138.8 | 21.0 | 462.8 |
| 2019 | 18.0 | 14.8 | 6.2 | 0.1 | 39.1 | 0.04 | 0.36 | 305.4 | 69.2 | 8.9 | 383.5 |
| 2020 | 17.5 | 24.1 | 8.0 | 0.1 | 49.6 | 0.01 [e/] | 0.23 | 217.2 | 35.1 | 4.6 | 256.9 |
| 2021 | 14.0 | 22.5 | 27.0 | 2.0 | 65.5 | 0.05 [e/] | 0.28 | 211.2 | 57.1 | 5.8 | 274.1 |
| 2022 | 15.4 | 11.3 | 7.4 | 0.9 | 35.0 | - | 0.4 | 173.4 | 53.5 | 20.0 | 246.9 |
| 2023 | NA | NA | NA | NA | NA | - | - | 185.8 [f/] | 26.9 [f/] | 5.6 [f/] | 218.3 [f/] |

a/ Huntley Park passage estimate and estuary harvest. Age composition from Huntley Park scale analysis.

b/ Exploitation rates since 1981 are based on Klamath River fall Chinook cohort analysis.

c/ Based on cohort reconstruction methods. Index values predicted from regression equations; postseason estimates are not available.

d/ Rogue ocean abundances initially reconstructed to May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the May 1 (t) number by the assumed Sept. 1 (t-1) through May 1 (t) survival rate: 0.5 age-3, 0.8 age-4, 0.8 age-5, 0.8 age-6.

e/ Preliminary, complete cohort not available.

f/ Preseason forecast.

TABLE II-8. Predicted and postseason returns of Columbia River adult summer and fall Chinook in thousands of fish. (Page 1 of 3)

| Year or Average | March Preseason Forecast[a/] | April STT Modeled Forecast[b/] | Postseason Return | March Pre/Postseason | April Pre/Postseason |
|---|---|---|---|---|---|
| | | | **URB** | | |
| 1984-85 | 124.6 | 126.1 | 163.9 | 0.75 | 0.76 |
| 1986-90 | 306.8 | 305.5 | 291.4 | 1.02 | 1.02 |
| 1991-95 | 86.2 | 91.5 | 105.3 | 0.83 | 0.87 |
| 1996-00 | 144.9 | 140.9 | 153.8 | 0.94 | 0.92 |
| 2001-05 | 266.6 | 260.3 | 303.9 | 0.88 | 0.87 |
| 2006 | 253.9 | 249.1 | 230.4 | 1.10 | 1.08 |
| 2007 | 182.4 | 185.2 | 112.6 | 1.62 | 1.64 |
| 2008 | 162.5 | 165.9 | 196.9 | 0.83 | 0.84 |
| 2009 | 259.9 | 269.8 | 212.0 | 1.23 | 1.27 |
| 2010 | 310.8 | 319.1 | 324.9 | 0.96 | 0.98 |
| 2011 | 398.2 | 399.5 | 324.1 | 1.23 | 1.23 |
| 2012 | 353.5 | 353.0 | 298.1 | 1.19 | 1.18 |
| 2013 | 432.5 | 434.7 | 784.1 | 0.55 | 0.55 |
| 2014 | 973.3 | 919.4 | 684.2 | 1.42 | 1.34 |
| 2015 | 500.3 | 516.2 | 795.9 | 0.63 | 0.65 |
| 2016 | 589.0 | 579.4 | 406.6 | 1.45 | 1.42 |
| 2017 | 260.0 | 275.1 | 297.1 | 0.88 | 0.93 |
| 2018 | 200.1 | 205.8 | 149.0 | 1.34 | 1.38 |
| 2019 | 158.4 | 162.6 | 212.2 | 0.75 | 0.77 |
| 2020 | 233.4 | 227.0 | 299.3 | 0.78 | 0.76 |
| 2021 | 354.2 | 349.2 | 239.9 | 1.48 | 1.46 |
| 2022[c/] | 230.4 | 229.6 | 254.9 | 0.91 | 0.90 |
| 2023 | 272.4 | - | - | - | - |
| | | | **LRW** | | |
| 1984-85 | 14.8 | NA | 13.3 | 1.12 | NA |
| 1986-90 | 27.8 | 30.8 | 32.6 | 0.86 | 0.95 |
| 1991-95 | 13.9 | 13.2 | 14.8 | 0.99 | 0.93 |
| 1996-00 | 6.1 | 5.5 | 9.5 | 0.69 | 0.62 |
| 2001-05 | 20.9 | 21.2 | 21.1 | 1.01 | 1.03 |
| 2006 | 16.6 | 16.6 | 18.1 | 0.92 | 0.92 |
| 2007 | 10.1 | 10.0 | 4.3 | 2.35 | 2.33 |
| 2008 | 3.8 | 3.8 | 7.1 | 0.54 | 0.54 |
| 2009 | 8.5 | 8.6 | 7.5 | 1.13 | 1.15 |
| 2010 | 9.7 | 10.0 | 10.9 | 0.89 | 0.92 |
| 2011 | 12.5 | 13.1 | 15.2 | 0.82 | 0.86 |
| 2012 | 16.2 | 16.2 | 13.9 | 1.17 | 1.17 |
| 2013 | 14.2 | 14.3 | 25.8 | 0.55 | 0.55 |
| 2014 | 34.2 | 33.4 | 25.8 | 1.33 | 1.29 |
| 2015 | 18.9 | 19.4 | 32.4 | 0.58 | 0.60 |
| 2016 | 22.2 | 22.4 | 13.0 | 1.71 | 1.72 |
| 2017 | 12.5 | 13.6 | 7.8 | 1.60 | 1.74 |
| 2018 | 7.6 | 7.9 | 8.3 | 0.92 | 0.95 |
| 2019 | 13.7 | 14.1 | 16.6 | 0.83 | 0.85 |
| 2020 | 19.7 | 19.2 | 35.4 | 0.56 | 0.54 |
| 2021 | 20.0 | 20.4 | 16.9 | 1.18 | 1.21 |
| 2022[c/] | 10.8 | 10.9 | 9.4 | 1.16 | 1.17 |
| 2023 | 8.6 | - | - | - | - |

TABLE II-8. Predicted and postseason returns of Columbia River adult summer and fall Chinook in thousands of fish.
(Page 2 of 3)

| Year | March Preseason Forecast[a/] | April STT Modeled Forecast[b/] | Postseason Return | March Pre/Postseason | April Pre/Postseason |
|---|---|---|---|---|---|
| | | | **LRH** | | |
| 1984-85 | 76.0 | 87.9 | 106.7 | 0.71 | 0.83 |
| 1986-90 | 209.8 | 204.2 | 234.9 | 0.91 | 0.88 |
| 1991-95 | 67.2 | 72.2 | 55.5 | 1.18 | 1.28 |
| 1996-00 | 33.9 | 40.8 | 49.0 | 0.72 | 0.86 |
| 2001-05 | 87.4 | 87.6 | 118.6 | 0.73 | 0.73 |
| 2006 | 55.8 | 57.5 | 58.3 | 0.96 | 0.99 |
| 2007 | 54.9 | 54.4 | 32.7 | 1.68 | 1.66 |
| 2008 | 59.0 | 55.9 | 60.3 | 0.98 | 0.93 |
| 2009 | 88.8 | 88.2 | 76.7 | 1.16 | 1.15 |
| 2010 | 90.6 | 85.6 | 103.0 | 0.88 | 0.83 |
| 2011 | 133.5 | 128.9 | 109.0 | 1.22 | 1.18 |
| 2012 | 127.0 | 128.4 | 84.8 | 1.50 | 1.51 |
| 2013 | 88.0 | 87.4 | 103.2 | 0.85 | 0.85 |
| 2014 | 110.0 | 100.7 | 101.8 | 1.08 | 0.99 |
| 2015 | 94.9 | 96.8 | 128.7 | 0.74 | 0.75 |
| 2016 | 133.7 | 142.5 | 81.9 | 1.63 | 1.74 |
| 2017 | 92.4 | 98.8 | 64.6 | 1.43 | 1.53 |
| 2018 | 62.4 | 63.9 | 50.4 | 1.24 | 1.27 |
| 2019 | 54.5 | 55.1 | 48.9 | 1.11 | 1.13 |
| 2020 | 51.0 | 50.0 | 77.9 | 0.65 | 0.64 |
| 2021 | 73.1 | 73.8 | 74.7 | 0.98 | 0.99 |
| 2022[c/] | 73.0 | 73.6 | 87.5 | 0.83 | 0.84 |
| 2023 | 77.1 | - | - | - | - |
| | | | **SCH** | | |
| 1984-85 | 28.1 | 32.1 | 40.4 | 0.75 | 0.85 |
| 1986-90 | 17.7 | 15.6 | 16.7 | 1.01 | 0.92 |
| 1991-95 | 31.0 | 34.5 | 30.2 | 1.05 | 1.18 |
| 1996-00 | 30.3 | 32.6 | 30.3 | 0.94 | 1.05 |
| 2001-05 | 110.0 | 113.1 | 148.5 | 0.76 | 0.78 |
| 2006 | 50.0 | 51.8 | 27.9 | 1.79 | 1.86 |
| 2007 | 21.8 | 21.3 | 14.5 | 1.50 | 1.47 |
| 2008 | 87.2 | 86.2 | 93.8 | 0.93 | 0.92 |
| 2009 | 59.3 | 56.5 | 49.0 | 1.21 | 1.15 |
| 2010 | 169.0 | 162.9 | 128.6 | 1.31 | 1.27 |
| 2011 | 116.4 | 116.7 | 70.5 | 1.65 | 1.66 |
| 2012 | 63.8 | 60.0 | 56.9 | 1.12 | 1.05 |
| 2013 | 38.0 | 36.7 | 86.7 | 0.44 | 0.42 |
| 2014 | 115.1 | 103.3 | 127.0 | 0.91 | 0.81 |
| 2015 | 160.5 | 163.9 | 166.4 | 0.96 | 0.98 |
| 2016 | 89.5 | 100.7 | 41.4 | 2.16 | 2.43 |
| 2017 | 158.4 | 164.4 | 48.1 | 3.29 | 3.42 |
| 2018 | 50.1 | 51.4 | 28.9 | 1.73 | 1.78 |
| 2019 | 46.0 | 48.4 | 29.0 | 1.59 | 1.67 |
| 2020 | 46.2 | 45.5 | 52.3 | 0.88 | 0.87 |
| 2021 | 46.8 | 47.3 | 73.7 | 0.64 | 0.64 |
| 2022[c/] | 91.2 | 92.2 | 258.3 | 0.35 | 0.36 |
| 2023 | 136.1 | - | - | - | - |

TABLE II-8. Predicted and postseason returns of Columbia River adult summer and fall Chinook in thousands of fish.
(Page 3 of 3)

| Year | March Preseason Forecast[a/] | April STT Modeled Forecast[b/] | Postseason Return | March Pre/Postseason | April Pre/Postseason |
|---|---|---|---|---|---|
| | | | **MCB** | | |
| 1991-95 | 34.6 | 35.6 | 32.4 | 1.08 | 1.10 |
| 1996-00 | 49.9 | 47.9 | 48.6 | 1.07 | 1.04 |
| 2001-05 | 84.9 | 82.0 | 110.1 | 0.77 | 0.75 |
| 2006 | 88.3 | 86.6 | 80.4 | 1.10 | 1.08 |
| 2007 | 68.0 | 69.1 | 46.9 | 1.45 | 1.47 |
| 2008 | 54.0 | 55.1 | 75.5 | 0.72 | 0.73 |
| 2009 | 94.4 | 97.9 | 73.1 | 1.29 | 1.34 |
| 2010 | 79.0 | 74.6 | 79.0 | 1.00 | 0.94 |
| 2011 | 100.0 | 100.4 | 85.4 | 1.17 | 1.18 |
| 2012 | 90.8 | 90.7 | 58.7 | 1.55 | 1.55 |
| 2013 | 105.2 | 96.3 | 243.4 | 0.43 | 0.40 |
| 2014 | 360.1 | 340.2 | 203.8 | 1.77 | 1.67 |
| 2015 | 113.3 | 116.9 | 170.6 | 0.66 | 0.69 |
| 2016 | 101.0 | 99.4 | 88.3 | 1.14 | 1.13 |
| 2017 | 45.6 | 48.3 | 47.4 | 0.96 | 1.02 |
| 2018 | 36.4 | 41.2 | 36.0 | 1.01 | 1.14 |
| 2019 | 56.7 | 66.4 | 58.1 | 0.98 | 1.14 |
| 2020 | 71.8 | 77.5 | 101.9 | 0.70 | 0.76 |
| 2021 | 77.4 | 85.0 | 66.0 | 1.17 | 1.29 |
| 2022[c/] | 70.2 | 78.6 | 64.6 | 1.15 | 1.29 |
| 2023 | 48.3 | - | - | - | - |
| | | | **SUMMER** | | |
| 2008 | 52.0 | | 55.5 | 0.94 | |
| 2009 | 70.7 | | 53.9 | 1.31 | |
| 2010 | 88.8 | | 72.3 | 1.23 | |
| 2011 | 91.1 | | 80.6 | 1.13 | |
| 2012 | 91.2 | 92.6 | 58.3 | 1.56 | 1.59 |
| 2013 | 73.5 | 78.5 | 67.6 | 1.09 | 1.16 |
| 2014 | 67.5 | 64.7 | 78.3 | 0.86 | 0.83 |
| 2015 | 73.0 | 100.1 | 126.9 | 0.58 | 0.79 |
| 2016 | 93.3 | 95.6 | 91.0 | 1.03 | 1.05 |
| 2017 | 63.1 | 64.8 | 68.2 | 0.93 | 0.95 |
| 2018 | 67.3 | 70.5 | 42.1 | 1.60 | 1.67 |
| 2019 | 35.9 | 36.3 | 34.6 | 1.04 | 1.05 |
| 2020 | 38.3 | 38.0 | 65.5 | 0.58 | 0.58 |
| 2021 | 77.6 | 78.8 | 56.8 | 1.37 | 1.39 |
| 2022[c/] | 57.5 | 56.3 | 78.5 | 0.73 | 0.72 |
| 2023 | 84.8 | - | - | - | - |

a/ March preseason forecasts are ocean escapements based on terminal run size and stock-specific cohort relationships affected by the historical "normal" ocean fisheries, generally betw een 1979 and the most recent complete broods.
b/ STT-modeled forecasts adjust March preseason forecasts for Council-adopted ocean regulations each year, and should provide a more accurate estimate of expected ocean escapement.
c/ Postseason estimates are preliminary.

TABLE II-9. Preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 1 of 3)

| Year or Average | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Nooksack-Samish Hatchery and Natural** | | | **East Sound Bay Hatchery** | | | **Skagit [b/] Hatchery** | | | **Skagit Natural** | | |
| 1993-95 | 45.2 | 27.9 | 1.63 | 3.3 | 1.6 | 15.40 | 1.3 | 3.4 | 0.47 | 9.1 | 7.3 | 1.33 |
| 1996-00 | 27.0 | 36.2 | 0.75 | 2.1 | 0.5 | 9.58 | 0.2 | 0.3 | 0.38 | 7.0 | 10.9 | 0.81 |
| 2001 | 34.9 | 66.5 | 0.52 | 1.6 | 0.9 | 1.85 | 0.0 | 0.2 | 0.00 | 9.1 | 14.0 | 0.65 |
| 2002 | 52.8 | 56.5 | 0.93 | 1.6 | 0.9 | 1.87 | 0.0 | 0.1 | 0.00 | 13.8 | 19.9 | 0.69 |
| 2003 | 45.8 | 29.9 | 1.53 | 1.6 | 0.2 | 7.51 | 0.0 | 0.3 | 0.00 | 13.7 | 10.1 | 1.36 |
| 2004 | 34.2 | 17.1 | 2.00 | 0.8 | 0.0 | 400.00 | 0.5 | 0.2 | 2.16 | 20.3 | 24.1 | 0.84 |
| 2005 | 19.5 | 16.6 | 1.17 | 0.4 | 0.1 | 7.69 | 0.7 | 0.4 | 1.88 | 23.4 | 23.4 | 1.00 |
| 2006 | 16.9 | 31.9 | 0.53 | 0.4 | 0.0 | 26.67 | 0.6 | 0.4 | 1.51 | 24.1 | 22.5 | 1.07 |
| 2007 | 18.8 | 26.6 | 0.71 | 0.4 | 0.0 | - | 1.1 | 0.4 | 2.59 | 15.0 | 12.9 | 1.16 |
| 2008 | 35.3 | 29.1 | 1.21 | 0.8 | 0.0 | - | 0.7 | 0.2 | 3.32 | 23.8 | 15.0 | 1.59 |
| 2009 | 23.0 | 20.9 | 1.10 | 0.1 | 0.0 | 4.76 | 0.6 | 0.1 | 4.48 | 23.4 | 12.1 | 1.93 |
| 2010 | 30.3 | 36.3 | 0.84 | 2.3 | 0.7 | 3.19 | 0.9 | 0.1 | 10.59 | 13.0 | 9.7 | 1.34 |
| 2011 | 37.5 | 33.5 | 1.12 | 0.4 | 0.7 | 0.57 | 1.5 | 0.1 | 13.51 | 14.3 | 9.2 | 1.55 |
| 2012 | 44.0 | 33.7 | 1.30 | 0.4 | 1.6 | 0.25 | 1.3 | 0.1 | 13.83 | 8.3 | 15.8 | 0.53 |
| 2013 | 47.2 | 32.9 | 1.43 | 2.0 | 1.1 | 1.79 | 0.3 | 0.1 | 3.45 | 12.9 | 13.0 | 0.99 |
| 2014 | 43.9 | 25.7 | 1.71 | 1.2 | 0.4 | 3.23 | 0.3 | 0.1 | 2.78 | 18.0 | 12.0 | 1.50 |
| 2015 | 38.6 | 18.8 | 2.06 | 1.2 | 0.9 | 1.39 | 0.6 | 0.1 | 5.94 | 11.8 | 14.7 | 0.80 |
| 2016 | 27.9 | 15.9 | 1.76 | 0.7 | 0.7 | 1.05 | 0.4 | 0.1 | 4.49 | 15.1 | 21.1 | 0.72 |
| 2017 | 21.2 | 18.9 | 1.12 | 0.8 | 0.5 | 1.70 | 0.4 | 0.1 | 3.96 | 15.8 | 14.0 | 1.13 |
| 2018 | 24.6 | 17.2 | 1.43 | 0.7 | 0.0 | 63.64 | 0.3 | 0.1 | 3.09 | 13.3 | 12.3 | 1.09 |
| 2019 | 21.3 | 14.2 | 1.51 | 0.3 | 0.0 | - | 0.3 | 0.1 | 3.09 | 13.6 | 13.1 | 1.04 |
| 2020 | 18.2 | 14.7 | 1.24 | 0.3 | 0.0 | - | 0.5 | 0.1 | 5.27 | 12.9 | 13.3 | 0.97 |
| 2021[c/] | 18.9 | 27.9 | 0.68 | 0.6 | 0.0 | 612.00 | 0.5 | 0.1 | 3.80 | 10.5 | 8.5 | 1.23 |
| 2022 | 28.1 | - | - | 0.4 | - | - | 0.5 | - | - | 12.5 | - | - |
| 2023 | 41.2 | - | - | 0.2 | - | - | 0.5 | - | - | 12.2 | - | - |

TABLE II-9. Preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 2 of 3)

| Year or Average | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Stillaguamish [d/] Natural** | | | **Snohomish [d/] Hatchery** | | | **Snohomish [d/] Natural** | | | **Tulalip [d/] Hatchery** | | |
| 1993-95 | 1.8 | 1.3 | 1.29 | 2.0 | 3.8 | 0.43 | 4.6 | 4.0 | 1.15 | 2.6 | 5.2 | 0.58 |
| 1996-00 | 1.6 | 2.0 | 0.82 | 7.0 | 8.1 | 0.93 | 5.3 | 3.5 | 1.64 | 3.7 | 9.5 | 0.43 |
| 2001 | 1.7 | 2.0 | 0.86 | 4.1 | 2.9 | 1.43 | 5.8 | 6.7 | 0.86 | 5.5 | 4.8 | 1.14 |
| 2002 | 2.0 | 2.2 | 0.90 | 6.8 | 2.6 | 2.60 | 6.7 | 7.4 | 0.90 | 5.8 | 5.2 | 1.11 |
| 2003 | 2.0 | 1.5 | 1.32 | 9.4 | 6.0 | 1.57 | 5.5 | 5.8 | 0.95 | 6.0 | 8.6 | 0.70 |
| 2004 | 3.3 | 2.1 | 1.55 | 10.1 | 6.4 | 1.58 | 15.7 | 11.0 | 1.42 | 6.8 | 5.5 | 1.24 |
| 2005 | 2.0 | 1.7 | 1.20 | 9.9 | 4.0 | 2.49 | 14.2 | 5.0 | 2.86 | 6.4 | 6.9 | 0.93 |
| 2006 | 1.6 | 1.8 | 0.87 | 9.6 | 5.9 | 1.62 | 8.7 | 7.2 | 1.21 | 9.3 | 5.1 | 1.84 |
| 2007 | 1.9 | 1.1 | 1.73 | 8.7 | 8.1 | 1.08 | 12.3 | 2.8 | 4.33 | 8.4 | 5.4 | 1.56 |
| 2008 | 1.1 | 2.1 | 0.53 | 8.8 | 7.4 | 1.20 | 6.5 | 7.1 | 0.92 | 2.7 | 3.5 | 0.77 |
| 2009 | 1.7 | 1.2 | 1.38 | 4.9 | 2.5 | 1.95 | 8.4 | 1.8 | 4.58 | 4.0 | 1.7 | 2.32 |
| 2010 | 1.4 | 1.5 | 0.91 | 5.6 | 3.4 | 1.65 | 9.9 | 3.5 | 2.81 | 3.4 | 3.6 | 0.94 |
| 2011 | 1.8 | 1.6 | 1.13 | 5.2 | 3.3 | 1.58 | 7.4 | 1.4 | 5.21 | 3.5 | 5.1 | 0.68 |
| 2012 | 0.9 | 1.9 | 0.46 | 3.9 | 8.4 | 0.47 | 2.8 | 3.4 | 0.83 | 5.9 | 0.4 | 16.16 |
| 2013 | 1.3 | 1.7 | 0.79 | 5.9 | 5.7 | 1.04 | 3.6 | 2.7 | 1.34 | 10.9 | 1.8 | 6.22 |
| 2014 | 1.6 | 0.9 | 1.81 | 5.4 | 6.1 | 0.89 | 5.3 | 2.4 | 2.21 | 4.7 | 1.7 | 2.83 |
| 2015 | 0.5 | 0.9 | 0.58 | 3.3 | 4.8 | 0.68 | 4.2 | 2.3 | 1.79 | 1.3 | 2.1 | 0.60 |
| 2016 | 0.5 | 1.2 | 0.41 | 5.0 | 10.0 | 0.50 | 3.3 | 3.5 | 0.95 | 1.4 | 6.0 | 0.23 |
| 2017 | 1.5 | 1.3 | 1.19 | 4.8 | 9.0 | 0.53 | 3.4 | 4.4 | 0.78 | 5.3 | 11.4 | 0.47 |
| 2018 | 1.6 | 1.2 | 1.35 | 6.5 | 6.0 | 1.09 | 3.5 | 3.3 | 1.06 | 7.5 | 9.3 | 0.80 |
| 2019 | 0.9 | 1.1 | 0.78 | 7.0 | 6.2 | 1.13 | 3.2 | 1.1 | 3.00 | 12.5 | 8.7 | 1.43 |
| 2020 | 0.9 | 1.6 | 0.56 | 6.8 | 5.3 | 1.28 | 3.0 | 2.8 | 1.05 | 6.0 | 3.4 | 1.78 |
| 2021[c/] | 0.9 | 0.9 | 1.07 | 6.1 | 6.2 | 0.98 | 2.9 | 2.1 | 1.42 | 5.8 | 2.1 | 2.79 |
| 2022 | 0.9 | - | - | 6.0 | - | - | 2.4 | - | - | 7.7 | - | - |
| 2023 | 1.2 | - | - | 7.5 | - | - | 3.4 | - | - | 5.5 | - | - |

TABLE II-9. Preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 3 of 3)

| Year or Average | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **South Puget Sound Hatchery** | | | **South Puget Sound Natural** | | | **Strait of Juan de Fuca Hatchery and Natural** | | | **Hood Canal Hatchery and Natural** | | |
| 1993-95 | 54.7 | 70.8 | 0.83 | 22.1 | 13.5 | 1.78 | 4.2 | 2.3 | 1.88 | 11.6 | 6.3 | 2.09 |
| 1996-00 | 64.3 | 72.6 | 0.93 | 19.2 | 14.7 | 1.31 | 3.0 | 3.5 | 0.89 | 7.3 | 16.3 | 0.54 |
| 2001 | 73.7 | 105.4 | 0.70 | 16.2 | 19.6 | 0.83 | 3.5 | 3.7 | 0.96 | 19.2 | 26.1 | 0.74 |
| 2002 | 90.8 | 104.3 | 0.87 | 16.9 | 19.9 | 0.85 | 3.6 | 3.7 | 0.96 | 25.3 | 30.2 | 0.84 |
| 2003 | 86.6 | 89.9 | 0.96 | 19.6 | 6.0 | 3.26 | 3.4 | 4.1 | 0.84 | 24.0 | 33.0 | 0.73 |
| 2004 | 86.5 | 95.6 | 0.90 | 17.5 | 10.4 | 1.68 | 3.6 | 5.4 | 0.66 | 29.6 | 34.3 | 0.86 |
| 2005 | 83.1 | 86.2 | 0.96 | 17.7 | 5.7 | 3.10 | 4.2 | 3.7 | 1.12 | 30.6 | 54.6 | 0.56 |
| 2006 | 85.8 | 129.9 | 0.66 | 21.3 | 9.1 | 2.34 | 4.2 | 4.6 | 0.91 | 30.2 | 39.8 | 0.76 |
| 2007 | 83.0 | 161.3 | 0.51 | 17.0 | 11.0 | 1.54 | 4.4 | 2.1 | 2.07 | 47.5 | 32.4 | 1.46 |
| 2008 | 101.6 | 109.7 | 0.93 | 21.1 | 14.9 | 1.42 | 3.2 | 1.9 | 1.69 | 36.8 | 33.4 | 1.10 |
| 2009 | 93.0 | 85.0 | 1.09 | 17.2 | 2.7 | 6.28 | 2.4 | 4.4 | 0.54 | 42.6 | 38.1 | 1.12 |
| 2010 | 97.4 | 92.0 | 1.06 | 12.7 | 4.0 | 3.16 | 1.9 | 2.9 | 0.65 | 45.0 | 37.8 | 1.19 |
| 2011 | 118.6 | 82.3 | 1.44 | 8.9 | 3.3 | 2.74 | 2.5 | 4.1 | 0.61 | 40.6 | 62.9 | 0.65 |
| 2012 | 95.8 | 78.5 | 1.22 | 8.9 | 5.5 | 1.61 | 2.9 | 4.3 | 0.68 | 46.8 | 85.6 | 0.55 |
| 2013 | 102.0 | 86.6 | 1.18 | 5.0 | 4.4 | 1.15 | 4.3 | 6.4 | 0.67 | 66.2 | 71.8 | 0.92 |
| 2014 | 96.7 | 41.9 | 2.31 | 4.8 | 3.2 | 1.51 | 5.3 | 6.9 | 0.76 | 84.1 | 30.8 | 2.73 |
| 2015 | 62.4 | 50.4 | 1.24 | 3.8 | 5.3 | 0.71 | 8.4 | 7.3 | 1.15 | 62.1 | 37.4 | 1.66 |
| 2016 | 43.1 | 85.9 | 0.50 | 4.5 | 6.6 | 0.68 | 6.6 | 4.5 | 1.48 | 45.0 | 69.7 | 0.65 |
| 2017 | 80.4 | 146.0 | 0.55 | 4.7 | 8.7 | 0.54 | 4.6 | 5.0 | 0.92 | 50.8 | 111.0 | 0.46 |
| 2018 | 123.6 | 110.8 | 1.12 | 4.8 | 7.3 | 0.66 | 7.4 | 10.3 | 0.72 | 61.4 | 75.4 | 0.82 |
| 2019 | 99.9 | 93.9 | 1.06 | 8.4 | 5.5 | 1.53 | 8.3 | 10.4 | 0.80 | 67.2 | 66.2 | 1.02 |
| 2020 | 100.7 | 60.3 | 1.67 | 5.8 | 5.7 | 1.02 | 5.0 | 5.4 | 0.91 | 72.2 | 32.8 | 2.20 |
| 2021[c/] | 78.8 | 89.3 | 0.88 | 7.0 | 6.3 | 1.11 | 5.5 | 5.5 | 0.99 | 69.8 | 59.9 | 1.16 |
| 2022 | 90.3 | - | - | 6.9 | - | - | 5.0 | - | - | 57.3 | - | - |
| 2023 | 90.4 | - | - | 7.0 | - | - | 3.7 | - | - | 56.8 | - | - |

a/ Puget Sound run size is defined as the run available to Puget Sound net fisheries. Does not include fish caught by troll and recreational fisheries inside Puget Sound.

b/ Postseason returns do not include hatchery strays to the spawning grounds.

c/ Postseason returns are preliminary.

d/ Preseason forecasts include a variety of runsize types including escapement without fishing and terminal run. Postseason returns are in terms of terminal run of Chinook returning to area 8A. This includes all adult Chinook harvested in the net fisheries in Areas 8A, 8D, and the Stillaguamish and Snohomish Rivers, harvest in sport fisheries in Area 8D, and the Stillaguamish and Snohomish River escapements.

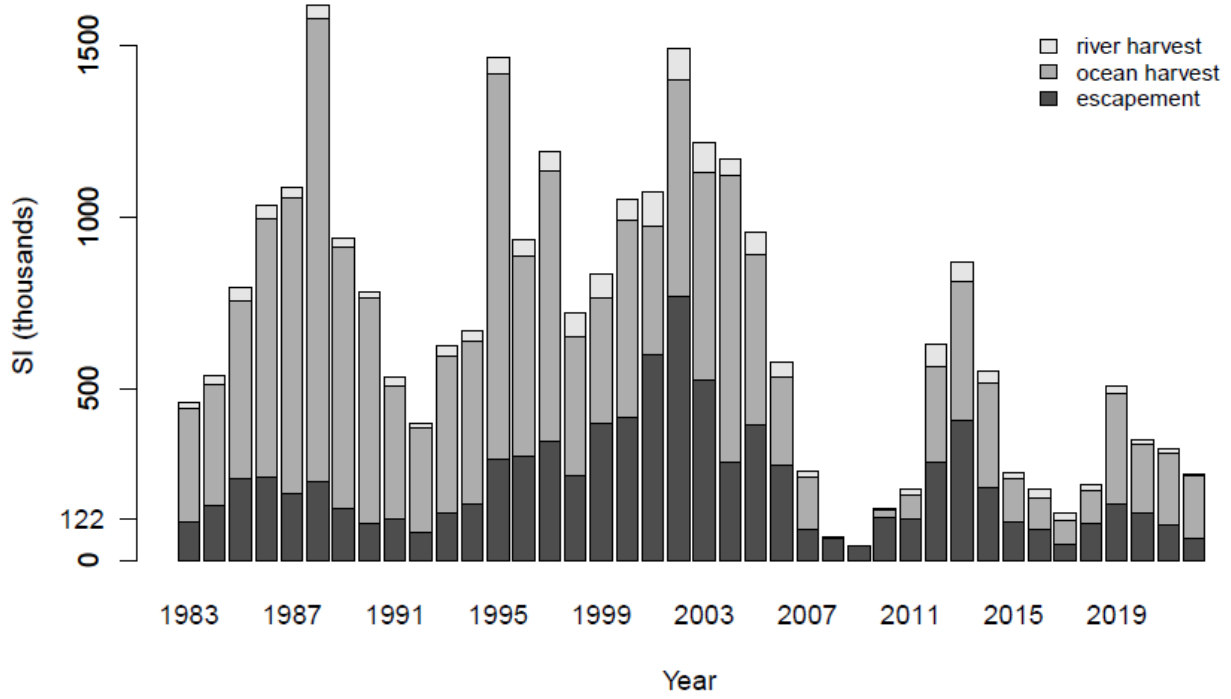



FIGURE II-1. The Sacramento Index (SI) and relative levels of its components. The Sacramento River fall Chinook $S_{MSY}$ of 122,000 adult spawners is noted on the vertical axis.

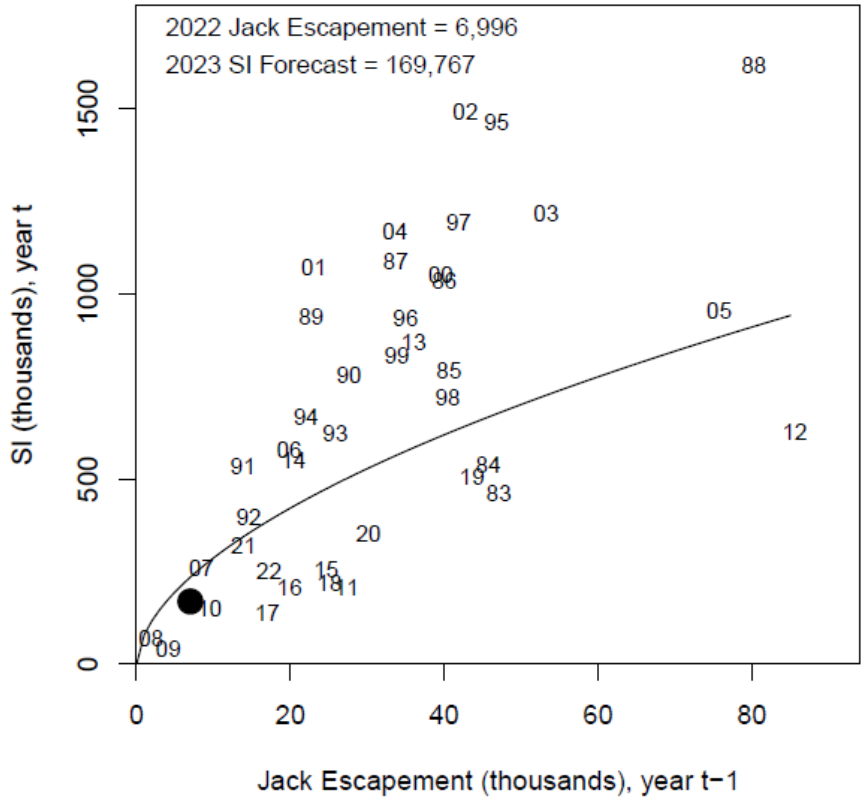



FIGURE II-2. Sacramento Index (SI) forecast based on log-log regression of the SI on jack escapement from the previous year, accounting for autocorrelated errors. The solid line represents the fitted model and the black dot denotes the SI forecast. Years shown are SI years.

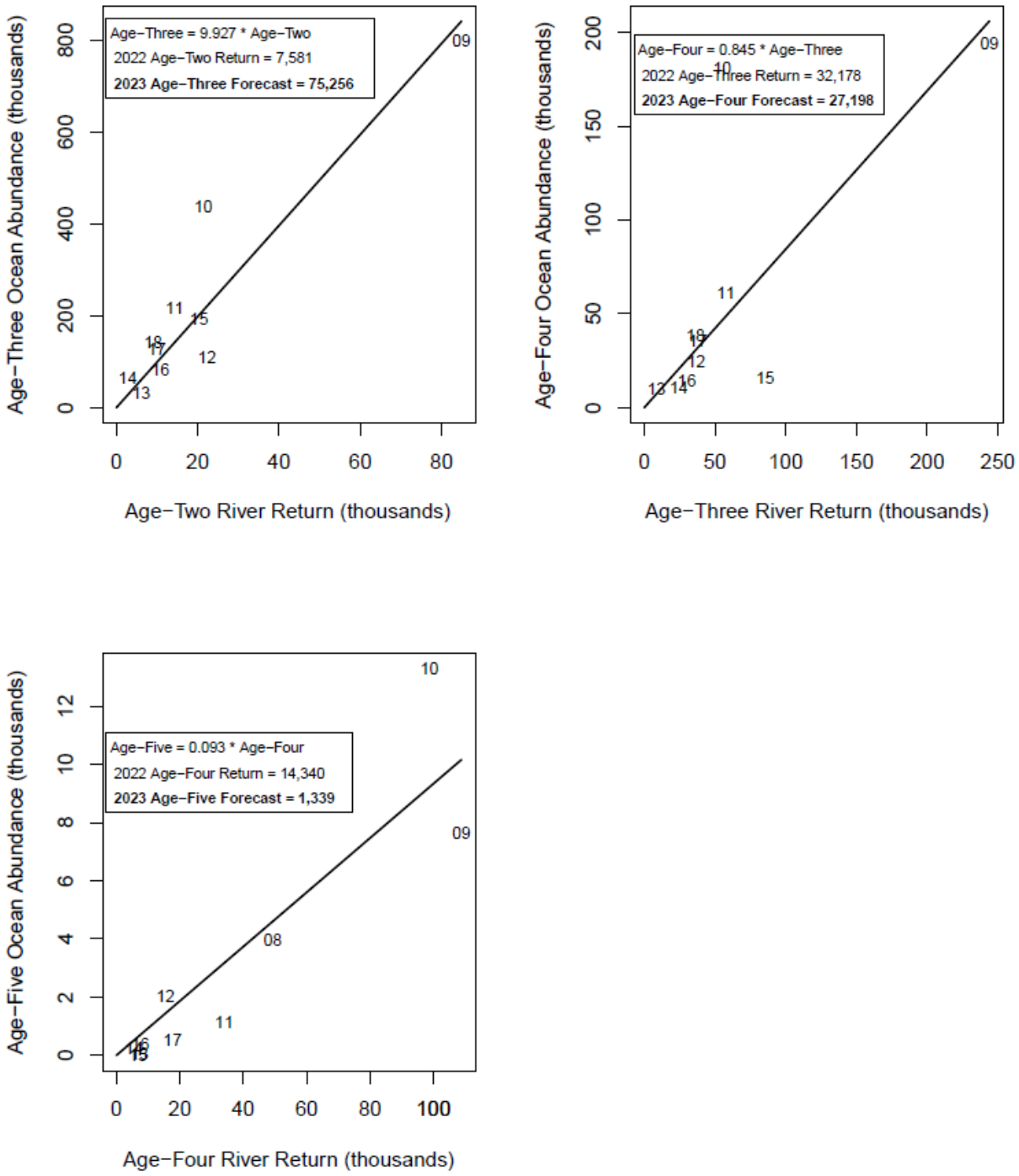



FIGURE II-3. Regression estimators for Klamath River fall Chinook ocean abundance (September 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

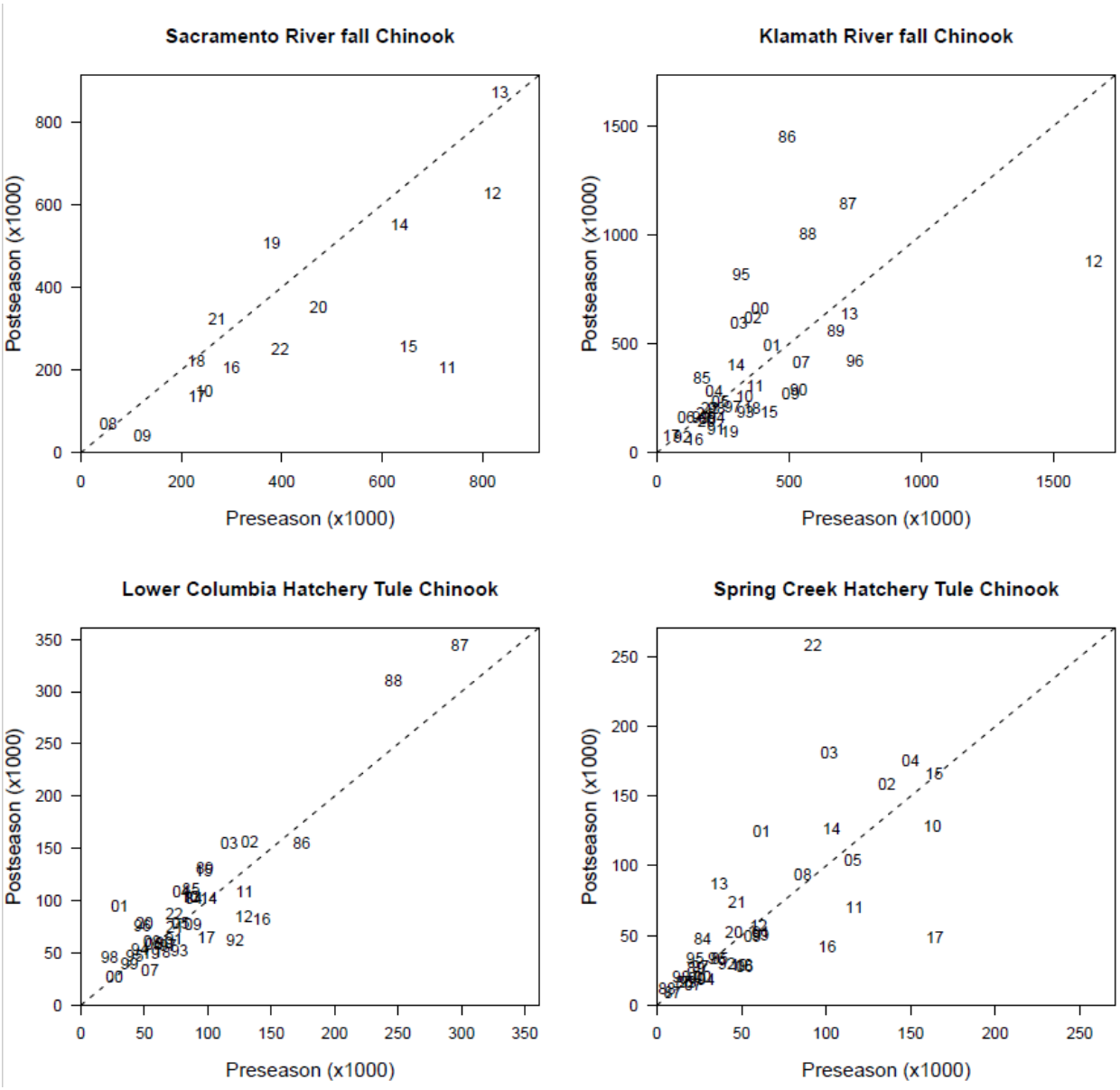



FIGURE II-4. Selected preseason vs. postseason forecasts for Chinook stocks with substantial contribution to Council area fisheries.

# CHAPTER III - COHO SALMON ASSESSMENT

## *COLUMBIA RIVER AND OREGON/CALIFORNIA COAST COHO*

### *3.1 OREGON PRODUCTION INDEX AREA*

The majority of coho harvested in the Oregon Production Index (OPI) area originate from stocks produced in rivers located within the OPI area (Leadbetter Point, Washington to the U.S./Mexico border). These stocks include hatchery and natural production from the Columbia River, Oregon Coast, and northern California, and are divided into the following components: (1) Columbia River, coastal Oregon, and northern California public hatchery (OPIH), (2) Oregon coastal natural (OCN), including river and lake components, and (3) Lower Columbia natural (LCN). Direct comparisons of 2023 abundance forecasts with recent year preseason abundance forecasts and postseason estimates are reported in Table III-1.

Beginning in 2008, a new method was developed to estimate postseason coho abundances for both the natural and hatchery components of the Columbia River and the Oregon coast. The traditional method of stock abundance estimation used only catch data from Leadbetter Point, Washington, to the U.S./Mexico border. The assumption prior to 2008 was that OPI stocks that were caught north of the OPI area were balanced by northern stocks that were caught inside the OPI area. This assumption was valid as long as fisheries north and south were balanced. However, in some recent years, fisheries to the south have been more restricted than those to the north, leading to underestimation of harvest of OPI area stocks. In addition, the estimation technique was not consistent with the methods used in Coho FRAM. The Mixed Stock Model (MSM) for constructing the FRAM base period data was used to estimate the contribution of various coho stocks, including the OPI area stocks, to ocean fisheries. MSM is based on CWT recoveries (release years 1986-1992) and associated tag rates. FRAM includes all fisheries that impact a particular stock, and therefore should provide a better overall accounting of total harvest and mortality of both Columbia River and Oregon coast coho stocks. The new run size estimates are based on Backwards FRAM (BKFRAM) run reconstructions. BKFRAM is used to estimate the pre-fishing abundances and post-season exploitation rates of OPI stocks. FRAM is populated with post-season estimates of escapements and catches/non-retention mortalities for OPI fisheries. When run in BKFRAM mode, stock specific mortalities are added to escapements to reconstruct pre-fishing abundances and to estimate exploitation rates.

#### 3.1.1 Hatchery Coho

OPI area public hatchery coho smolt production occurs primarily in Columbia River facilities and net pens. Several facilities located in Oregon coastal rivers and in the Klamath River Basin, California, collectively produce fewer coho. Salmon Trout Enhancement Hatchery Coho Smolt Program (STEP) releases were discontinued after the 2004 brood. OPI area smolt releases since 1960 are reported by geographic area in Appendix C, Table C-1.

There have been no Oregon coastal private hatchery coho (PRIH) smolt releases since 1990.

##### *Predictor Description*

The adult return for the OPIH component is forecast using fish data from public hatcheries in Washington, Oregon, and California. The present OPIH forecast approach has been used since 1996. Prior to 2008, the OPIH stock predictor was a multiple linear regression with the following variables: (1) Columbia River jacks (Jack CR), (2) Oregon coastal and Klamath River Basin jacks (Jack OC), and (3) a correction term for the proportion of delayed smolts released from Columbia River hatcheries (Jack CR * [SmD/SmCR]).

In 2008, the stock predictor was modified slightly from that used in previous years. Because of the shorter data set (1986-2007 vs. 1970-2007) and the near-total phase-out of coastal coho salmon hatcheries, the factor for Oregon and California jacks (Jack OC) was not statistically significant in the regression. A

simplified model with all OPI jacks combined into one term (Jack OPI) was used, and all parameters were statistically significant. In 2011, the longer (1970-2010) time series was used with the simplified model.

Since 2011, the longer time series was used with the exception of 1983 which was excluded due to El Niño impacts. The OPIH stock predictor is partitioned into Columbia River early and late stocks based on the proportion of the 2022 jack returns of each stock adjusted for stock-specific maturation rates. The coastal hatchery stock is partitioned into northern and southern coastal stock components. The northern OPIH coastal stock is comprised of hatchery production from the central Oregon Coast. The southern OPIH coastal stock is comprised of hatchery production from the Rogue River basin in southern Oregon and the Klamath and Trinity basins in northern California. The 2023 partition was based on the proportion of the smolt releases in 2022.

For the 2023 abundance forecast the regression includes recruits from 1970-2022 and jack returns and smolt production from 1969-2021. The 2023 abundance is predicted using jack returns and smolt releases from 2022. The model was:

$$OPIH(t) = a ( Jack\ OPI(t-1)) + b ( (Jack\ CR(t-1) ( [SmD(t-1)/SmCR(t-1)]) + c$$

Where:

a = 18.57
b = 31.63
c = -111.18
adjusted $r^2$ = 0.91

The OPIH stock data set and a definition of the above terms are presented in Appendix C, Table C-2.

### *Predictor Performance*

Recent year OPIH stock preseason abundance forecasts partitioned by production area, stock, and as a total, are compared with postseason estimates in Table III-1 and Figure III-1a. The 2022 preseason abundance prediction of 1,003,500 OPIH coho was 144 percent of the preliminary postseason estimate of 696,000 coho.

### *Stock Forecast and Status*

Using the appropriate values from Appendix C, Table C-2, the OPIH abundance forecast for 2023 is 896,900 coho, 89 percent of the 2022 preseason abundance prediction and 129 percent of the preliminary 2022 postseason estimate.

## 3.1.2 Oregon Coastal Natural Coho (OCN)

The OCN stock encompasses the ESA-listed Oregon Coast coho ESU and is composed of natural production north of Cape Blanco, Oregon from river (OCNR) and lake (OCNL) systems, which are forecasted independently.

Under the FMP, ESA consultation standards are used in place of ACLs for ESA-listed species like OCN (and Southern Oregon/Northern California Coast (SONCC) and Central California Coast (CCC)) coho.

### *Predictor Description*

#### 3.1.2.1.1 Oregon Coastal Natural Rivers

Prior to 2010, a variety of methods were used to forecast OCNR coho abundance. Beginning in 2011, generalized additive models (GAMs) were used to relate OCNR recruitment to ocean environment indices. Nine variables were evaluated, ranging from indices of large-scale ocean patterns (e.g., Pacific Decadal Oscillation [PDO]) to local ecosystem variables (e.g., sea surface temperature at Charleston, OR). It was found that high explanatory power and promising forecast skill could be achieved when the mean May-July PDO averaged over the four years prior to the return year was used in combination with two other variables in a GAM. The multi-year average of the PDO, in essence, explains the lower frequency (multi-year) variability in recruitment, and can be viewed as a replacement of the Regime Index used previously. A final set of six models using six different environmental indices plus parent spawner abundance was chosen from the possible model combinations. When averaging the predictions from the set of models (the ensemble mean), a higher skill (in terms of variance explained or cross-validation) was achieved than by selecting any single model. Making multiple forecasts from a set of models also provides a range of possible outcomes that reflects, to some degree, the uncertainty in understanding how salmon productivity is driven by ocean conditions.

Specifically, the final estimate is the mean of six GAM estimates, each with three predictor variables. The individual GAMs can be expressed in the following general form:

$$\hat{Y} = f(X_1) + f(X_2) + f(X_3) + \varepsilon$$

Where $\hat{Y}$ is the prediction, $X_1$ through $X_3$ are the predictor variables, and $\varepsilon$ is the deviation of $\hat{Y}$ from the observation $Y$. For the prediction, $Y$ was the log-transformation of annual recruit abundance. The term $f$ represents a smooth function, which in this case is a cubic spline.

The ensemble mean predictor used for the 2023 forecast was the geometric mean of the six GAM predictors:

**Ensemble Mean of the six predictors based on environmental conditions and spawners.**

| Variables | | | Prediction | $r^2$ | OCV[a/] |
|---|---|---|---|---|---|
| PDO | Spring Transition (Julian date; t-1) | Log Spawners (t-3) | 233,689 | 0.62 | 0.49 |
| PDO | Multivariate ENSO Index (Oct-Dec; t-1) | Upwelling (July-Sept; t-1) | 276,640 | 0.68 | 0.58 |
| PDO | Spring Transition (Julian date; t-1) | Multivariate ENSO Index (Oct-Dec; t-1) | 262,603 | 0.65 | 0.57 |
| PDO | Upwelling (July-Sept; t-1) | Sea Surface Temperature (May-Jul; t-1) | 217,788 | 0.63 | 0.51 |
| PDO | Sea Surface Height (Apr-June; t-1) | Upwelling (July-Sept; t-1) | 227,216 | 0.67 | 0.53 |
| PDO | Upwelling (Sept-Nov; t-1) | Sea Surface Temperature (Jan; t) | 159,807 | 0.63 | 0.50 |
| Ensemble Mean | | | 226,284 | 0.68 | 0.58 |
| (90% prediction intervals) | | | (103,870-480,191) | | |

a/ OCV – ordinary cross-validation score

The OCNR stock data set and a definition of the above terms are presented in Appendix C, Table C-4.

#### 3.1.2.1.2 Oregon Coastal Natural Lakes

Since 1988, except for 2008, the abundance of OCNL index coho has been predicted using the most recent three-year average adult stock abundance. OCNL coho production occurs from three lake systems (Tenmile, Siltcoos, and Tahkenitch). Following the same reasoning used for the OCN Rivers predictor in 2008, OPITT chose to use the 2007 postseason abundance estimate of 10,000 coho for the 2008 preseason prediction instead of using the most recent three-year average. For 2023, the OCNL forecast is 12,500, based on most recent three-year average adult stock abundance.

### *Predictor Performance*

Recent year OCN preseason abundance predictions are compared to postseason estimates in Table III-1. The 2022 preseason abundance prediction of 222,400 OCN coho was 116 percent of the preliminary postseason estimate of 191,500 coho

### *Stock Forecasts and Status*

The 2023 preseason prediction for OCN (river and lake systems combined) is 238,800 coho, 107 percent of the 2022 preseason prediction and 125 percent of the 2022 postseason estimate (Table III-1). The 2023 preseason prediction for OCNR and OCNL components are 226,300 and 12,500 coho, respectively.

Based on parent escapement levels and observed OPI smolt-to-jack survival for 2020 brood OPI smolts, the total allowable OCN coho exploitation rate for 2023 fisheries is no greater than 20.0 percent under the Salmon FMP (Amendment 13) and no greater than 20.0 percent under the matrix developed by the OCN Coho Work Group during their review of Amendment 13 (Table V-8; Appendix A, Tables A-2, and A-3, respectively). The work group recommendation was accepted by the Council as expert biological advice in November 2000.

In November 2013, the Council approved a methodology change for a new marine survival index for the OCN coho harvest matrix that uses biological and oceanographic indicators for preseason planning beginning in 2014[1]. Based on this methodology, the marine survival index of 7.9 percent and the parent escapement levels, allows for a total allowable exploitation rate for 2023 fisheries that is no greater than 20.0 percent (Table V-8: Appendix Table A-4).

## 3.1.3 Southern Oregon / Northern California Coast (SONCC) Coho

The SONCC coho ESU consists of all naturally produced populations of coho from coastal streams between Cape Blanco, OR and Punta Gorda, CA and coho from three hatchery programs. Under the FMP, ESA consultation standards are used to manage ESA-listed stocks, including SONCC coho and CCC coho.

Under FMP Amendment 22, the harvest control rule was revised to include (1) a total fishery (marine and freshwater) exploitation rate limit of 15.0 percent for all populations within the SONCC ESU, except the Trinity River coho populations, and (2) a total fishery exploitation rate limit of 16.0 percent for the Trinity River coho populations.

## 3.1.4 Lower Columbia River Natural (LCN)

LCN coho refers to naturally produced coho mostly from Columbia River tributaries below Bonneville Dam; however, coho produced in the upper Willamette are not part of the ESA-listed ESU and are not included in the LCN coho forecast. LCN coho were listed as endangered under the Oregon State ESA in 2002, and as threatened under the Federal ESA on June 28, 2005. Under the FMP, ESA consultation standards are used in place of ACLs for ESA-listed species like LCN coho.

### *Predictor Description*

The LCN stock predictor methodology was developed in 2007.

The 2023 predictions for the Oregon LCN coho populations are derived by the recent 3-year average abundances based on spawning ground counts. The 2023 adult abundance forecast for Oregon LCN coho is 19,700.

[1] For additional information see the November 2013 PFMC Briefing Book, Agenda Item C.2.a, Attachment 1: Technical Revision to the OCN Coho Work Group Harvest Matrix.

The 2023 predictions for the Washington LCN coho populations are derived by combining estimates of the 2020 brood year natural smolt production based on watershed area and the marine survival rate of 4.3 percent. The 2023 adult abundance forecast for Washington LCN coho is 25,800.

#### *Predictor Performance*

The preseason abundance compared to the postseason estimate is presented in Table III-1. The 2022 preseason abundance prediction of 65,700 LCN coho was 90 percent of the preliminary postseason estimate of 73,100 coho.

#### *Stock Forecast and Status*

The 2023 prediction for LCN coho is 45,500 coho (Table III-1). This abundance estimate includes both Oregon and Washington LCN components.

NMFS ESA guidance for harvest of LCN coho in marine and mainstem Columbia River fisheries is based on a matrix describing parent escapement levels for multiple populations and the observed Columbia River OPI smolt-to-jack survival rate. Based on this matrix, the total allowable marine and mainstem Columbia River exploitation rate for LCN coho in 2023 fisheries would be no more than 23.0 percent.

### 3.1.5 Oregon Production Index Area Summary of Forecasts

The 2023 combined OPI area stock abundance is predicted to be 1,135,700 coho, which is 93 percent of the 2022 preseason prediction of 1,225,900 coho, and 128 percent of the 2022 preliminary postseason estimate of 887,500 coho. The historical OPI abundances are reported in Table III-2.

## *3.2 WASHINGTON COAST COHO*

Washington coastal coho stocks include all natural and hatchery stocks originating in Washington coastal streams north of the Columbia River to the western Strait of Juan de Fuca (west of the Sekiu River). The stocks in this group most pertinent to ocean salmon fishery management are Willapa Bay (hatchery), Grays Harbor, Quinault (hatchery), Queets, Hoh, and Quillayute coho. These stocks contribute primarily to ocean fisheries off Washington and B.C.

A variety of preseason abundance estimators currently are employed for Washington coast and Puget Sound coho stocks, primarily based on smolt production and survival (Table I-2). These estimators are used to forecast preseason abundance of adult ocean (age-3) recruits.

A comparison was made of preseason OA3 forecasts with postseason estimates derived from run reconstructions using FRAM ("Backwards" mode, BKFRAM) to expand observed escapements to ocean abundance from CWT recovery data. It should be noted that forecast methodology has changed over time, and the overall trends and biases may not reflect the current methods.

Except for Willapa Bay, Washington coast coho fall within an exception to the ACL requirements of the MSA because they are managed under an international agreement (the PST); therefore, specification of ACLs is not necessary for these stocks.

### 3.2.1 Willapa Bay

#### *Predictor Description*

Willapa Bay natural coho ocean abundance predictions were generated with the auto-regressive (AR1) and spatio-temporal integrated population model (STIPM) state-space models presented for SSC review in

October 2021 and built from the work of DeFilippo et al 2021. These approaches base estimates on the series of past total returns (AR1) and a simplified life cycle model (returning spawners give rise to smolts, which are subject to marine survival and harvest). The 2023 forecast value is the weighted average of the AR1 and STIPM posterior medians, with weights defined by the inverse of lag-1 median symmetric accuracy (MSA) skill that were presented at the October 2021 Salmon Methodology Review.

The hatchery forecast was calculated using a recent 3-year average terminal marine survival (3.86 percent) applied to the estimated 2020 brood year smolts (1,954,458) released in the spring of 2022 from all Willapa Bay hatchery facilities. The terminal runsize was expanded to OA3 using a 0.32 exploitation rate expansion factor for the ocean fisheries from CWT recoveries for Willapa Bay. The pre-terminal impact rate was evaluated looking at CWT recoveries from Willapa Bay.

### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-3; Figure III-1a). In 2021, the preseason forecast was 64 percent of the postseason estimate.

### *Stock Forecasts and Status*

The 2023 natural coho OA3 abundance forecast is 42,663, compared to a 2022 preseason forecast of 35,776.

The 2023 Willapa Bay hatchery coho OA3 abundance forecast is 110,954 compared to a 2022 preseason forecast of 74,707.

### *OFL, ABC, and ACL*

The OFL, ABC, and ACL are defined in terms of spawner escapement ($S_{OFL}$, $S_{ABC}$, and $S_{ACL}$), and are calculated using potential spawner abundance forecasts and established exploitation rates. Potential Willapa Bay coho natural area spawner abundance was derived by adding the current forecast of natural origin coho OA3 abundance, 42,663, to the predicted abundance of OA3 hatchery origin coho spawning in natural areas. The forecast of OA3 naturally spawning, hatchery origin coho is 16,754 and was calculated by multiplying the OA3 hatchery coho abundance forecast, 110,954, by the most recent 3-year average stray rate (0.151). Annual stray rates were estimated by dividing the number of hatchery origin spawners in natural areas by the number of hatchery origin river mouth returns. Stray rates in 2019, 2020, and 2021 were 0.158, 0.119, and 0.175, respectively.

For Willapa Bay natural coho, $F_{MSY} = 0.74$, the value estimated from a stock-specific spawner-recruit analysis. The OFL for Willapa Bay natural coho is $S_{OFL} = 59{,}417 \times (1\text{-}0.74) = 15{,}448$. Because Willapa Bay natural coho are a Tier-1 stock, $F_{ABC} = F_{MSY} \times 0.95 = 0.70$, and $F_{ACL} = F_{ABC}$. The ABC for Willapa Bay natural coho is $S_{ABC} = 59{,}417 \times (1\text{-}0.70) = 17{,}825$, with $S_{ACL} = S_{ABC}$. These preseason estimates will be recalculated with postseason abundance estimates (when available) to assess ACL and OFL compliance.

## 3.2.2 Grays Harbor

Preseason abundance forecasts are made for natural fish throughout the system and for hatchery fish returning to three freshwater rearing complexes and three saltwater net-pen sites. The forecasts include fish originating from numerous volunteer production projects.

### *Predictor Description*

The natural forecast is the sum of the Chehalis River natural, Humptulips River natural, and South Bay tributary natural forecasts. An OA3 coho marine survival prediction was developed by dividing the

Quinault Department of Fisheries prediction of Queets coho JA3 marine survival by the natural mortality rate of 1.23169. The Chehalis wild coho smolt production estimate was developed by scaling the 2022 Queets River natural coho smolt production to the Chehalis River production based on the relationship between the Backward FRAM (BKFRAM) OA3 ocean abundances of Queets and Chehalis natural coho abundances during the past 15 years. The Humptulips and South Bay tributary forecasts are based on recruit densities scaled from Clearwater and Chehalis basins, respectively.

The hatchery forecast is the sum of the Chehalis River, Humptulips River, and Grays Harbor net pen and off-site hatchery program hatchery-origin forecasts. The Chehalis River, Humptulips River, and Grays Harbor net-pen and off-site hatchery program hatchery-origin forecasts were based on Bingham Creek hatchery tag recoveries for brood year released 2013-2016 (most recent full complement of tag code recoveries, 9.81 percent of the tags recovered pre-terminally).

### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-3; Figure III-1a). In 2021, the preseason forecast was 58 percent of the postseason estimate.

### *Stock Forecasts and Status*

The 2023 Grays Harbor natural OA3 abundance forecast is 102,841, compared to a 2022 preseason forecast of 120,381. This ocean abundance results in classification of this stock's status as "Abundant" under the 2019 PST Southern Coho Management Plan (Table III-5).

The 2023 Grays Harbor hatchery coho OA3 abundance forecast is 111,430, compared to a 2022 preseason forecast of 78,338.

### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). Potential Grays Harbor coho natural area spawner abundance was derived by adding the current forecast of natural origin coho OA3 abundance, 102,841, to the predicted abundance of OA3 hatchery origin coho spawning in natural areas. The forecast of OA3 naturally spawning hatchery origin coho is 10,586 and was calculated by multiplying the OA3 hatchery coho abundance forecast, 111,430, by the most recent 5-year average stray rate (2017-2021 average = 0.095). Annual stray rates were estimated by dividing the number of hatchery origin spawners in natural areas by the total hatchery origin escapement. For Grays Harbor natural coho MFMT = 0.65 and the OFL is $S_{OFL} = 113,427 \times (1\text{-}0.65) = 39,699$. The preseason $S_{OFL}$ will also be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

## 3.2.3 Quinault River

### *Predictor Description*

The 2023 Quinault natural coho forecast is the recent 5 year average JA3 abundance calculated from PSC post season FRAM modeling.

The hatchery forecast is calculated by multiplying the smolt releases from the Quinault (Cook Creek) Hatchery (675,977 adipose clipped smolts) by a forecasted marine survival rate of 4.5218 percent. The marine survival rate (OA3 recruits/release) forecast is a recent 3 year mean (2018-2020 smolt years).

### *Predictor Performance*

There was no information available to evaluate performance of predictors for these stocks.

### *Stock Forecasts and Status*

The 2023 forecast for Quinault natural coho is 23,595 OA3 recruits, an increase from the 2022 forecast of 19,429.

The 2023 Quinault hatchery coho forecast is 30,566 OA3 recruits, a decrease from the 2022 forecast of 34,705.

## 3.2.4 Queets River

### *Predictor Description*

The natural forecast was developed by multiplying the 2022 smolt outmigration of 135,678 by the predicted marine survival rate of 10.291 percent, which results in an abundance prediction of 13,963 JA3. The model uses run reconstructions developed by the Quinault Department of Fisheries (QDFi) as a response, which includes FRAM natural and incidental mortality, but does not include estimates of mark-selective fishery mortality. Expansion for mark-selective fishery mortality is estimated as mean (post season FRAM / QDFi run reconstruction for run years 2010 to 2020) * abundance prediction for 2023 = 1.095037 * 13,963 = 15,290.

Marine survival is typically predicted using a general additive logistic regression model (logit (recruits/smolts) ~ spline (explanatory variable(s)). The explanatory variables are the Pacific Decadal Oscillation index (PDO) maximum May-August and Biologically Effective Upwelling Transport Index (BEUTI) median April-August.

The hatchery forecast is based on the 2022 coho smolt release from the Salmon River Hatchery of 652,530 (565,993 adipose clipped). The OA3 marine survival rate of 2.2844 percent is estimated using the 3-year mean of marine survival over the years 2018-2020.

### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-3; Figure III-1a). In 2021, the OA3 preseason fall natural forecast was 78 percent of the postseason estimate.

### *Stock Forecasts and Status*

The 2023 Queets natural coho forecast is 12,414 OA3 recruits, which is a decrease from the 2022 forecast of 18,160. This ocean abundance results in classification of this stock's status as "Abundant" under the 2019 PST Southern Coho Management Plan (Table III-5).

The 2023 Queets hatchery (Salmon River) coho forecast is 14,906 OA3 recruits, which is lower than the 2022 forecast of 18,035. Approximately 87 percent of the fish released from the Salmon River facility were marked with an adipose fin clip.

### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). For Queets River coho, MFMT = 0.65, and the OFL is $S_{OFL} = 12,414 \times (1\text{-}0.65) = 4,345$. The preseason $S_{OFL}$ value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

### 3.2.5 Hoh River

#### *Predictor Description*

The natural coho forecast is based on estimated average smolt production per square mile of watershed from the Clearwater tributary which lies between the Queets River mainstem and the Hoh River. The Quinault Fisheries Department has a long-standing trapping program on the Clearwater River to estimate smolt production; it is assumed the two rivers produce smolts at a comparable rate per square mile of watershed. In 2022, the Clearwater produced 38,019 smolts at the rate of 272 smolts/mi$^2$. Applying that rate to the Hoh watershed of 299 mi$^2$ yields 81,328 natural coho smolts emigrating from the Hoh River in 2022.

A marine survival estimate to JA3 of 9.89 percent was applied to the total natural smolt production estimate to predict the 2023 return of Hoh River wild coho. This rate is the mean of two marine survival estimates of wild stocks that are to the north and south of the Hoh River: the Queets wild coho to the south with a marine survival estimate of 10.29 percent JA3 (Jurasin, QDFi) and Strait of Juan de Fuca wild coho to the north with a marine survival estimate of 9.48 percent JA3 (WDFW, 2023). The average marine survival rate of 9.89 percent JA3 (8.03 percent OA3) is within 2 percent of the OA3 survival of 6.6 percent predicted in the 2023 Wild Coho Forecasts for other Washington Coast coho stocks (WDFW, 2023).

No hatchery production is projected for the Hoh system for 2023.

#### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-3; Figure III-1a). In 2021, the OA3 preseason natural forecast was 39 percent of the postseason estimate.

#### *Stock Forecasts and Status*

The 2023 Hoh River natural coho forecast is 6,531 OA3 recruits, an increase compared to the 2022 forecast of 4,679. This ocean abundance results in classification of this stock's status as "Abundant" under the 2019 PST Southern Coho Management Plan (Table III-5).

#### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). For Hoh River coho, MFMT = 0.65, and the OFL is $S_{OFL}$ = 6,531 × (1-0.65) = 2,286. The preseason $S_{OFL}$ value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

### 3.2.6 Quillayute River

Quillayute River coho consist of a summer run that is managed primarily for hatchery production, and a fall run that is managed primarily for natural production. Quillayute River coho have both natural and hatchery components to both runs.

#### *Predictor Description*

The natural coho forecast is based on coho smolt data measured in the Quillayute watershed in 2022 by West Fork Environmental and the Quileute Nation. A total of 339,000 coho smolts are estimated to have emigrated from the Quillayute River system in 2022.

Smolt abundance from the Dickey River was estimated to be 80,568 wild coho smolts (746 smolts/mi$^2$). Smolt abundance from the Bogachiel, Calawah, and Sol Duc rivers was estimated to be 258,416 wild coho smolts (496 smolts/mi$^2$).

Total smolts were separated into summer and fall natural coho smolts by the relative number of natural brood year 2020 spawners, 10.84 percent and 89.16 percent, respectively. Results from this separation yield estimates of 37,000 natural summer coho smolts and 302,000 natural fall coho smolts.

The JA3 natural marine survival estimate is 5.49 percent (4.46 percent OA3) for the Quillayute system natural coho. This is the past 10-year JA3 mean marine survival for Quillayute System wild stocks (JA3 recruits survival = 1.232 * OA3 recruits survival, this calculation of JA3 ocean survival was used beginning for 2016 coho forecast instead of the previous year's estimate methodology using OA3 recruitment to the fishery). This compares with a Quillayute marine survival of 6.6 percent OA3 (8.13 percent JA3) predicted by WDFW (WDFW 2023).

The hatchery coho forecast is calculated by applying a JA3 marine survival rate of 4.420 percent to the Sol Duc Hatchery coho released in 2022. An examination of the return rates of both hatchery releases and natural smolts indicate hatchery return rates are slightly below natural returns. A JA3 marine survival rate of 4.420 was derived by applying the last 10-year JA3 mean marine adult survival for Quillayute hatchery stocks.

### Summer Coho

The summer natural coho forecast is based on the estimated total summer coho smolt production (36,754) and a JA3 projected marine survival rate of 5.491 percent.

The summer hatchery production forecast was based on a marine survival estimate of 4.420 percent multiplied by a release of 109,009 smolts from the Sol Duc Hatchery.

### Fall Coho

The forecast for the natural component was based on the estimated total fall coho smolt production (302,230) multiplied by an expected marine survival rate of 5.491 percent, the same survival rate used to forecast summer natural returns.

The fall hatchery production forecast was based on a marine survival estimate of 4.42 percent multiplied by a release of 532,830 smolts.

## *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-3; Figure III-1a). In 2021, the OA3 preseason fall natural forecast was 73 percent of the postseason estimate.

## *Stock Forecasts and Status*

The 2023 Quillayute River summer natural and hatchery coho forecasts are 1,638 and 3,912 OA3 recruits, respectively; 99.2 percent of the hatchery smolts were marked with an adipose fin clip and coded wire tag. The 2023 forecast abundance of natural summer coho is higher than the 2022 forecast of 912.

The 2023 Quillayute River fall natural and hatchery coho forecasts are 13,475 and 19,121 OA3 recruits, respectively. The 2023 forecast abundance of Quillayute fall natural coho is higher than the 2022 forecast of 12,479. Approximately 85 percent of the hatchery fish were marked with an adipose fin clip.

The ocean abundance forecast for Quillayute fall natural coho results in classification of the stock abundance as "Abundant" under the 2019 PST Southern Coho Management Plan (Table III-5).

### 3.2.7 North Washington Coast Independent Tributaries

#### *Predictor Description*

The 2023 forecast of natural coho production for these independent streams is based on a prediction of 483 smolts per square mile of watershed drainage, 424 square miles of watershed, and resulting in 205,000 (rounded from 204,792) smolts. This is multiplied by an expected marine survival rate of 6.6 percent.

The 2023 hatchery forecast is based on the predicted JA3 marine survival of 7.52 percent for the brood year 2020 multiplied by a proxy brood year smolt release (188,494 marked, 4,034 unmarked) into the Tsoo-Yess River from the Makah National Fish Hatchery. As a result of changing climate conditions and increasing difficulty with rearing coho in the hatchery over the summer, Makah National Fish Hatchery and the Makah Tribe implemented a coho fry release program. Smolt outmigration was estimated using a rotary screw trap.

Recently, new data became available to estimate hatchery origin adults separate from natural origin adults which rendered previous estimation methods based on the jack return rate insignificant. A single, best fit model was selected to predict marine survival of Tsoo-Yess coho entering the ocean 2022. The best-fit model uses the Pacific Decadal Oscillation (PDO) for the months of May through September as a predictor variable and predicted a JA3 marine survival rate of 7.52 percent.

#### *Predictor Performance*

There was no information available to evaluate performance of predictors for these stocks.

#### *Stock Forecasts and Status*

The 2023 forecast of natural coho production for these independent streams is 13,530 OA3 recruits, compared to the 2022 preseason forecast of 18,020.

The 2023 hatchery forecast is 11,754 OA3 recruits (11,508 marked, 246 unmarked), compared to 133 in 2022. 97.9 percent of smolts released were marked with an adipose fin clip.

## *3.3 PUGET SOUND COHO STOCKS*

Puget Sound coho salmon stocks include natural and hatchery stocks originating from U.S. tributaries in Puget Sound and the Strait of Juan de Fuca. The primary stocks in this group that are most pertinent to ocean salmon fishery management are Strait of Juan de Fuca, Hood Canal, Skagit, Stillaguamish, Snohomish, and South Puget Sound (hatchery) coho. These stocks contribute primarily to ocean fisheries off Washington and B.C.

A variety of preseason abundance estimators are currently employed for Puget Sound coho stocks, primarily based on smolt production and survival (Table I-2). These estimators are used to forecast preseason abundance of adult OA3 recruits. Forecasts for natural Puget Sound coho stocks were generally derived by measured or predicted smolt production from each major watershed or region, multiplied by stock-specific marine survival rate predictions based on a jack return model from the WDFW Big Beef Creek Research Station in Hood Canal, natural coho CWT tagging programs at Baker Lake (Skagit River basin) and South Fork Skykomish River, adult recruits/smolt data generated from the WDFW Deschutes River Research Station, or other information. Puget Sound hatchery forecasts were generally the product of 2020 brood year (BY) smolt releases from each facility, and a predicted marine survival rate for each program. Hatchery marine survival rates were typically based on recent year average survival rates derived from CWT recovery information and/or run reconstructions.

The 2023 total Puget Sound region natural and hatchery coho ocean recruit forecast is 742,673, compared to a 2022 preseason forecast of 666,317. The 2023 natural forecast is 291,248, compared to the 2022 preseason forecast of 264,013. The 2023 hatchery forecast is 451,425, compared to the 2022 preseason forecast of 402,304.

A comparison was made of preseason OA3 forecasts with postseason estimates derived from run reconstructions using BKFRAM. This method expands observed escapements and actual catch to produce a FRAM estimate of post-season ocean abundance. This post-season FRAM estimate is dependent upon Base Period (1986-1992 fishing years) CWT recovery data. It should be noted that forecast methodology has changed over time, and the overall trends and biases may not reflect the current methods.

Puget Sound coho fall within an exception to the ACL requirements of the MSA because they are managed under an international agreement (the PST); therefore, specification of ACLs is not necessary for these stocks.

### 3.3.1 Strait of Juan de Fuca

#### *Predictor Description*

The natural forecast includes both Eastern and Western Strait of Juan de Fuca drainages. JA3 ocean recruits were predicted as the product of the estimated 2022 coho smolt outmigration from all independent tributaries of the Strait of Juan de Fuca, and a predicted marine survival rate (6.29 percent). The marine survival rate was predicted by a linear regression model using the NOAA copepod community index during the year of smolt outmigration. The linear relationship that this model solved for is highly significant (P=0.0037) and has an $r^2$ value of 0.34.

#### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates. In 2021, the preseason forecast was 30 percent of the postseason estimate (Table III-4).

#### *Stock Forecasts and Status*

The 2023 Strait of Juan de Fuca natural OA3 abundance forecast is 15,625 compared to the 2022 preseason forecast of 7,297.

The 2023 Strait of Juan de Fuca hatchery OA3 abundance forecast is 21,776, compared to the 2022 preseason forecast of 12,728.

The ocean abundance forecast for Strait of Juan de Fuca natural coho results in classification of the stock abundance as "Moderate" under the 2019 PST Southern Coho Management Plan and “Low” under the FMP. This results in an allowable total exploitation rate of no more than 40 percent under both the Council-adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

#### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). For Strait of Juan de Fuca coho MFMT = 0.60, and the OFL is $S_{OFL}$ = 15,625 × (1-0.60) = 6,250. The preseason $S_{OFL}$ value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

### 3.3.2 Nooksack-Samish

#### *Predictor Description*

The natural coho forecast is the product of projected natural smolt production from each stream basin in the region, multiplied by stock-specific marine survival rate expectations, ranging from 3.5 to 5.5 percent.

The hatchery forecast is based on recent 5-year median marine survival rate expectations for Skookum Hatchery multiplied by the number of smolts released.

#### *Predictor Performance*

There was no information available to evaluate performance of predictors for Nooksack-Samish coho stocks.

#### *Stock Forecasts and Status*

The 2023 Nooksack-Samish natural OA3 abundance forecast is 29,504, compared to the 2022 preseason forecast of 36,046.

The 2023 Nooksack-Samish hatchery OA3 abundance forecast is 49,208, compared to the 2022 preseason forecast of 73,842.

### 3.3.3 Skagit

#### *Predictor Description*

This natural forecast is based on a prediction of total smolt to OA3 survival using a single beta regression model of PDO in May – September and SAR Chloro in May. The range of brood years used in this analysis was 2000 to 2018. The analysis produced a weighted average marine survival of 6.84 percent; this was multiplied by the measured smolt production from the Skagit basin (54,457 Baker natural smolts and 573,325 Skagit natural smolts).

The hatchery forecast is based on the weighted average of beta regression models of PDO_ May – September and SAR Chloro in May, and NPGO March – May and SAR Chloro in May. The analysis produced a weighted average marine survival of 3.73 percent; this was multiplied by the total number of 2022 smolts released from all regional hatcheries (11,964 Baker marked hatchery smolts, 44,173 Marblemount unmarked hatchery smolts, and 478,342 Marblemount marked hatchery smolts). This survival rate was also multiplied by the 2022 Oak Harbor net pen release of 29,950 to generate the Oak Harbor net pen forecast.

#### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-4; Figure III-1b). In 2021, the preseason forecast was 52 percent of the postseason estimate.

#### *Stock Forecasts and Status*

The 2023 Skagit natural OA3 abundance forecast is 43,146, compared to the 2022 preseason forecast of 80,378.

The 2023 Skagit hatchery OA3 abundance forecast is 21,053, compared to the 2022 preseason forecast of 21,273.

The ocean abundance forecast for Skagit natural coho results in classification of the stock abundance as "Moderate" under the 2019 PST Southern Coho Management Plan and “Low” under the FMP. This results in an allowable total exploitation rate of no more than 35 percent under both the Council-adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

#### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). For Skagit River coho, MFMT = 0.60 and the OFL is $S_{OFL} = 43{,}146 \times (1\text{-}0.60) = 17{,}258$. The preseason $S_{OFL}$ value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

### 3.3.4 Stillaguamish

#### *Predictor Description*

Regressing annual coho smolt trap CPUE (total fish/total hours fished) against terminal run size one year later generates a relationship that could be used to predict Stillaguamish adult returns. However, due to the high variability in marine survival (MS), coho smolt numbers at the trap are not a very precise predictor of adult returns one year later. Therefore, the Stillaguamish smolt trap CPUE was corrected with the SF Skykomish MS estimate for each brood and log transformed the data, which tightened the regression relationship with the terminal run.

The natural coho marine survival rate is estimated at 5.7 percent, based on recent 5-year SF Skykomish marine survival estimates. Due to consecutive years of low returns, discussion with the co-managers concluded that a marine survival of 5.7 percent is most risk-averse for harvest management purposes.

The Stillaguamish Hatchery released 66,711 marked and 247 unmarked yearlings in 2022, with a forecasted adult return estimated at 1,738 marked and 6 unmarked based on current a hatchery marine survival estimate of 2.6 percent.

#### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-4; Figure III-1b). In 2021, the preseason forecast was 63 percent of the postseason estimate.

#### *Stock Forecasts and Status*

The 2023 Stillaguamish natural OA3 abundance forecast is 30,238, compared to the 2022 preseason forecast of 24,892.

The 2023 Stillaguamish hatchery OA3 abundance is 1,744, compared to the 2022 preseason forecast of 1,937.

The ocean abundance forecast for Stillaguamish natural coho results in classification of the stock abundance as "Abundant" under the 2019 PST Southern Coho Management Plan and “Normal” under the FMP. This results in an allowable total exploitation rate of no more than 50 percent under both the Council-adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). For Stillaguamish coho, MFMT = 0.50 and the OFL is $S_{OFL}$= 30,238× (1-0.50) = 15,119. The preseason $S_{OFL}$ value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

## 3.3.5 Snohomish

### *Predictor Description*

The natural forecast is based on production of 2022 out-migrant smolts estimated from a mark-recapture estimate of smolt abundance from two smolt traps, one operated on the Skykomish River (river mile 26.5) and the second on the Snoqualmie River (river mile 12.2). The 2022 out-migrant smolt estimate for the Skykomish trap is based on the recent (four year) average percent production in the Snoqualmie relative to the Skykomish. Smolt trap estimates for the Skykomish and Snoqualmie rivers are summed and further expanded for rearing downstream of the trap locations in the Snohomish River. A marine survival rate of 5.4 percent, the average marine survival for brood year 2016-2017 Snohomish smolt coho, was applied to the total smolt production estimate for the Snohomish watershed of 1,417,000 smolts. The resulting forecast was rounded to the nearest hundred to account for co-manager agreed-to precision.

The hatchery forecast is based on 2022 hatchery releases of smolts from the WDFW Wallace River Hatchery, the Everett Net Pens, Eagle Creek, and Tulalip Bernie Kai Kai Gobin Hatchery and estimated marine survival rates for each release group. 2023 marine survival rates for Tulalip releases, 4.3 percent, were estimated from coded-wire tag recovery rates averaged for brood years 2018 and 2019. For Wallace, Eagle Creek, and Everett net pen releases, marine survival rates were based on Snohomish juvenile trap average survivals for brood years 2018-2019, 5.4 percent.

### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-4). In 2021, the preseason forecast was 55 percent of the postseason estimate.

### *Stock Forecasts and Status*

The 2023 Snohomish natural OA3 abundance forecast is 76,500, compared to the 2022 preseason forecast of 64,200.

The 2023 Snohomish hatchery OA3 abundance forecast is 63,994, compared to the 2022 preseason forecast of 22,559.

The ocean abundance forecast for Snohomish natural coho results in classification of the stock abundance as "Moderate" under the 2019 PST Southern Coho Management Plan and “Low” under the FMP. This results in an allowable total exploitation rate of no more than 40 percent under both the Council-adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). For Snohomish coho, MFMT = 0.60 and the OFL is $S_{OFL}$= 76,500 × (1-0.60) = 30,600. The preseason $S_{OFL}$ value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

### 3.3.6 Hood Canal

#### *Predictor Description*

The natural forecast is based on a linear regression model that related the return of tagged natural jack coho at Big Beef Creek to Hood Canal December age-2 recruits in the subsequent run year, using brood years 1983-1998 and 2002-2018. This forecast was then converted to OA3. The 1999-2001 broods were excluded because of the unusually high recruit-per-tagged jack ratio, which is not expected to occur this year. For 2023, as was done since 2016, the co-managers agreed to apply a conservative bias correction for forecasting natural coho in Hood Canal.

The hatchery forecast is utilized an average marine survival from CWT-based cohort reconstruction of December age-2 recruits/smolt for the six most recent available broods from each facility, applied to the 2020 brood smolt releases for each facility and converted to OA3.

#### *Predictor Performance*

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-4; Figure III-1b). In 2021, the preseason forecast was 63 percent of the postseason estimate.

#### *Stock Forecasts and Status*

The 2023 Hood Canal natural OA3 abundance forecast is 37,888, compared to the 2022 preseason forecast of 20,196.

The 2023 Hood Canal hatchery OA3 abundance forecast is 74,882, compared to the 2022 preseason forecast of 61,418.

The ocean abundance forecast for Hood Canal natural coho results in classification of the stock abundance as "Moderate" under the 2019 PST Southern Coho Management Plan and “Low” under the FMP. This results in an allowable total exploitation rate of no more than 45 percent under both the Council-adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

#### *OFL*

The OFL is defined in terms of spawner escapement ($S_{OFL}$). For Hood Canal coho MFMT = 0.65, and the OFL is $S_{OFL}$ = 37,888 × (1-0.65) = 13,261. The preseason $S_{OFL}$ value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

### 3.3.7 South Sound

#### *Predictor Description*

The natural forecast is the product of projected smolt production from each of the stream basins in the region multiplied by a marine survival rate expectation for natural coho in the region. The upper South Sound natural stocks’ marine survival rates ranged from 3.8 to 4.7 percent and were based on recent 5-year average marine survival. The deep South Sound stocks’ marine survival predictions ranged from 3.8 to 8.1 percent and were derived using multiple methods. South Sound natural and Deschutes River natural forecasts were based modeling of PDO index May to September of ocean entry in the WDFW report ‘2023 Wild Coho Forecasts for Puget Sound, Washington Coast, and Lower Columbia’ (WDFW 2023). The

Nisqually River natural forecast was based on a recent 5-year average marine survival. The Puyallup River natural forecast was based on recent 4-year average marine survival.

### *Stock Forecasts and Status*

The 2023 South Sound natural OA3 abundance forecast is 58,347 compared to the 2022 preseason forecast of 31,004.

The 2023 South Sound hatchery OA3 abundance forecast is 218,828, compared to the 2022 preseason forecast of 208,547.

## *3.4. STOCK STATUS DETERMINATION UPDATES*

Queets River natural coho, Strait of Juan de Fuca natural coho, and Snohomish River natural coho were found to meet the criteria for being classified as overfished in the PFMC *Review of 2017 Ocean Salmon Fisheries,* released in February 2018.

Queets River natural coho continue to meet the criteria for overfished status, Strait of Juan de Fuca natural coho have met the criteria for not overfished/rebuilding status, and Snohomish natural coho now meet the criteria for rebuilt status based on recent three-year geometric mean escapement estimates (2019-2021) detailed in the PFMC *Review of 2022 Ocean Salmon Fisheries* (PFMC 2023).

## *3.5. SELECTIVE FISHERY CONSIDERATIONS FOR COHO*

As the region has moved forward with mass marking of hatchery coho salmon stocks, selective fishing options have become an important consideration for fishery managers. Projected coho mark rates in Council area fisheries are generally similar to 2022 projections. Table III-6 summarizes projected 2023 mark rates for coho fisheries by month from Southern British Columbia, Canada to the Oregon Coast, based on preseason abundance forecasts.

TABLE III-1. Preliminary preseason and postseason coho stock abundance estimates for Oregon production index area stocks in thousands of fish. (Page 1 of 2)

| Year or Average | Preseason | Postseason[a/] | Pre/Post season[a/] | Preseason | Postseason[a/] | Pre/Post season[a/] | Preseason | Postseason[a/] | Pre/Post season[a/] | Preseason | Postseason[a/] | Pre/Post season[a/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Columbia River Hatchery Early | | | Columbia River Hatchery Late | | | Lower Columbia River Natural (LCN) | | | Oregon Coast Natural (OCN) (Rivers and Lakes) | | |
| 1996-00 | 212.9 | 181.4 | 1.3 | 128.9 | 102.5 | 1.6 | | | | 62.7 | 52.8 | 1.5 |
| 2001 | 1036.5 | 873.0 | 1.2 | 491.8 | 488.3 | 1.0 | | | | 50.1 | 163.2 | 0.3 |
| 2002 | 161.6 | 324.7 | 0.5 | 143.5 | 271.8 | 0.5 | | | | 71.8 | 304.5 | 0.2 |
| 2003 | 440.0 | 645.7 | 0.7 | 377.9 | 248.0 | 1.5 | | | | 117.9 | 278.8 | 0.4 |
| 2004 | 313.6 | 389.0 | 0.8 | 274.7 | 203.0 | 1.4 | | | | 150.9 | 197.0 | 0.8 |
| 2005 | 284.6 | 282.7 | 1.0 | 78.0 | 111.6 | 0.7 | | | | 152.0 | 150.1 | 1.0 |
| 2006 | 245.8 | 251.4 | 1.0 | 113.8 | 156.3 | 0.7 | | | | 60.8 | 116.4 | 0.5 |
| 2007 | 424.9 | 291.0 | 1.5 | 139.5 | 171.0 | 0.8 | 21.5 | 20.5 | 1.0 | 255.4 | 60.0 | 4.3 |
| 2008 | 110.3 | 333.9 | 0.3 | 86.4 | 207.6 | 0.4 | 13.4 | 28.7 | 0.5 | 60.0 | 170.9 | 0.4 |
| 2009 | 672.7 | 681.4 | 1.0 | 369.7 | 374.1 | 1.0 | 32.7 | 37.6 | 0.9 | 211.6 | 257.0 | 0.8 |
| 2010 | 245.3 | 274.3 | 0.9 | 144.2 | 263.6 | 0.5 | 15.1 | 53.2 | 0.3 | 148.0 | 266.8 | 0.6 |
| 2011 | 216.0 | 288.5 | 0.7 | 146.5 | 141.2 | 1.0 | 22.7 | 29.5 | 0.8 | 249.4 | 311.6 | 0.8 |
| 2012 | 229.8 | 114.7 | 2.0 | 87.4 | 55.6 | 1.6 | 30.1 | 12.9 | 2.3 | 291.0 | 123.8 | 2.4 |
| 2013 | 331.6 | 190.8 | 1.7 | 169.5 | 110.7 | 1.5 | 46.5 | 36.8 | 1.3 | 191.0 | 128.4 | 1.5 |
| 2014 | 526.6 | 760.5 | 0.7 | 437.5 | 480.3 | 0.9 | 33.4 | 108.7 | 0.3 | 230.6 | 403.3 | 0.6 |
| 2015 | 515.2 | 150.5 | 3.4 | 261.9 | 91.8 | 2.9 | 35.9 | 20.9 | 1.7 | 206.6 | 70.4 | 2.9 |
| 2016 | 153.7 | 127.0 | 1.2 | 226.9 | 96.1 | 2.4 | 40.0 | 25.1 | 1.6 | 152.7 | 83.2 | 1.8 |
| 2017 | 231.7 | 170.9 | 1.4 | 154.6 | 108.4 | 1.4 | 30.1 | 31.2 | 1.0 | 101.9 | 65.6 | 1.6 |
| 2018 | 164.7 | 82.7 | 2.0 | 121.5 | 64.6 | 1.9 | 21.9 | 29.7 | 0.7 | 54.9 | 81.3 | 0.7 |
| 2019 | 545.0 | 191.4 | 2.8 | 360.6 | 106.1 | 3.4 | 36.9 | 34.1 | 1.1 | 76.1 | 107.6 | 0.7 |
| 2020 | 130.7 | 240.7 | 0.5 | 50.3 | 122.9 | 0.4 | 24.8 | 55.4 | 0.4 | 83.0 | 110.0 | 0.8 |
| 2021 | 1014.0 | 580.3 | 1.7 | 576.0 | 249.6 | 2.3 | 39.2 | 70.5 | 0.6 | 125.0 | 273.3 | 0.5 |
| 2022 | 592.5 | 434.3 | 1.4 | 404.7 | 250.9 | 1.6 | 65.7 | 73.1 | 0.9 | 222.4 | 191.5 | 1.2 |
| 2023 | 481.8 | - | - | 404.3 | - | - | 45.5 | - | - | 238.8 | - | - |

TABLE III-1. Preliminary preseason and postseason coho stock abundance estimates for Oregon production index area stocks in thousands of fish. (Page 2 of 2)

| Year or Average | Preseason | Postseason[a/] | Pre/Post season[a/] | Preseason | Postseason[a/] | Pre/Post season[a/] | Preseason | Postseason[a/] | Pre/Post season[a/] | Preseason | Postseason[a/] | Pre/Post season[a/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Salmon Trout Enhancement Program (STEP)[c/] | | | Oregon Coast North of Cape Blanco | | | California and Oregon Coast South of Cape Blanco | | | Oregon Production Index (OPI) Area Hatchery Total[b/] | | |
| 1996-00 | 0.6 | | | | | | | | | | | |
| 2001 | 1.0 | 1.4 | 0.7 | 127.3 | 46.9 | 2.7 | 52.0 | 46.0 | 1.1 | 1,707.6 | 1,454.2 | 1.2 |
| 2002 | 0.6 | 3.0 | 0.2 | 36.6 | 41.6 | 0.9 | 20.0 | 22.0 | 0.9 | 361.7 | 660.1 | 0.5 |
| 2003 | 3.6 | 3.6 | 1.0 | 29.3 | 34.5 | 0.8 | 15.9 | 24.3 | 0.7 | 863.1 | 952.5 | 0.9 |
| 2004 | 3.1 | 1.0 | 3.1 | 16.6 | 21.7 | 0.8 | 19.0 | 29.9 | 0.6 | 623.9 | 634.6 | 1.0 |
| 2005 | 1.0 | 0.4 | 2.5 | 11.5 | 10.7 | 1.1 | 15.8 | 38.1 | 0.4 | 389.9 | 443.1 | 0.9 |
| 2006 | 0.6 | 0.1 | 6.0 | 8.6 | 7.9 | 1.1 | 30.6 | 25.0 | 1.2 | 398.8 | 440.6 | 0.9 |
| 2007 | 0.2 | 0.0 | - | 7.0 | 1.3 | 5.4 | 22.2 | 13.2 | 1.7 | 593.6 | 476.5 | 1.2 |
| 2008 | | | | 1.7 | 7.1 | 0.2 | 17.7 | 16.8 | 1.1 | 216.1 | 565.4 | 0.4 |
| 2009 | | | | 7.3 | 7.5 | 1.0 | 23.4 | 3.1 | 7.5 | 1,073.1 | 1,066.2 | 1.0 |
| 2010 | | | | 4.4 | 8.6 | 0.5 | 14.1 | 4.8 | 2.9 | 408.0 | 551.3 | 0.7 |
| 2011 | | | | 3.6 | 3.6 | 1.0 | 9.0 | 9.0 | 1.0 | 375.1 | 442.3 | 0.8 |
| 2012 | | | | 6.4 | 3.1 | 2.1 | 18.1 | 8.6 | 2.1 | 341.7 | 182.3 | 1.9 |
| 2013 | | | | 5.6 | 5.7 | 1.0 | 18.7 | 7.6 | 2.5 | 525.4 | 316.9 | 1.7 |
| 2014 | | | | 4.8 | 19.3 | 0.2 | 14.2 | 3.4 | 4.2 | 983.1 | 1,263.6 | 0.8 |
| 2015 | | | | 6.9 | 5.6 | 1.2 | 24.4 | 3.8 | 6.4 | 808.4 | 251.7 | 3.2 |
| 2016 | | | | 5.5 | 9.3 | 0.6 | 10.4 | 1.5 | 6.9 | 396.5 | 233.8 | 1.7 |
| 2017 | | | | 3.5 | 1.9 | 1.8 | 4.5 | 3.6 | 1.3 | 394.3 | 284.8 | 1.4 |
| 2018 | | | | 3.3 | 1.1 | 3.0 | 4.6 | 1.0 | 4.6 | 294.1 | 149.4 | 2.0 |
| 2019 | | | | 12.0 | 2.2 | 5.5 | 15.9 | 0.8 | 19.9 | 933.5 | 300.5 | 3.1 |
| 2020 | | | | 2.4 | 4.7 | 0.5 | 2.3 | 1.3 | 1.8 | 185.7 | 369.6 | 0.5 |
| 2021 | | | | 6.4 | 5.8 | 1.1 | 11.5 | 5.6 | 2.1 | 1,607.9 | 841.3 | 1.9 |
| 2022 | | | | 1.9 | 5.5 | 0.3 | 4.4 | 5.2 | 0.8 | 1,003.5 | 696.0 | 1.4 |
| 2023 | | | | 3.0 | - | - | 7.8 | - | - | 896.9 | - | - |

a/ Postseason estimates are based on preliminary data and not all stocks have been updated.

b/ LCN abundance is included as a subset of early/late hatchery abundance beginning in 2007. STEP estimates not included.

c/ Program was discontinued in 2005.

TABLE III-2. Oregon production index (OPI) area coho harvest impacts, spawning, abundance, and exploitation rate estimates in thousands of fish.[a/]

| Year or Avg. | Ocean Fisheries[b/] | | Oregon and California Coastal Returns | | | Columbia River Returns | Abundance[e/] | Ocean Exploitation Rate Based on OPI Abundance[f/] |
|---|---|---|---|---|---|---|---|---|
| | Troll | Sport | Hatcheries and Freshwater Harvest[c/] | OCN Spawners[d/] | Private Hatcheries | | | |
| 1970-1975 | 1,629.6 | 558.4 | 45.8 | 55.2 | - | 460.4 | 2,749.3 | 0.80 |
| 1976-1980 | 1,253.6 | 555.0 | 31.2 | 31.1 | 26.1 | 263.3 | 2,154.2 | 0.84 |
| 1981-1985 | 451.2 | 274.0 | 37.2 | 56.0 | 176.8 | 305.3 | 1,328.6 | 0.55 |
| 1986-1990 | 574.6 | 339.3 | 55.1 | 45.5 | 154.3 | 705.0 | 1,602.2 | 0.57 |
| 1991-1995 | 107.4 | 182.7 | 46.6 | 53.2 | 35.1 | 315.1 | 668.4 | 0.43 |
| 1996 | 7.0 | 31.8 | 45.8 | 87.5 | - | 117.1 | 260.3 | 0.15 |
| 1997 | 5.5 | 22.4 | 27.9 | 31.6 | - | 156.4 | 230.5 | 0.12 |
| 1998 | 3.5 | 12.8 | 31.2 | 34.9 | - | 175.9 | 270.8 | 0.06 |
| 1999 | 3.6 | 36.5 | 23.4 | 48.6 | - | 289.1 | 432.0 | 0.09 |
| 2000 | 25.2 | 74.6 | 37.0 | 84.8 | - | 558.3 | 762.4 | 0.13 |
| 2001 | 38.1 | 216.8 | 75.7 | 174.7 | - | 1128.3 | 1,673.2 | 0.15 |
| 2002 | 15.0 | 118.7 | 53.9 | 266.9 | - | 535.8 | 972.2 | 0.14 |
| 2003 | 28.8 | 252.4 | 44.9 | 236.2 | - | 713.2 | 1,266.9 | 0.22 |
| 2004 | 26.2 | 159.3 | 38.1 | 198.5 | - | 463.5 | 904.5 | 0.21 |
| 2005 | 10.5 | 58.2 | 42.7 | 165.1 | - | 354.7 | 629.9 | 0.11 |
| 2006 | 4.5 | 47.5 | 29.5 | 133.1 | - | 409.7 | 674.1 | 0.08 |
| 2007 | 26.2 | 128.5 | 10.9 | 71.6 | - | 349.0 | 631.3 | 0.25 |
| 2008 | 0.6 | 26.4 | 16.0 | 180.2 | - | 520.8 | 769.8 | 0.04 |
| 2009 | 27.7 | 201.2 | 16.5 | 265.5 | - | 760.2 | 1,341.3 | 0.17 |
| 2010 | 5.8 | 48.8 | 18.5 | 287.7 | - | 466.5 | 848.4 | 0.06 |
| 2011 | 4.2 | 54.7 | 20.0 | 361.3 | - | 378.1 | 836.4 | 0.07 |
| 2012 | 4.7 | 45.5 | 18.5 | 104.9 | - | 152.4 | 311.3 | 0.16 |
| 2013 | 8.4 | 48.3 | 26.5 | 136.8 | - | 252.8 | 494.1 | 0.11 |
| 2014 | 35.6 | 197.4 | 42.0 | 362.4 | - | 1,019.5 | 1,724.8 | 0.14 |
| 2015 | 11.7 | 84.4 | 11.8 | 61.6 | - | 169.5 | 350.5 | 0.27 |
| 2016 | 2.8 | 31.7 | 11.4 | 83.5 | - | 203.6 | 340.3 | 0.10 |
| 2017 | 2.1 | 50.0 | 3.9 | 66.2 | - | 235.9 | 362.4 | 0.14 |
| 2018 | 1.5 | 53.8 | 3.1 | 83.8 | - | 137.2 | 265.8 | 0.21 |
| 2019 | 5.0 | 135.4 | 4.3 | 97.8 | - | 212.4 | 454.3 | 0.31 |
| 2020 | 2.3 | 40.2 | 8.1 | 111.8 | - | 338.6 | 499.7 | 0.08 |
| 2021 | 5.0 | 158.6 | 21.1 | 251.1 | - | 665.7 | 1,126.9 | 0.15 |
| 2022[g/] | 8.4 | 127.4 | 15.8 | 169.8 | - | 524.5 | 896.8 | 0.15 |

a/ The OPI area includes ocean and inside harvest impacts and escapement to streams and lakes south of Leadbetter Pt., Washington.

b/ Includes estimated non-retention mortalities; troll: release mort.(1982-present) and drop-off mort.(all yrs.); sport: release mort.(1994-present) and drop-off mort.(all yrs.).

c/ Includes STEP smolt releases through the 2007 return year, after which the program was terminated.

d/ Includes Rogue River.

e/ FRAM post-season runs used after 1985 and includes OPI origin stock catches in all fisheries.

f/ Private hatchery stocks are excluded in calculating the OPI area stock aggregate ocean exploitation rate index.

g/ Preliminary.

TABLE III-3. Preseason forecasts and postseason estimates of ocean abundance for selected Washington coastal adult natural coho stocks in thousands of fish. (Page 1 of 2)

| Year or Ave. | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season |
|---|---|---|---|---|---|---|---|---|---|
| | | **Quillayute River Fall** | | | **Hoh River** | | | **Queets River** | |
| 1991-1995 | 15.4 | 16.2 | 1.07 | 7.1 | 8.5 | 1.32 | 11.9 | 14.0 | 1.2 |
| 1996 | 13.0 | 20.3 | 0.64 | 4.2 | 7.7 | 0.54 | 8.3 | 22.6 | 0.37 |
| 1997 | 8.9 | 5.8 | 1.53 | 2.8 | 4.1 | 0.68 | 4.3 | 2.2 | 1.92 |
| 1998 | 8.0 | 17.4 | 0.46 | 3.4 | 5.6 | 0.61 | 4.2 | 6.3 | 0.66 |
| 1999 | 14.5 | 16.1 | 0.90 | 3.2 | 6.8 | 0.47 | 4.3 | 8.6 | 0.50 |
| 2000 | 8.7 | 16.5 | 0.53 | 3.5 | 9.3 | 0.38 | 2.7 | 12.1 | 0.22 |
| 2001 | 23.0 | 28.4 | 0.81 | 8.5 | 16.2 | 0.52 | 12.0 | 35.8 | 0.33 |
| 2002 | 22.3 | 33.2 | 0.67 | 8.5 | 13.2 | 0.64 | 12.5 | 26.3 | 0.47 |
| 2003 | 24.9 | 22.5 | 1.11 | 12.5 | 8.7 | 1.44 | 24.0 | 15.7 | 1.52 |
| 2004 | 21.2 | 20.7 | 1.02 | 8.1 | 6.9 | 1.17 | 18.5 | 13.3 | 1.39 |
| 2005 | 18.6 | 20.9 | 0.89 | 7.6 | 8.2 | 0.93 | 17.1 | 11.9 | 1.43 |
| 2006 | 14.6 | 9.9 | 1.48 | 6.4 | 2.7 | 2.36 | 8.3 | 9.2 | 0.90 |
| 2007 | 10.8 | 10.7 | 1.01 | 5.4 | 5.8 | 0.93 | 13.6 | 7.1 | 1.92 |
| 2008 | 10.5 | 11.1 | 0.95 | 4.3 | 4.3 | 1.00 | 10.2 | 7.4 | 1.39 |
| 2009 | 19.3 | 15.5 | 1.24 | 9.5 | 9.5 | 1.00 | 31.4 | 16.0 | 1.97 |
| 2010 | 22.0 | 17.1 | 1.29 | 7.6 | 11.4 | 0.67 | 21.8 | 19.9 | 1.09 |
| 2011 | 28.2 | 13.3 | 2.11 | 11.6 | 13.0 | 0.89 | 13.3 | 15.1 | 0.88 |
| 2012 | 33.5 | 12.8 | 2.61 | 14.3 | 8.1 | 1.77 | 37.2 | 9.1 | 4.08 |
| 2013 | 17.2 | 15.8 | 1.09 | 8.6 | 9.2 | 0.94 | 24.5 | 9.9 | 2.48 |
| 2014 | 18.4 | 17.3 | 1.07 | 8.9 | 9.1 | 0.97 | 10.3 | 12.8 | 0.80 |
| 2015 | 10.5 | 4.8 | 2.19 | 5.1 | 2.9 | 1.74 | 7.5 | 2.7 | 2.75 |
| 2016 | 4.5 | 11.7 | 0.38 | 2.1 | 5.4 | 0.39 | 3.5 | 6.5 | 0.54 |
| 2017 | 15.8 | 12.9 | 1.22 | 6.2 | 6.0 | 1.03 | 6.5 | 6.8 | 0.96 |
| 2018 | 10.6 | 8.7 | 1.22 | 5.8 | 3.7 | 1.56 | 7.0 | 3.4 | 2.04 |
| 2019 | 14.8 | 10.9 | 1.36 | 7.0 | 5.2 | 1.36 | 11.2 | 3.9 | 2.84 |
| 2020 | 9.2 | 9.1 | 1.01 | 4.2 | 5.4 | 0.77 | 7.8 | 5.1 | 1.53 |
| 2021 | 7.5 | 10.4 | 0.73 | 3.0 | 7.8 | 0.39 | 3.9 | 5.0 | 0.78 |
| 2022 | 12.5 | - | - | 4.7 | - | - | 18.2 | - | - |
| 2023 | 13.5 | - | - | 6.5 | - | - | 12.4 | - | - |

TABLE III-3. Preseason forecasts and postseason estimates of age-3 ocean abundance for selected Washington coastal adult natural coho stocks in thousands of fish.[a/] (Page 2 of 2)

| Year or Ave. | Preseason Forecast | Postseason Return | Pre/Post-season | Preseason Forecast | Postseason Return | Pre/Post-season |
|---|---|---|---|---|---|---|
| | | **Grays Harbor** | | | **Willapa Bay** | |
| 1991-1995 | 122.8 | 68.0 | 2.2 | | | |
| 1996 | 121.4 | 89.7 | 1.4 | | | |
| 1997 | 26.1 | 20.2 | 1.3 | | | |
| 1998 | 30.1 | 46.4 | 0.6 | | | |
| 1999 | 57.7 | 42.7 | 1.4 | | | |
| 2000 | 47.8 | 51.9 | 0.9 | | | |
| 2001 | 51.3 | 103.2 | 0.5 | | | |
| 2002 | 55.4 | 142.0 | 0.4 | | Data not available | |
| 2003 | 58.0 | 108.4 | 0.5 | | until 2010 | |
| 2004 | 117.9 | 90.8 | 1.3 | | | |
| 2005 | 91.1 | 65.9 | 1.4 | | | |
| 2006 | 67.3 | 30.6 | 2.2 | | | |
| 2007 | 59.4 | 34.6 | 1.7 | | | |
| 2008 | 42.7 | 49.0 | 0.9 | | | |
| 2009 | 59.2 | 104.6 | 0.6 | | | |
| 2010 | 67.9 | 117.4 | 0.6 | 20.4 | 101.1 | 0.20 |
| 2011 | 89.1 | 86.2 | 1.0 | 47.8 | 61.6 | 0.78 |
| 2012 | 150.2 | 103.9 | 1.4 | 81.3 | 40.6 | 2.00 |
| 2013 | 196.8 | 80.3 | 2.4 | 58.6 | 36.7 | 1.60 |
| 2014 | 108.8 | 152.9 | 0.7 | 58.9 | 95.6 | 0.62 |
| 2015 | 142.6 | 31.7 | 4.5 | 42.9 | 18.6 | 2.30 |
| 2016 | 35.7 | 35.3 | 1.0 | 39.5 | 40.5 | 0.98 |
| 2017 | 50.0 | 37.3 | 1.3 | 36.7 | 14.3 | 2.56 |
| 2018 | 42.5 | 60.8 | 0.7 | 20.7 | 17.0 | 1.21 |
| 2019 | 71.8 | 51.0 | 1.4 | 63.4 | 19.4 | 3.27 |
| 2020 | 50.0 | 31.6 | 1.6 | 17.9 | 18.5 | 0.96 |
| 2021 | 44.8 | 77.4 | 0.6 | 19.0 | 29.8 | 0.64 |
| 2022 | 120.4 | - | - | 35.8 | - | - |
| 2023 | 102.8 | - | - | 42.7 | - | - |

a/ Coho FRAM was used to estimate post-season ocean abundance.

b/ In 1993 and 1994 preseason forecasts were a range of 144-153 and 53.8-60.2 respectively. The midpoint of each range was used in calculating the 1991-1995 average.

TABLE III-4. Preseason forecasts and postseason estimates of ocean abundance for selected Puget Sound adult natural coho stocks in thousands of fish[a/]. (Page 1 of 2)

| Year or Ave. | Preseason Forecast[b/] | Postseason Return | Pre/Postseason | Preseason Forecast | Postseason Return | Pre/Postseason | Preseason Forecast | Postseason Return | Pre/Postseason |
|---|---|---|---|---|---|---|---|---|---|
| | | **Skagit River** | | | **Stillaguamish River** | | | **Hood Canal** | |
| 1991-1995 | NA | 82.0 | - | 53.6 | 18.1 | 3.74 | 94.2 | 14.2 | 6.63 |
| 1996 | NA | 48.3 | - | 51.6 | 12.5 | 4.13 | 25.1 | 37.2 | 0.67 |
| 1997 | 70.9 | 63.1 | 1.12 | 36.0 | 14.1 | 2.56 | 78.4 | 101.8 | 0.77 |
| 1998 | 55.0 | 95.1 | 0.58 | 47.8 | 31.1 | 1.54 | 108.0 | 118.5 | 0.91 |
| 1999 | 75.7 | 40.9 | 1.85 | 35.7 | 7.5 | 4.77 | 65.1 | 17.6 | 3.70 |
| 2000 | 30.2 | 95.2 | 0.32 | 17.7 | 31.2 | 0.57 | 61.0 | 39.7 | 1.54 |
| 2001 | 87.2 | 132.5 | 0.66 | 24.4 | 81.8 | 0.30 | 62.0 | 110.0 | 0.56 |
| 2002 | 98.5 | 71.8 | 1.37 | 19.7 | 30.4 | 0.65 | 34.9 | 81.0 | 0.43 |
| 2003 | 116.6 | 114.1 | 1.02 | 37.8 | 49.8 | 0.76 | 33.4 | 199.9 | 0.17 |
| 2004 | 155.8 | 145.3 | 1.07 | 38.0 | 73.9 | 0.51 | 98.7 | 219.7 | 0.45 |
| 2005 | 61.8 | 52.4 | 1.18 | 56.7 | 29.1 | 1.95 | 98.4 | 68.3 | 1.44 |
| 2006 | 106.6 | 11.5 | 9.25 | 45.0 | 11.8 | 3.81 | 59.4 | 49.7 | 1.20 |
| 2007 | 26.8 | 83.0 | 0.32 | 69.2 | 45.2 | 1.53 | 42.4 | 78.6 | 0.54 |
| 2008 | 61.4 | 35.5 | 1.73 | 31.0 | 15.3 | 2.03 | 30.4 | 25.8 | 1.18 |
| 2009 | 33.4 | 87.5 | 0.38 | 13.4 | 27.4 | 0.49 | 48.6 | 45.7 | 1.06 |
| 2010 | 95.9 | 64.6 | 1.48 | 25.9 | 16.8 | 1.55 | 33.2 | 14.5 | 2.29 |
| 2011 | 138.1 | 78.1 | 1.77 | 66.6 | 61.3 | 1.09 | 74.7 | 56.8 | 1.31 |
| 2012 | 48.3 | 139.1 | 0.35 | 47.5 | 60.6 | 0.78 | 73.4 | 125.5 | 0.58 |
| 2013 | 137.2 | 150.7 | 0.91 | 33.1 | 78.1 | 0.42 | 36.8 | 37.9 | 0.97 |
| 2014 | 112.4 | 51.7 | 2.17 | 32.5 | 49.1 | 0.66 | 82.8 | 69.6 | 1.19 |
| 2015 | 121.4 | 15.5 | 7.82 | 31.3 | 5.6 | 5.59 | 61.5 | 63.7 | 0.96 |
| 2016 | 8.9 | 44.7 | 0.20 | 2.8 | 15.6 | 0.18 | 35.3 | 31.8 | 1.11 |
| 2017 | 11.2 | 22.3 | 0.50 | 7.6 | 6.9 | 1.10 | 115.6 | 35.0 | 3.31 |
| 2018 | 59.4 | 36.9 | 1.61 | 19.0 | 30.9 | 0.62 | 59.9 | 18.7 | 3.20 |
| 2019 | 58.2 | 27.5 | 2.12 | 23.9 | 16.2 | 1.48 | 40.4 | 14.7 | 2.76 |
| 2020 | 31.0 | 41.5 | 0.75 | 19.5 | 24.7 | 0.79 | 35.0 | 23.6 | 1.48 |
| 2021 | 58.4 | 112.0 | 0.52 | 26.8 | 42.7 | 0.63 | 28.8 | 45.7 | 0.63 |
| 2022 | 80.4 | - | - | 24.9 | - | - | 20.2 | - | - |
| 2023 | 43.1 | - | - | 30.2 | - | - | 37.9 | - | - |

TABLE III-4. Preseason and postseason estimates of ocean abundance for selected Puget Sound adult natural coho stocks in thousands of fish[a/]. (Page 2 of 2)

| Year or Ave. | Preseason Forecast | Postseason Return | Pre/Postseason | Preseason Forecast | Postseason Return | Pre/Postseason |
|---|---|---|---|---|---|---|
| | | **Snohomish** | | | **Strait of Juan de Fuca** | |
| 1991-1995 | 341.6 | 200.6 | 1.85 | 20.6 | 19.3 | 1.22 |
| 1996 | 338.1 | 132.3 | 2.55 | 10.7 | 19.4 | 0.55 |
| 1997 | 186.6 | 106.4 | 1.75 | 6.5 | 20.3 | 0.32 |
| 1998 | 165.3 | 193.9 | 0.85 | 16.8 | 21.0 | 0.80 |
| 1999 | 141.6 | 82.2 | 1.72 | 14.7 | 9.9 | 1.48 |
| 2000 | 53.0 | 154.6 | 0.34 | 13.5 | 28.6 | 0.47 |
| 2001 | 129.6 | 360.1 | 0.36 | 21.4 | 43.9 | 0.49 |
| 2002 | 123.1 | 185.5 | 0.66 | 21.3 | 26.3 | 0.81 |
| 2003 | 203.0 | 198.0 | 1.03 | 25.6 | 22.9 | 1.12 |
| 2004 | 192.1 | 287.9 | 0.67 | 35.7 | 23.8 | 1.50 |
| 2005 | 241.6 | 133.4 | 1.81 | 20.7 | 12.5 | 1.66 |
| 2006 | 139.5 | 94.2 | 1.48 | 26.1 | 4.6 | 5.65 |
| 2007 | 98.9 | 156.4 | 0.63 | 29.9 | 10.2 | 2.92 |
| 2008 | 92.0 | 49.5 | 1.86 | 24.1 | 3.9 | 6.25 |
| 2009 | 67.0 | 133.4 | 0.50 | 20.5 | 24.7 | 0.83 |
| 2010 | 99.4 | 54.4 | 1.83 | 8.5 | 20.1 | 0.42 |
| 2011 | 180.0 | 137.4 | 1.31 | 12.3 | 11.7 | 1.05 |
| 2012 | 109.0 | 175.8 | 0.62 | 12.6 | 12.5 | 1.01 |
| 2013 | 163.8 | 176.0 | 0.93 | 12.6 | 9.8 | 1.29 |
| 2014 | 150.0 | 66.6 | 2.25 | 12.5 | 13.8 | 0.91 |
| 2015 | 151.5 | 28.3 | 5.35 | 11.1 | 4.7 | 2.36 |
| 2016 | 20.6 | 54.1 | 0.38 | 4.4 | 8.7 | 0.51 |
| 2017 | 107.3 | 23.2 | 4.63 | 13.1 | 5.9 | 2.24 |
| 2018 | 66.3 | 77.6 | 0.85 | 7.2 | 5.9 | 1.21 |
| 2019 | 62.9 | 48.7 | 1.29 | 8.8 | 5.3 | 1.68 |
| 2020 | 39.0 | 47.7 | 0.82 | 7.5 | 9.2 | 0.82 |
| 2021 | 60.0 | 109.9 | 0.55 | 6.7 | 22.5 | 0.30 |
| 2022 | 64.2 | - | - | 7.3 | - | - |
| 2023 | 76.5 | - | - | 15.6 | - | - |

a/ Coho FRAM was used to estimate post season ocean abundance.

b/ Preseason forecasts in 1986-1996 were based on accounting system that signficantly underestimated escapement and are not comparable to post season.

TABLE III-5. Status categories and constraints for Puget Sound and Washington Coast coho under the FMP and PST Southern Coho Management Plan.

**FMP**

| FMP Stock | Total Exploitation Rate Constraint[a/] | Categorical Status[a/] |
|---|---|---|
| Skagit | 35% | Low |
| Stillaguamish | 50% | Normal |
| Snohomish | 40% | Low |
| Hood Canal | 45% | Low |
| Strait of Juan de Fuca | 40% | Low |
| Quillayute Fall | 59% | |
| Hoh | 65% | |
| Queets | 65% | |
| Grays Harbor | 65% | |

**PST Southern Coho Management Plan**

| U.S. Management Unit | Total Exploitation Rate Constraint[b/] | Categorical Status[c/] |
|---|---|---|
| Skagit | 35% | Moderate |
| Stillaguamish | 50% | Abundant |
| Snohomish | 40% | Moderate |
| Hood Canal | 45% | Moderate |
| Strait of Juan de Fuca | 40% | Moderate |
| Quillayute Fall[c/] | 53% | Abundant |
| Hoh[c/] | 69% | Abundant |
| Queets[c/] | 53% | Abundant |
| Grays Harbor[c/d/] | 69% | Abundant |

a/ Preliminary. For Puget Sound stocks, the exploitation rate constraints and categorical status (Normal, Low, Critical) reflect application of Comprehensive Coho Agreement rules, as adopted in the FMP. For Washington Coast stocks, exploitation rate constraints represent MFMT. Note that under U.S. v. Washington and Hoh v. Baldrige case law, the management objectives can differ from FMP objectives provided there is an annual agreement among the state and tribal comanagers; therefore, the exploitation rates used to report categorical status do not necessarily represent maximum allowable rates for these stocks.

b/ Preliminary. For Puget Sound and Washington Coast management units, the exploitation rate constraints reflect application of the 2019 PST Southern Coho Management Plan.

c/ Categories (Abundant, Moderate, Low) correspond to the general exploitation rate ranges depicted in paragraph 8(b)(iii) of the 2019 PST Southern Coho Management Plan. For Washington Coast stocks, categorical status is determined by the exploitation rate associated with meeting the escapement goal (or the lower end of the escapement goal range). As Washington Coast stocks are managed to achieve agreed escapement goals, this exploitation rate also becomes an approximation of the maximum allowable rate unless the stock is in the "Low" status. In that case, an ER of up to 20% is allowed.

d/ Based on projected natural area spawners (wild plus hatchery strays) and MSP escapement goal of 35,400. Exploitation rate constraint subject to change should comanagers agree to a modified escapement goal under U.S. v. Washington and Hoh v. Baldrige case law.

TABLE III-6. Projected coho mark rates for 2023 U.S. forecasts under base period fishing patterns (percent marked).

| Area | Fishery | June | July | August | Sept |
|---|---|---|---|---|---|
| Canada | | | | | |
| Johnstone Strait | Recreational | -- | 26% | 23% | -- |
| West Coast Vancouver Island | Recreational | 45% | 35% | 30% | 29% |
| North Georgia Strait | Recreational | 38% | 39% | 38% | 33% |
| South Georgia Strait | Recreational | 40% | 45% | 42% | 41% |
| Juan de Fuca Strait | Recreational | 44% | 43% | 45% | 40% |
| Johnstone Strait | Troll | 46% | 35% | 28% | 31% |
| NW Vancouver Island | Troll | 43% | 38% | 40% | 40% |
| SW Vancouver Island | Troll | 54% | 46% | 48% | 48% |
| Georgia Strait | Troll | 47% | 43% | 44% | 38% |
| Puget Sound | | | | | |
| Strait of Juan de Fuca (Area 5) | Recreational | 61% | 48% | 48% | 46% |
| Strait of Juan de Fuca (Area 6) | Recreational | 53% | 46% | 48% | 43% |
| San Juan Island (Area 7) | Recreational | 47% | 52% | 43% | 31% |
| North Puget Sound (Areas 6 & 7A) | Net | -- | 51% | 49% | 32% |
| Council Area | | | | | |
| Neah Bay (Area 4/4B) | Recreational | 45% | 57% | 51% | 60% |
| LaPush (Area 3) | Recreational | 58% | 60% | 67% | 49% |
| Westport (Area 2) | Recreational | 74% | 71% | 68% | 63% |
| Columbia River (Area 1) | Recreational | 77% | 79% | 70% | 73% |
| Tillamook | Recreational | 68% | 62% | 55% | 46% |
| Newport | Recreational | 61% | 55% | 53% | 40% |
| Coos Bay | Recreational | 50% | 45% | 35% | 22% |
| Brookings | Recreational | 44% | 30% | 26% | 6% |
| Neah Bay (Area 4/4B) | Troll | 54% | 52% | 54% | 58% |
| LaPush (Area 3) | Troll | 53% | 55% | 53% | 53% |
| Westport (Area 2) | Troll | 59% | 64% | 66% | 64% |
| Columbia River (Area 1) | Troll | 75% | 75% | 71% | 57% |
| Tillamook | Troll | 63% | 61% | 59% | 57% |
| Newport | Troll | 59% | 56% | 51% | 50% |
| Coos Bay | Troll | 49% | 45% | 40% | 25% |
| Brookings | Troll | 37% | 36% | 41% | 60% |
| Columbia River | | | | | |
| Buoy 10 | Recreational | -- | -- | -- | 65% |

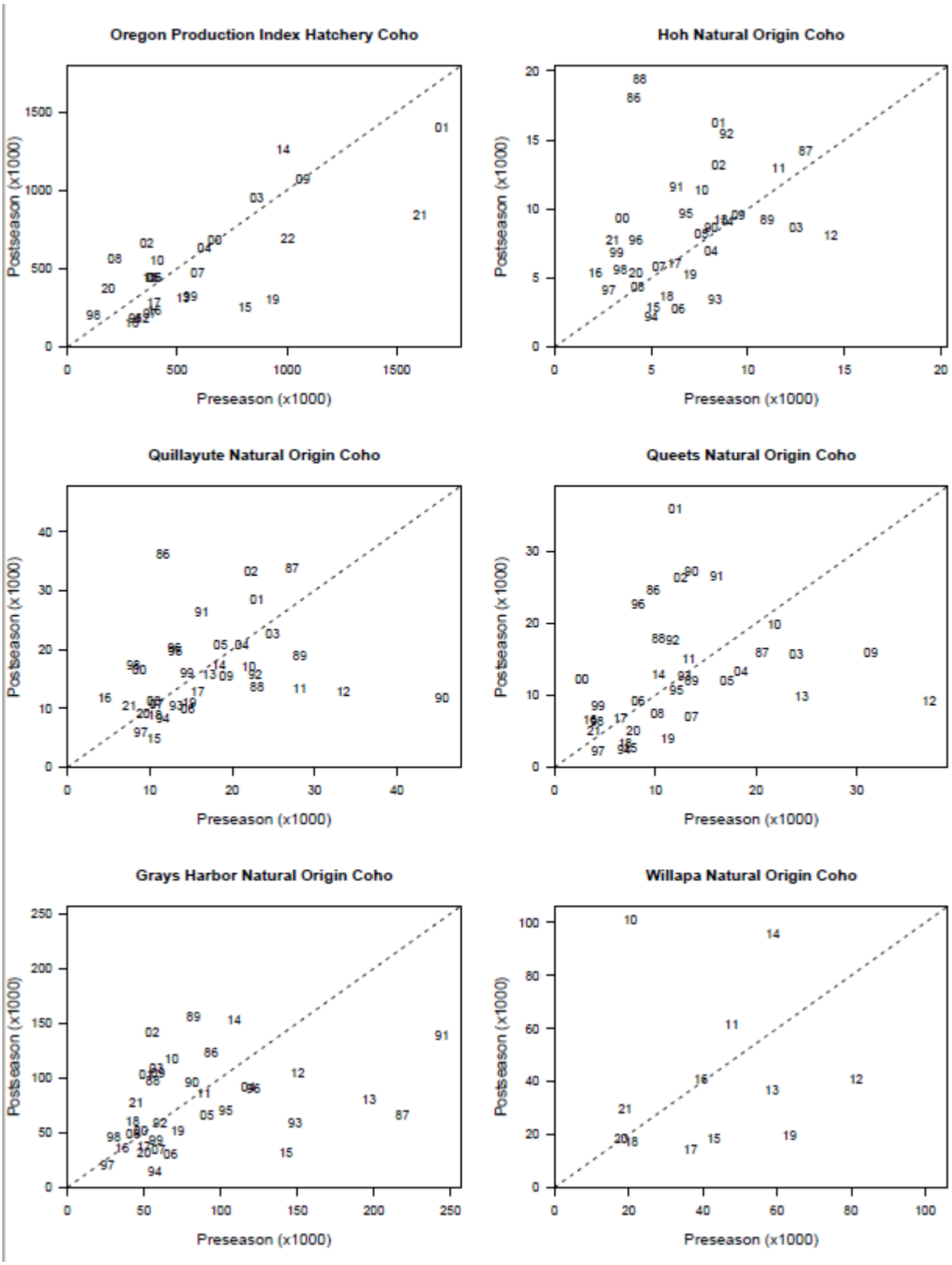



FIGURE III-1a. Selected preseason vs. postseason forecasts for coho stocks with substantial contribution to Council area fisheries.

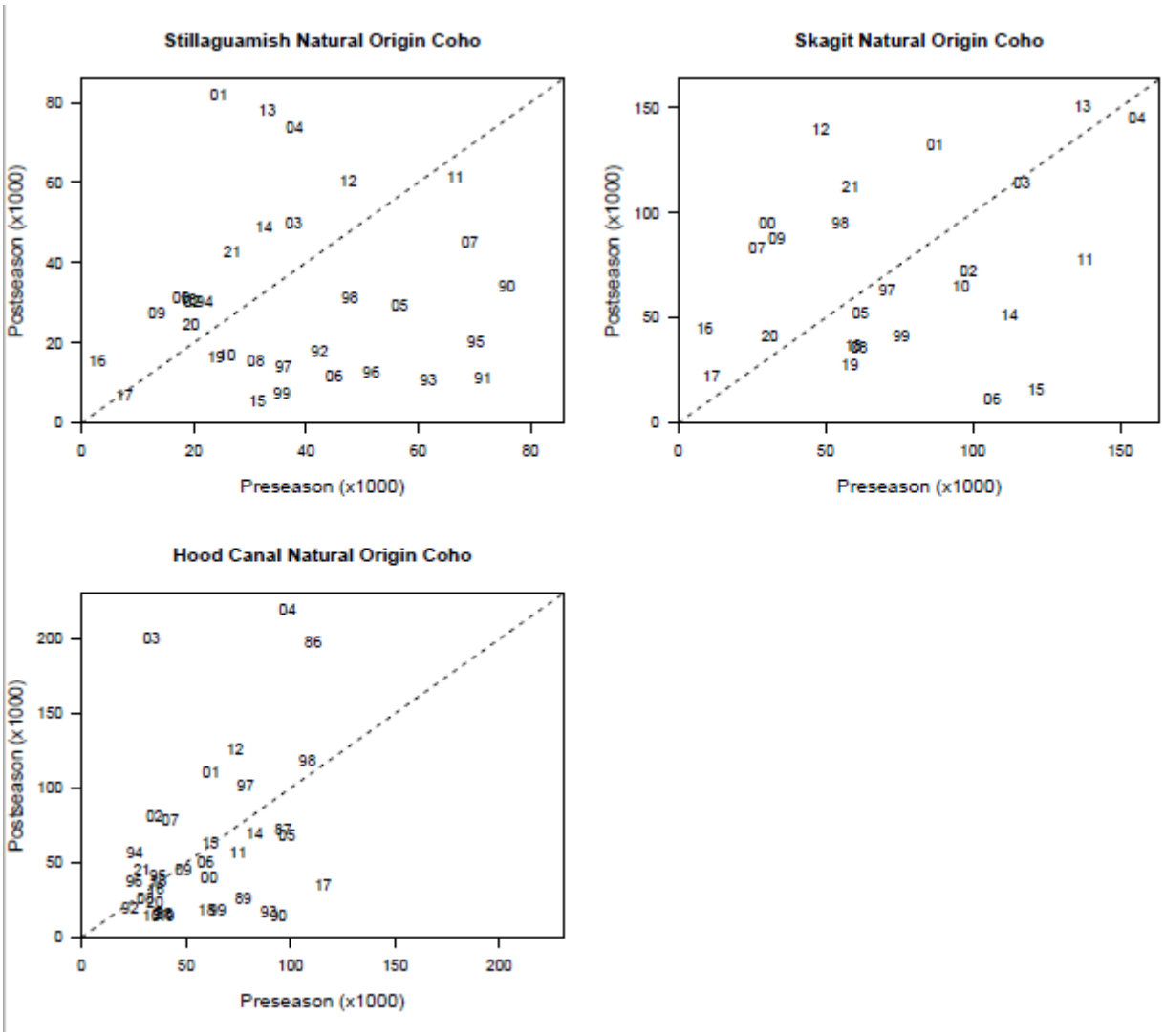



FIGURE III-1b. Selected preseason vs. postseason forecasts for coho stocks with substantial contribution to Council area fisheries.

# CHAPTER IV: AFFECTED ENVIRONMENT - PINK SALMON ASSESSMENT

Two major runs comprise the pink salmon population available to Council fisheries during odd-numbered years: the Puget Sound run, and the Fraser River (British Columbia) run, the latter is the more abundant of the two. The 2021 pink salmon run size forecasts were 2,925,681 for the Puget Sound and 3,009,000 for the Fraser River. The actual 2021 run size was 8,105,000 in the Fraser River and 3,771,032 in Puget Sound.

The 2023 pink salmon run size forecasts are 3,950,917 for the Puget Sound and 6,140,000 for the Fraser River. See Table IV-1 for details.

TABLE IV-1. Estimated annual (odd-numbered years) run sizes and forecasts for Fraser River and Puget Sound pink salmon in millions of fish.

| | Puget Sound | | Fraser River[a/] | |
|---|---|---|---|---|
| Year | Forecast | Actual | Forecast | Actual |
| 1977 | NA | 0.88 | NA | 8.21 |
| 1979 | NA | 1.32 | NA | 14.40 |
| 1981 | NA | 0.50 | NA | 18.69 |
| 1983 | NA | 1.01 | NA | 15.35 |
| 1985 | NA | 1.76 | NA | 19.10 |
| 1987 | NA | 1.57 | NA | 7.17 |
| 1989 | NA | 1.93 | NA | 16.63 |
| 1991 | NA | 1.09 | NA | 22.18 |
| 1993 | NA | 1.06 | NA | 16.98 |
| 1995 | 3.4 | 2.08 | NA | 12.90 |
| 1997 | NA | 0.44 | 11.40 | 8.18 |
| 1999 | NA | 0.96 | NA | 3.59 |
| 2001 | 2.92 | 3.56 | 5.47 | 21.17 |
| 2003 | 2.32 | 2.90 | 17.30 | 26.00 |
| 2005 | 1.98 | 1.23 | 16.30 | 10.00 |
| 2007 | 3.34 | 2.45 | 19.60 | 11.00 |
| 2009 | 5.16 | 9.84 | 17.54 | 19.50 |
| 2011 | 5.98 | 5.27 | 17.50 | 20.65 |
| 2013 | 6.27 | 8.75 | 8.93 | 15.90 |
| 2015 | 6.76 | 3.70 | 14.50 | 5.78 |
| 2017 | 1.15 | 0.51 | 8.69 | 3.62 |
| 2019 | 0.61 | 2.94 | 5.02 | 8.86 |
| 2021 | 2.93 | 3.77 | 3.01 | 8.11 |
| 2023[b/] | 3.95 | NA | 6.14 | NA |

a/ Total run size.

b/ Preliminary forecasts

# CHAPTER V: DESCRIPTION AND ANALYSIS OF THE NO-ACTION ALTERNATIVE

The No-Action Alternative consists of the preseason management measures adopted by the Council and approved by the Secretary of Commerce for the 2022 ocean salmon season between the U.S./Canada border and the U.S./Mexico border. The management measures relate to three fishery sectors: non-Indian commercial (Table V-1), recreational (Table V-2), and treaty Indian (Table V-3). A description of the 2022 preseason management measures and analyses of their projected effects on the biological and socioeconomic environment are presented in Preseason Report III (PFMC 2022c). A description of the 2022 management measures as implemented, including inseason modifications, and an analysis of their effects on the environment, including a historical perspective, is presented in the SAFE document - Review of 2022 Ocean Salmon Fisheries (PFMC 2023).

## *5.1 ANALYSIS OF EFFECTS ON THE ENVIRONMENT OF THE NO-ACTION ALTERNATIVE*

### 5.1.1 Overview

Table V-4 provides a summary, where possible, of Salmon FMP stock spawning escapement and exploitation rate projections for 2023 under the No-Action Alternative (2022 regulations), as well as postseason estimates of these quantities for earlier years, which are compared to FMP conservation objectives. For some stocks, postseason estimates of these metrics were either incomplete or unavailable when the Review of 2022 Ocean Salmon Fisheries (PFMC 2023) was published. A preliminary determination of stock status under the FMP Status Determination Criteria (SDC) was available for some of these stocks in time for this report; however, some estimates remain unavailable. The STT will report to the Council on the status of stocks at the March 2023 Council meeting and may further update the status of stocks present in Table V-4 at that time.

Chinook escapements and fishery impacts were forecast using the Sacramento Harvest Model, the Winter Run Harvest Model, and the Klamath Ocean Harvest Model for SRFC, SRWC, and KRFC, respectively. Assessment of effects under the No-Action Alternative for Oregon Coast Chinook are not available. Columbia River Chinook stock assessments were based on qualitative assessment of the magnitude of forecasts, if available, in relation to escapement goals.

Coho escapements and fishery impacts were forecast using the Coho FRAM. Abundance forecasts for 2023 were updated for Washington and Oregon stocks, but forecasts for Canadian stocks are unchanged from those employed for 2022 planning. Updated forecasts for Canadian stocks are expected to become available in March 2023. To provide information on the effects of changes in abundance forecasts, the final 2022 preseason regulatory package for ocean and inside fisheries was applied to 2023 projections of abundance.

### 5.1.2 Sacramento River Fall Chinook

A repeat of 2022 regulations would be expected to result in an escapement of 84,750 hatchery and natural area SRFC adults. This projection is lower than the minimum escapement level specified by the control rule for 2023, which is $S_{MSY}$ (122,000), but greater than the 2023 preseason $S_{ACL}$ (50,930; Tables V-4 and V-5). The geometric mean of the 2021 and 2022 spawning escapement estimates and the 2023 forecast spawning escapement under the No-Action Alternative is lower than the MSST and $S_{MSY}$ (Table V-4). The predicted SRFC exploitation rate under the No-Action Alternative is 50.1 percent, which is below the MFMT (78.0 percent; Table V-4) but greater than the maximum allowable rate specified by the control rule for 2023 (28.1 percent). If the ocean fisheries were closed from January through August 2023 between Cape Falcon and the U.S./Mexico border, and Sacramento Basin fisheries were closed in 2023, the expected number of hatchery and natural area adult spawners would be 165,057.

The 2022 estimate of SRFC escapement was 61,850 hatchery and natural area adults, which is lower than the 2022 postseason $S_{ACL}$ of 75,357, but greater than the $S_{OFL}$ of 55,262 (Table V-5).

### 5.1.3 Sacramento River Winter Chinook

A repeat of 2022 regulations would be expected to result in an age-3 impact rate of 15.9 percent for the area south of Point Arena, California. The 2023 forecast age-3 impact rate under the No-Action Alternative is lower than the 2023 maximum allowable rate of 20.0 percent.

### 5.1.4 Klamath River Fall Chinook

A repeat of 2022 regulations, which included a river recreational harvest allocation of 22.5 percent of the non-tribal harvest and a tribal allocation of 50 percent of the overall adult harvest, would be expected to result in 17,792 natural area adult spawners. This projection is lower than the minimum escapement level specified by the control rule for 2023 (23,614) and $S_{MSY}$ (40,700), but greater than the 2023 preseason $S_{ACL}$ (8,396; Tables V-4 and V-5). The geometric mean of the 2021 and 2022 natural area adult spawner escapement estimates and the 2023 forecast spawning escapement under the No-Action Alternative is lower than the MSST and $S_{MSY}$ (Table V-4). The predicted KRFC exploitation rate under the No-Action Alternative is 32.2 percent, which is lower than the MFMT (71.0 percent; Table V-4) but greater than the maximum allowable rate specified by the control rule for 2023 (10.0 percent). If the ocean fisheries were closed from January through August 2023 between Cape Falcon and Point Sur, and the Klamath Basin fisheries (tribal and recreational) were closed in 2023, the expected number of natural area adult spawners would be 26,202.

The 2022 estimate of KRFC escapement was 22,051 natural area adults, which exceeds the 2022 postseason $S_{ACL}$ of 12,917 (Table V-5).

### 5.1.5 California Coastal Chinook Stocks

The NMFS ESA consultation standard restricts the KRFC age-4 ocean harvest rate, estimated post-season, to no more than 16.0 percent to limit impacts on these stocks. The postseason estimate of this rate for 2022 is 38.2 percent. Applying 2022 regulations to the 2023 KRFC abundance results in an age-4 ocean harvest rate forecast of 12.3 percent. If the ocean fisheries were closed from January through August 2023 between Cape Falcon and Point Sur, the expected age-4 ocean harvest rate would be 0.3 percent (68 age-4 KRFC were harvested during the September through November 2022 period).

### 5.1.6 Oregon Coast Chinook Stocks

The FMP conservation objective for the northern and central Oregon coast Chinook stock complexes is based on a total goal of 150,000 to 200,000 natural adult spawners. For these two stock complexes, attainment of goals is assessed using peak spawner counts observed in standard index reaches for the respective complexes. For the southern Oregon coast Chinook stock complex, the FMP conservation objective is assessed using the escapement estimate at Huntley Park on the Rogue River. Forecasts are not available for all these stocks, but given recent trends, the escapement goals may not be met for all stocks in 2023 under 2022 fishing seasons.

### 5.1.7 Columbia River Chinook Stocks

The 2023 forecast for Columbia River spring Chinook originating from both below and above Bonneville dam is greater than the 2022 forecast. The 2023 forecasts for summer Chinook, tule fall Chinook, and bright fall Chinook are greater than the 2022 forecasts. The 2023 forecast for summer Chinook is greater than the 2022 forecast. The 2023 aggregate forecast for fall Chinook is also greater than the 2022 forecast. This trend also holds true for each of the fall Chinook stock aggregates, with the exception of LRW and MCB. Given these differences in forecasts for 2023 relative to 2022, applying 2022 regulations to the

forecasted 2023 abundance of Columbia River Chinook should result in ocean escapements meeting spawning escapement goals for all summer and fall Chinook stocks (Table V-4)

### 5.1.8 Washington Coast and Puget Sound Chinook Stocks

Council fisheries north of Cape Falcon have a negligible impact on Washington coast Chinook stocks and a minor impact on stocks that originate in Puget Sound. These stocks have northerly marine distribution patterns and are therefore impacted primarily by Canadian and Alaskan fisheries. Thus, an evaluation of 2022 Council area management measures on projected 2023 abundance would not provide a useful comparison of fishery impacts in relation to conservation objectives.

### 5.1.9 Oregon Production Index Area Coho Stocks

Ocean fisheries were modeled with 2022 Council regulations and 2022 regulations for non-Council area fisheries. The 2023 OPI forecasts are similar to, but overall, slightly lower than the 2022 forecasts, with fewer hatchery fish but more natural fish expected. As a result, when the model is run with 2023 forecasted abundances and 2022 fishery regulations, the fishery impact rates on LCN coho, OCN coho, and SONCC coho populations were generally similar to or slightly higher than when run with 2022 forecasts. This provides some indication of the fishery impacts and fisheries planning relative to the conservation objectives in 2023. Under this scenario, the expected escapement is 202,900 for OCN coho (Table V-6). For Columbia River hatchery coho stocks, the predicted ocean exploitation rate (excluding the Buoy 10 and inriver fisheries) is 28.7 percent on the Columbia River early stock and 41.8 percent on the Columbia River late stock; total predicted exploitation rates are 50.3 percent and 50.9 percent for early and late stock respectively. Predicted ocean escapements (after Buoy 10) into the Columbia River in 2023 show that under 2022 ocean regulations, Columbia River early and late coho would be expected to meet egg-take goals.

As noted in Chapter III, the total allowable OCN coho exploitation rate for 2023 fisheries is no greater than 20.0 percent in the revised OCN coho matrix (Table V-8; Appendix A, Table A-4). Under 2022 fishery regulations and 2023 abundance forecasts, these exploitation rates are predicted to be 15.4 percent for OCN. The total allowable exploitation rate for the SONCC coho is 16 percent for the Trinity population and 15 percent for all other populations. When 2022 fishery regulations are modeled with 2023 forecasts, the resulting exploitation rates are 13.5 percent for the Trinity population and 8.7, 7.8, and 2.9 percent for the Klamath, Rogue, and all other populations, respectively. For all populations, the exploitation rate in marine fisheries is 2.9 percent.

The 2023 allowable LCN coho exploitation rate is expected to be 23.0 percent in the marine area and mainstem Columbia River fisheries combined pending NMFS ESA guidance. Under 2022 fishery regulations and 2023 abundance forecasts, the exploitation rate is predicted to be 14.4 percent for marine fisheries (excluding the Buoy 10 and inriver fisheries) using combined unmarked Columbia River hatchery stocks as the proxy. The LCN coho exploitation rate estimate for the Buoy 10 fishery would be 2.9 percent and the estimated exploitation rate in freshwater fisheries would be 1.6 percent. The total exploitation rate on LCN coho would be 18.8 percent, which is less than the assumed 23.0 percent allowable rate.

### 5.1.10 Washington Coast, Puget Sound, and Canadian Coho Stocks

Exploitation rate and ocean escapement expectations in relation to management goals for select naturally-spawning coho stocks, given 2023 preseason abundance forecasts and 2022 preseason projections for fishing patterns, are presented in Table V-6. The 2023 forecasts for Canadian coho stocks are not available but are assumed to be at 2022 levels for this analysis. More detailed fishery management goals for Council area coho stocks are listed in Appendix A.

Based on the geometric mean of the two most recent spawning escapement estimates and the 2023 forecasted spawning escapement under the No-Action Alternative, there are no coho stocks that meet the criteria for being at risk of approaching an overfished condition (Table V-4).

Under the No-Action Alternative, FMP exploitation rate conservation objectives applicable for 2023 would be met for all Puget Sound natural coho stocks with the exception of Skagit. Ocean escapements for Washington Coast natural coho stocks are above FMP spawning escapement conservation objectives. Management objectives for U.S. Puget Sound natural coho stocks subject to the PST are identical to FMP objectives and would be met under 2022 regulations for all stocks with the exception of Skagit; all coastal stocks also meet agreed-to PST management objectives under 2022 regulations.

The exploitation rate by U.S. fisheries south of the Canadian border on Interior Fraser (B.C.) coho is projected to be 9.5 percent, which is below the anticipated 10.0 percent allowable exploitation rate under the 2019 PST Southern Coho Management Plan. The Council area fisheries portion would be 4.7 percent.

### 5.1.11 Summary

The effects of projected impacts (where available) under 2022 fishery regulations and 2023 abundance forecasts are as follows:

- The projected SRFC exploitation rate under the no action alternative is higher than the maximum level specified by the control rule for 2023.
- SRFC are at risk of approaching an overfished condition.
- For SRWC, the predicted age-3 impact rate is lower than the maximum allowable rate specified by the control rule and thus meets the 2023 objective.
- The projected KRFC exploitation rate under the no action alternative is higher than the maximum level specified by the control rule for 2023.
- KRFC are at risk of approaching an overfished condition.
- All Puget Sound and Washington Coast natural coho stocks, with the exception of Skagit, would achieve $S_{MSY}$ spawning escapement objectives.
- No Puget Sound or Washington Coast natural coho stocks would be at risk of approaching an overfished condition.
- OCN and LCN coho would have projected exploitation rates that comply with anticipated ESA consultation standards.
- All coho stocks would have exploitation rates below the MFMT.
- All Puget Sound coho stocks, with the exception of Skagit would have exploitation rates that comply with the annual rates allowed under the FMP harvest rate matrix and the allowable levels under the 2019 PST Southern Coho Management Plan.
- All Washington coastal coho stocks would have exploitation rates that comply with the annual rates allowed under the 2019 PST Southern Coho Management Plan.

### 5.1.12 Conclusion

The No-Action alternative would not meet the Purpose and Need for the proposed action because:

- The projected Sacramento River fall Chinook exploitation rate is above the control rule defined maximum for 2023.
- The projected Klamath River fall Chinook exploitation rate is above the control rule defined maximum for 2023.

- Skagit natural coho would not achieve $S_{MSY}$ spawning escapement objectives and would exceed exploitation rate limits set forth under the FMP and the 2019 PST Southern Coho Management Plan..

The No-Action alternative does not reflect consideration of changes in the status of salmon stocks from the previous year; therefore, over- or under- harvest of some salmon stocks would occur if this alternative were implemented. The analysis of the No-Action Alternative does, however, provide perspective that is useful in the planning process for 2023 ocean salmon fishery management measures. An understanding of stock shortfalls and surpluses under the No-Action Alternative helps managers, advisors, and constituents construct viable alternatives to the status-quo management measures.

TABLE V-I. 2022 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted.
(Page 1 of 9)

**A. SEASON DESCRIPTIONS**

**North of Cape Falcon**

**Supplemental Management Information**

1. Overall non-Indian TAC: 54,000 Chinook and 200,000 coho marked with a healed adipose fin clip (marked).
2. Non-Indian commercial troll TAC: 27,000 Chinook and 32,000 marked coho.
3. For fisheries scheduled prior to May 16, 2022: See 2021 management measures, which are subject to inseason action and the 2022 season description described below.

*Model run: Coho-2229, Chin-2522*

- May 1-15;
- May 16 through the earlier of June 29, or 18,000 Chinook. No more than 6,040 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 4,840 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8).

Open seven days per week (C.1).

In the area between the U.S./Canada border and the Queets River the landing and possession limit is 80 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6).

In the area between Leadbetter Pt. and Cape Falcon the landing and possession limit is 80 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6).

All salmon, except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

When it is estimated that approximately 50% of the overall Chinook quota or any Chinook subarea guideline has been landed, inseason action may be considered to ensure the quota and subarea guidelines are not exceeded.

In 2023, the season will open May 1 consistent with all preseason regulations in place in this area and subareas during May 16-June 29, 2022, including subarea salmon guidelines and quotas and weekly vessel limits except as described below for vessels fishing or in possession of salmon north of Leadbetter Point. This opening could be modified following Council review at its March and/or April 2023 meetings.

**U.S./Canada Border to Cape Falcon**

- July 1 through the earlier of September 30, or 9,000 Chinook or 32,000 coho (C.8).

Open seven days per week. All salmon. Chinook minimum size limit of 27 inches total length. Coho minimum size limit of 16 inches total length (B, C.1). All coho must be marked with a healed adipose fin clip (C.8.d). No chum retention north of Cape Alava, Washington beginning August 1 (C.4, C.7). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

Landing and possession limit of 150 marked coho per vessel per landing week (Thurs.-Wed.) (C.1).

When it is estimated that approximately 50% of the overall Chinook quota or any Chinook subarea guideline has been landed, inseason action may be considered to ensure the quota and subarea guidelines are not exceeded.

**For all commercial troll fisheries north of Cape Falcon**:

Mandatory closed areas include Salmon troll Yelloweye Rockfish Conservation Area, Cape Flattery, and Columbia Control Zones, and beginning August 8, Grays Harbor Control Zone (C.5).

Vessels must land and deliver their salmon within 24 hours of any closure of this fishery.

Vessels may not land fish east of the Sekiu River or east of the Megler-Astoria bridge.

Vessels fishing or in possession of salmon north of Leadbetter Point must land and deliver all species of fish in a Washington port and must possess a Washington troll and/or salmon delivery license. For delivery to Washington ports south of Leadbetter Point, vessels must notify the Washington Department of Fish and Wildlife at 360-249-1215 prior to crossing the Leadbetter Point line with area fished, total Chinook, coho, and halibut catch aboard, and destination with approximate time of delivery. **During any single trip, only one side of the Leadbetter Point line may be fished** (C.11).

Vessels fishing or in possession of salmon while fishing south of Leadbetter Point must land and deliver all species of fish within the area and south of Leadbetter Point, except that Oregon permitted vessels may also land all species of fish in Garibaldi, Oregon. All Chinook caught north of Cape Falcon and being delivered by boat to Garibaldi must meet the minimum legal total length of 28 inches for Chinook for south of Cape Falcon seasons unless the season in waters off Garibaldi have been closed for Chinook retention for more than 48 hours (C.1.).

(*Continued next page)*

TABLE 1. 2022 Commercial troll management measures for non-Indian ocean salmon fisheries – Council adopted. (Page 2 of 9)

**A. SEASON DESCRIPTIONS**

**North of Cape Falcon**

**For all commercial troll fisheries north of Cape Falcon**: *(continued)*

Under state law, vessels must report their catch on a state fish receiving ticket. Oregon State regulations require all fishers landing salmon into Oregon from any fishery between Leadbetter Point, Washington and Cape Falcon, Oregon to notify ODFW within one hour of delivery or prior to transport away from the port of landing by either calling 541-857-2546 or sending notification via e-mail to nfalcon.trollreport@odfw.oregon.gov. Notification shall include vessel name and number, number of salmon by species, port of landing and location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

Vessels in possession of salmon north of the Queets River may not cross the Queets River line without first notifying WDFW at 360-249-1215 with area fished, total Chinook, coho and halibut catch aboard, and destination. Vessels in possession of salmon south of the Queets River may not cross the Queets River line without first notifying WDFW at 360-249-1215 with area fished, total Chinook, coho and halibut catch aboard, and destination. (C.11).Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

TABLE 1. 2022 Commercial troll management measures for non-Indian ocean salmon fisheries – Council adopted. (Page 3 of 9)

**A. SEASON DESCRIPTIONS**

**South of Cape Falcon**

**Supplemental Management Information**

1. Sacramento River fall Chinook spawning escapement of 198,694 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 49.9%.
3. Klamath River recreational fishery allocation: 2,119 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 9,434 adult Klamath River fall Chinook.
5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 65.5% / 34.5%.
6. Overall commercial troll coho TAC: 10,000 coho marked with a healed adipose fin clip (marked).
7. Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the California Fish and Game Commission.
8. For fisheries scheduled prior to May 16, 2022, see 2021 management measures, which are subject to inseason action and the 2022 season description described below.

**Cape Falcon to Heceta Bank line**

- March 15-May 15;
- May 21-31;
- June 1-12, 18-30;
- July 5-9, 17-21, 25-31;
- August 4-11;
- September 1-4, 11-14;
- October 1-31 (C.9.a).

Open seven days per week . All salmon except coho. (C.4, C.7). Chinook minimum size limit of 28 inches total length (B, C.1). All vessels fishing in the area must land their salmon in the State of Oregon. See gear restrictions and definitions (C.2, C.3). Beginning September 1, no more than 100 Chinook allowed per vessel per landing week (Thurs.-Wed.).

- Mark-selective coho fishery open July 5-9, 17-21, 25-31, and August 4-11, or until a Cape Falcon to Humbug Mt. quota of 10,000 marked coho is met. If the coho quota for the combined area from Cape Falcon to Humbug Mt. of 10,000 marked coho is met, then the season continues for all salmon except coho on the remaining open days.

All salmon, all retained coho must be marked with a healed adipose fin clip (C.4, C.7). Coho minimum size limit of 16 inches total length, and Chinook minimum size limit of 28 inches total length (B, C.1). All vessels fishing in the area must land their salmon in the State of Oregon. See gear restrictions and definitions (C.2, C.3).

Salmon trollers may take and retain or possess on board a fishing vessel no more than 30 coho per vessel per open period. All coho retained, possessed on a vessel, and landed must not exceed a 1:1 ratio with Chinook salmon that are retained and landed at the same time.

In 2023, the season will open March 15 for all salmon except coho. Chinook minimum size limit of 28 inches total length. Gear restrictions same as in 2022. This opening could be modified following Council review at its March 2023 meeting.

**Heceta Bank Line to Humbug Mt.**

- May 1-15;
- May 21-31;
- August 4-11;
- September 1-4, 11-14;
- October 1-31 (C.9.a).

Open seven days per week. All salmon except coho. (C.4, C.7). Chinook minimum size limit of 28 inches total length (B, C.1). All vessels fishing in the area must land their salmon in the State of Oregon. See gear restrictions and definitions (C.2, C.3). Beginning September 1, no more than 100 Chinook allowed per vessel per landing week (Thurs.-Wed.).

- Mark-selective coho fishery open August 4-11; or Cape Falcon to Humbug Mt. quota of 10,000 marked coho. If the coho quota for the combined area from Cape Falcon to Humbug Mt. of 10,000 marked coho is met, then the season continues for all salmon except coho on the remaining open days.

All salmon, all retained coho must be marked with a healed adipose fin clip (C.4, C.7). Coho minimum size limit of 16 inches total length, and Chinook minimum size limit of 28 inches total length (B, C.1). All vessels fishing in the area must land their salmon in the State of Oregon. See gear restrictions and definitions (C.2, C.3).

Salmon trollers may take and retain or possess on board a fishing vessel no more than 30 coho per vessel per open period. All coho retained, possessed on a vessel, and landed must not exceed a 1:1 ratio with Chinook salmon that are retained and landed at the same time.

In 2023, the season will open March 15 for all salmon except coho. Chinook minimum size limit of 28 inches total length. Gear restrictions same as in 2022. This opening could be modified following Council review at its March 2023 meeting.

TABLE 1. 2022 Commercial troll management measures for non-Indian ocean salmon fisheries – **Council adopted.** (Page 4 of 9)

**A. SEASON DESCRIPTIONS**

**South of Cape Falcon**

**Humbug Mt. to OR/CA Border (Oregon KMZ)**

- March 15-April 30;
- June 1-30, or the earlier of 800 Chinook quota;
- July 1-31, or the earlier of 400 Chinook quota;
- August 1-28, or the earlier of 250 Chinook quota (C.9.a).

Open seven days per week (Thurs.-Wed.). All salmon except coho (C.4, C.7). Chinook minimum size limit of 28 inches total length (B, C.1). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Prior to June 1, all salmon caught in this area must be landed and delivered in the State of Oregon.

June 1-August 28 weekly landing and possession limit of 50 Chinook per vessel per week (Thurs.-Wed.).

Any remaining portion of Chinook quotas may be transferred inseason on an impact neutral basis to the next open quota period (C.8.b).

All vessels fishing in this area during June, July, and August must land and deliver all salmon within this area or into Port Orford within 24 hours of any closure of this fishery and prior to fishing outside of this area.

For all quota managed seasons, Oregon state regulations require fishers to notify ODFW within one hour of landing and prior to transport away from the port of landing by calling 541-857-2538 or sending notification via e-mail to kmzor.trollreport@odfw.oregon.gov, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery.

In 2023, the season will open March 15 for all salmon except coho. Chinook minimum size limit of 28 inches total length. Gear restrictions same as in 2022. This opening could be modified following Council review at its March 2023 meeting.

**OR/CA Border to Humboldt South Jetty (California KMZ)**

- Closed.

In 2023, the season will open May 1 through the earlier of May 31, or a 3,000 Chinook quota. Chinook minimum size limit of 27 inches total length (B, C.1). Landing and possession limit of 20 Chinook per vessel per day (C.8.f). Open five days per week (Fri.-Tue.). All salmon except coho (C.4, C.7). Any remaining portion of Chinook quotas may be transferred inseason on an impact neutral basis to the next open quota period (C.8.b). All fish caught in this area must be landed within the area, within 24 hours of any closure of the fishery (C.6), and prior to fishing outside the area (C.10). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.e). See California State regulations for an additional closure adjacent to the Smith River. This opening could be modified following Council review at its March or April 2023 meetings.

**Humboldt South Jetty to Latitude 40°10' N**

- Closed.

When the fishery is closed between the OR/CA border and Humbug Mountain and open to the south, vessels with fish on board caught in the open area off California may seek temporary mooring in Brookings, Oregon prior to landing in California only if such vessels first notify the Chetco River Coast Guard Station via VHF channel 22A between the hours of 0500 and 2200 and provide the vessel name, number of fish on board, and estimated time of arrival (C.6).

TABLE 1. 2022 Commercial troll management measures for non-Indian ocean salmon fisheries – Council adopted. (Page 5 of 9)

**A. SEASON DESCRIPTIONS**

**Latitude 40°10' N. to Point Arena (Fort Bragg)**

- July 8-12, 21-25;
- August 3-12, (C.9.b).

Open seven days per week. All salmon except coho (C.4, C.7). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Chinook minimum size limit of 27 inches total length (B, C.1).

All salmon must be landed in California and north of Point Arena (C.6, C.11).

In 2023, the season will open April 16 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B, C.1). Gear restrictions same as in 2022 (C.2, C.3). This opening could be modified following Council review at its March 2023 meeting.

**Pt. Arena to Pigeon Pt. (San Francisco)**

- July 8-12, 21-25;
- August 3-12;
- September 1-30 (C.9.b).

Open seven days per week. All salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length through August, then 26 inches thereafter (B, C.1). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

All salmon must be landed in California (C.6).
During September, all salmon must be landed south of Point Arena (C.6, C.11).

In 2023, the season will open May 1 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B, C.1). Gear restrictions same as in 2022 (C.2, C.3). This opening could be modified following Council review at its March or April 2023 meeting.

**Point Reyes to Point San Pedro (Fall Area Target Zone)**

- October 3-7, 10-14.

Open five days per week (Mon.-Fri.). All salmon except coho (C.4, C.7). Chinook minimum size limit of 26 inches total length (B, C.1). All salmon caught in this area must be landed between Point Arena and Pigeon Point (C.6, C.11). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

**Pigeon Point to U.S./Mexico Border (Monterey)**

- May 1-5, 10-15, 20-24;
- June 1-12;
- July 8-12, 21-25;
- August 3-12 (C.9.b).

Open seven days per week. All salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B, C.1). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). All salmon must be landed in California (C.6). All salmon caught in this area in the month of May must be landed within 24 hours of any closure of the fishery (C.6).
During the months of May and June, all salmon caught in this area must be landed south of Point Arena (C.11).

In 2023, the season will open May 1 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B, C.1). Gear restrictions same as in 2022 (C.2, C.3). This opening could be modified following Council review at its March or April 2023 meeting.

California State regulations require all salmon be made available to a CDFW representative for sampling immediately at port of landing. Any person in possession of a salmon with a missing adipose fin, upon request by an authorized agent or employee of the CDFW, shall immediately relinquish the head of the salmon to the State (California Fish and Game Code §8226).

**B. MINIMUM SIZE (Inches) (See C.1)**

| Area (when open) | Chinook | | Coho | | Pink |
|---|---|---|---|---|---|
| | Total Length | Head-off | Total Length | Head-off | |
| North of Cape Falcon | 27 | 20.5 | 16 | 12 | None |
| Cape Falcon to Humbug Mt. | 28 | 21.5 | 16 | 12 | None |
| Humbug Mt. to OR/CA Border | 28 | 21.5 | - | - | None |
| OR/CA Border to Humboldt South Jetty | - | - | - | - | - |
| Latitude 40°10' N. to Pt. Arena | 27 | 20.5 | - | - | 27 |
| Pt. Arena to Pigeon Pt. through August | 27 | 20.5 | - | - | 27 |
| Pt. Arena to Pigeon Pt. September-October | 26 | 19.5 | - | - | 26 |
| Pigeon Pt. to U.S./Mexico Border | 27 | 20.5 | - | - | 27 |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Compliance with Minimum Size or Other Special Restrictions: All salmon on board a vessel must meet the minimum size, landing/possession limit, or other special requirements for the area being fished and the area in which they are landed if the area is open or has been closed less than 48 hours for that species of salmon. Salmon may be landed in an area that has been closed for a species of salmon more than 48 hours only if they meet the minimum size, landing/possession limit, or other special requirements for the area in which they were caught. Salmon may not be filleted prior to landing.

Any person who is required to report a salmon landing by applicable state law must include on the state landing receipt for that landing both the number and weight of salmon landed by species. States may require fish landing/receiving tickets be kept on board the vessel for 90 days or more after landing to account for all previous salmon landings.

C.2. Gear Restrictions:

a. Salmon may be taken only by hook and line using single point, single shank, barbless hooks.
b. Cape Falcon, Oregon, to the OR/CA border: No more than 4 spreads are allowed per line.
c. OR/CA border to U.S./Mexico border: No more than 6 lines are allowed per vessel, and barbless circle hooks are required when fishing with bait by any means other than trolling.

C.3. Gear Definitions:

*Trolling defined*: Fishing from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

*Troll fishing gear defined*: One or more lines that drag hooks behind a moving fishing vessel engaged in trolling. In that portion of the fishery management area off Oregon and Washington, the line or lines must be affixed to the vessel and must not be intentionally disengaged from the vessel at any time during the fishing operation.

*Spread defined*: A single leader connected to an individual lure and/or bait.

*Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90º angle.

C.4. Vessel Operation in Closed Areas with Salmon on Board:

a. Except as provided under C.4.b below, it is unlawful for a vessel to have troll or recreational gear in the water while in any area closed to fishing for a certain species of salmon, while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.
b. When Genetic Stock Identification (GSI) samples will be collected in an area closed to commercial salmon fishing, the scientific research permit holder shall notify NOAA OLE, USCG, CDFW, WDFW, ODFW, and OSP at least 24 hours prior to sampling and provide the following information: the vessel name, date, location, and time collection activities will be done. Any vessel collecting GSI samples in a closed area shall not possess any salmon other than those from which GSI samples are being collected. Salmon caught for collection of GSI samples must be immediately released in good condition after collection of samples.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (*continued)***

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48º23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to Cape Alava (48º10'00" N. lat.) and east of 125º05'00" W. long.

b. *Mandatory Yelloweye Rockfish Conservation Area* – The area in Washington Marine Catch Area 3 from 48°00.00' N. lat.; 125°14.00' W. long. to 48°02.00' N. lat.; 125°14.00' W. long. to 48°02.00' N. lat.; 125°16.50' W. long. to 48°00.00' N. lat.; 125°16.50' W. long. and connecting back to 48°00.00' N. lat.; 125°14.00' W. long.

c. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 55'36" N. lat., 124°10'51" W. long.).

d. *Columbia Control Zone* - An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat.,124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°15'48" N. lat., 124°05'20" W. long.), and then along the north jetty to the point of intersection with the Buoy #10 line; and, on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

e. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately 6 nautical miles north of the Klamath River mouth); on the west by 124°23'00" W. long. (approximately 12 nautical miles off shore); and on the south by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

f. Waypoints for the 40 fathom regulatory line from Cape Falcon to Humbug Mt. (50 CFR 660.71 (k) (12)-(70), when in place.

| | | |
|---|---|---|
| 45°46.00′ N. lat., 124°04.49′ W. long.; | 44°41.68′ N. lat., 124°15.38′ W. long.; | 43°17.96′ N. lat., 124°28.81′ W. long.; |
| 45°44.34′ N. lat., 124°05.09′ W. long.; | 44°34.87′ N. lat., 124°15.80′ W. long.; | 43°16.75′ N. lat., 124°28.42′ W. long.; |
| 45°40.64′ N. lat., 124°04.90′ W. long.; | 44°33.74′ N. lat., 124°14.44′ W. long.; | 43°13.97′ N. lat., 124°31.99′ W. long.; |
| 45°33.00′ N. lat., 124°04.46′ W. long.; | 44°27.66′ N. lat., 124°16.99′ W. long.; | 43°13.72′ N. lat., 124°33.25′ W. long.; |
| 45°32.27′ N. lat., 124°04.74′ W. long.; | 44°19.13′ N. lat., 124°19.22′ W. long.; | 43°12.26′ N. lat., 124°34.16′ W. long.; |
| 45°29.26′ N. lat., 124°04.22′ W. long.; | 44°15.35′ N. lat., 124°17.38′ W. long.; | 43°10.96′ N. lat., 124°32.33′ W. long.; |
| 45°20.25′ N. lat., 124°04.67′ W. long.; | 44°14.38′ N. lat., 124°17.78′ W. long.; | 43°05.65′ N. lat., 124°31.52′ W. long.; |
| 45°19.99′ N. lat., 124°04.62′ W. long.; | 44°12.80′ N. lat., 124°17.18′ W. long.; | 42°59.66′ N. lat., 124°32.58′ W. long.; |
| 45°17.50′ N. lat., 124°04.91′ W. long.; | 44°09.23′ N. lat., 124°15.96′ W. long.; | 42°54.97′ N. lat., 124°36.99′ W. long.; |
| 45°11.29′ N. lat., 124°05.20′ W. long.; | 44°08.38′ N. lat., 124°16.79′ W. long.; | 42°53.81′ N. lat., 124°38.57′ W. long.; |
| 45°05.80′ N. lat., 124°05.40′ W. long.; | 44°08.30′ N. lat., 124°16.75′ W. long.; | 42°50.00′ N. lat., 124°39.68′ W. long.; |
| 45°05.08′ N. lat., 124°05.93′ W. long.; | 44°01.18′ N. lat., 124°15.42′ W. long.; | 42°49.13′ N. lat., 124°39.70′ W. long.; |
| 45°03.83′ N. lat., 124°06.47′ W. long.; | 43°51.61′ N. lat., 124°14.68′ W. long.; | 42°46.47′ N. lat., 124°38.89′ W. long.; |
| 45°01.70′ N. lat., 124°06.53′ W. long.; | 43°42.66′ N. lat., 124°15.46′ W. long.; | 42°45.74′ N. lat., 124°38.86′ W. long.; |
| 44°58.75′ N. lat., 124°07.14′ W. long.; | 43°40.49′ N. lat., 124°15.74′ W. long.; | 42°44.79′ N. lat., 124°37.96′ W. long.; |
| 44°51.28′ N. lat., 124°10.21′ W. long.; | 43°38.77′ N. lat., 124°15.64′ W. long.; | 42°45.01′ N. lat., 124°36.39′ W. long.; |
| 44°49.49′ N. lat., 124°10.90′ W. long.; | 43°34.52′ N. lat., 124°16.73′ W. long.; | 42°44.14′ N. lat., 124°35.17′ W. long.; |
| 44°44.96′ N. lat., 124°14.39′ W. long.; | 43°28.82′ N. lat., 124°19.52′ W. long.; | 42°42.14′ N. lat., 124°32.82′ W. long.; |
| 44°43.44′ N. lat., 124°14.78′ W. long.; | 43°23.91′ N. lat., 124°24.28′ W. long.; | 42°40.50′ N. lat., 124°31.98′ W. long. |
| 44°42.26′ N. lat., 124°13.81′ W. long.; | 43°20.83′ N. lat., 124°26.63′ W. long.; | |

C.6. Notification When Unsafe Conditions Prevent Compliance with Regulations: If prevented by unsafe weather conditions or mechanical problems from meeting special management area landing restrictions, vessels must notify the U.S. Coast Guard and receive acknowledgment of such notification prior to leaving the area. This notification shall include the name of the vessel, port where delivery will be made, approximate number of salmon (by species) on board, the estimated time of arrival, and the specific reason the vessel is not able to meet special management area landing restrictions.

In addition to contacting the U.S. Coast Guard, vessels fishing south of the Oregon/California border must notify CDFW within one hour of leaving the management area by calling 800-889-8346 and providing the same information as reported to the U.S. Coast Guard. All salmon must be offloaded within 24 hours of reaching port.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

C.7. Incidental Halibut Harvest: License applications for incidental harvest for halibut during commercial salmon fishing must be obtained from IPHC.

a. During the 2022 salmon troll season, incidental harvest is authorized only during April, May, and June, and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825 or 206-526-6667). WDFW, ODFW, and CDFW will monitor landings. If the landings are projected to exceed the IPHC's preseason allocation or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to prohibit retention of halibut in the non-Indian salmon troll fishery.
b. Through May 15, 2022, consistent with regulations adopted in April 2021, license holders may land no more than 1 Pacific halibut per each 2 Chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 halibut may be landed per trip.
c. Beginning May 16, 2022, through the end of the 2022 salmon troll fishery, and beginning April 1, 2023, until modified through inseason action or superseded by the 2023 management measures, license holders may land or possess no more than one Pacific halibut per two Chinook, except one Pacific halibut may be possessed or landed without meeting the ratio requirement, and no more than 35 halibut may be possessed or landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).
d. Incidental Pacific halibut catch regulations in the commercial salmon troll fishery adopted for 2022, prior to any 2022 inseason action, will be in effect when incidental Pacific halibut retention opens on April 1, 2023, unless otherwise modified by inseason action at the March 2023 Council meeting.
e. "C-shaped" yelloweye rockfish conservation area is an area to be voluntarily avoided for salmon trolling. NMFS and the Council request salmon trollers voluntarily avoid this area to protect yelloweye rockfish. The area is defined in the Pacific Council Halibut Catch Sharing Plan in the North Coast subarea (Washington marine area 3), with the following coordinates in the order listed:
    48°18' N. lat.; 125°18' W. long.;
    48°18' N. lat.; 124°59' W. long.;
    48°11' N. lat.; 124°59' W. long.;
    48°11' N. lat.; 125°11' W. long.;
    48°04' N. lat.; 125°11' W. long.;
    48°04' N. lat.; 124°59' W. long.;
    48°00' N. lat.; 124°59' W. long.;
    48°00' N. lat.; 125°18' W. long.;
    and connecting back to 48°18' N. lat.; 125°18' W. long.

C.8. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June non-Indian commercial troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline if the transfer would not result in exceeding preseason impact expectations on any stocks.
b. Chinook remaining from May, June, and/or July non-Indian commercial troll quotas in the Oregon or California KMZ may be transferred to the Chinook quota for the next open period if the transfer would not result in exceeding preseason impact expectations on any stocks.
c. NMFS may transfer salmon between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the areas' representatives on the Salmon Advisory Subpanel (SAS), and if the transfer would not result in exceeding preseason impact expectations on any stocks.
d. The Council will consider inseason recommendations for special regulations for any experimental fisheries annually in March; proposals must meet Council protocol and be received in November the year prior.
e. If retention of unmarked coho (adipose fin intact) is permitted by inseason action, the allowable coho quota will be adjusted to ensure preseason projected impacts on all stocks is not exceeded.
f. Landing limits may be modified inseason to sustain season length and keep harvest within overall quotas.

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 9 of 9)

C.9. State Waters Fisheries: Consistent with Council management objectives:
   a. The State of Oregon may establish additional late-season fisheries in state waters.
   b. The State of California may establish limited fisheries in selected state waters.
   c. Check state regulations for details.

C.10. For the purposes of California Fish and Game Code, Section 8232.5, the definition of the Klamath Management Zone (KMZ) for the ocean salmon season shall be that area from Humbug Mountain, Oregon, to Latitude 40°10' N.

C.11. Latitudes for geographical reference of major landmarks along the west coast. Majority of information from source: 2021 West Coast federal salmon regulations.
https://www.fisheries.noaa.gov/action/fisheries-west-coast-states-west-coast-salmon-fisheries-2021-management-measures

| | | | |
|---|---|---|---|
| Cape Flattery, WA | 48°23′00″ N lat. | Humboldt South Jetty, CA | 40°45′53″ N lat. |
| Cape Alava, WA | 48°10′00″ N lat. | 40°10′ line (near Cape Mendocino, CA) | 40°10′00″ N lat. |
| Queets River, WA | 47°31′42″ N lat. | Horse Mountain, CA | 40°05′00″ N lat. |
| Leadbetter Point, WA | 46°38′10″ N lat. | Point Arena, CA | 38°57′30″ N lat. |
| Cape Falcon, OR | 45°46′00″ N lat. | Point Reyes, CA | 37°59′44″ N lat. |
| South end Heceta Bank line, OR | 43°58′00″ N lat. | Point San Pedro, CA | 37°35′40″ N lat. |
| Humbug Mountain, OR | 42°40′30″ N lat. | Pigeon Point, CA | 37°11′00″ N lat. |
| Oregon-California border | 42°00′00″ N lat. | Point Sur, CA | 36°18′00″ N lat. |
| | | Point Conception, CA | 34°27′00″ N lat. |

TABLE V-2. 2022 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted.
(Page 1 of 5)

| A. SEASON DESCRIPTIONS |
|---|
| **North of Cape Falcon** |
| **Supplemental Management Information** |
| |
| 1. Overall non-Indian TAC: 54,000 Chinook and 200,000 coho marked with a healed adipose fin clip (marked).<br>2. Recreational TAC: 27,000 Chinook and 168,000 marked coho; all retained coho must be marked.<br>3. Buoy 10 fishery opens August 1 with an expected landed catch of 55,000 marked coho in August and September. |
| **U.S./Canada Border to Cape Alava (Neah Bay Subarea**)<br>• June 18 through earlier of September 30, or 17,470 marked coho subarea quota, with a subarea guideline of 6,110 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day. All coho must be marked with a healed adipose fin clip (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3).<br><br>Beginning August 1, Chinook non-retention east of the Bonilla-Tatoosh line (C.4.a) during Council managed ocean fishery.<br><br>Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5). |
| **Cape Alava to Queets River (La Push Subarea)**<br>• June 18 through earlier of September 30, or 4,370 marked coho subarea quota, with a subarea guideline of 995 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day. All coho must be marked with a healed adipose fin clip (C.1). See gear restrictions and definitions (C.2, C.3). Chinook minimum size limit of 24 inches total length (B).<br><br>Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5).<br><br>• October 5 through earlier of October 8, or 125 Chinook quota (C.5) in the area north of 47°50'00 N. lat. and south of 48°00'00" N. lat.<br><br>Open seven days per week. Chinook only, 2 Chinook per day. See gear restrictions and definitions (C.2, C.3). Chinook minimum size limit of 24 inches total length (B, C.1). |
| **Queets River to Leadbetter Point (Westport Subarea)**<br>• July 2 through earlier of September 30, or 62,160 marked coho subarea quota, with a subarea guideline of 12,070 Chinook (C.5).<br><br>Open seven days per week. All salmon; two salmon per day, no more than one of which may be a Chinook. All coho must be marked with a healed adipose fin clip (C.1). See gear restrictions and definitions (C.2, C.3). Chinook minimum size limit of 22 inches total length (B).<br><br>Grays Harbor Control Zone closed beginning August 8 (C.4.b). Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5). |
| **Leadbetter Point to Cape Falcon (Columbia River Subarea)**<br>• June 25 through earlier of September 30, or 84,000 marked coho subarea quota, with a subarea guideline of 7,700 Chinook (C.5).<br><br>Open seven days per week. All salmon; two salmon per day, no more than one of which may be a Chinook. All coho must be marked with a healed adipose fin clip (C.1). See gear restrictions and definitions (C.2, C.3). Chinook minimum size limit of 22 inches total length (B).<br><br>Columbia Control Zone closed (C.4.c). Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5). |

TABLE 2. 2022 Recreational management measures for non-Indian ocean salmon fisheries – Council adopted. (Page 2 of 5)

**South of Cape Falcon**

**Supplemental Management Information**

1. Sacramento River fall Chinook spawning escapement of 198,694 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 49.9%.
3. Klamath River recreational fishery allocation: 2,119 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 9,434 adult Klamath River fall Chinook.
5. Overall recreational coho TAC: 100,000 coho marked with a healed adipose fin clip (marked), and 17,000 coho in the non-mark-selective coho fishery.
6. Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the CFGC.
7. For fisheries scheduled prior to May 16, 2022, see 2021 management measures, which are subject to inseason action and the 2022 season description described below.

**A. SEASON DESCRIPTIONS**

**South of Cape Falcon**

**Cape Falcon to Humbug Mt.**
- March 15-May 15;
- May 16-October 31 (C.6).

Open seven days per week. All salmon except coho, except as provided below during the all-salmon mark-selective coho fishery and the non-mark-selective coho fishery (C.5), two fish per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2023, the season will open March 15 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); and the same gear restrictions as in 2022 (C.2, C.3). This opening could be modified following Council review at its March 2023 meeting.

**Cape Falcon to OR/CA Border.**
All-salmon mark-selective coho fishery:
- June 18 through the earlier of August 21, or 100,000 marked coho quota (C.6).

Open seven days per week. Cape Falcon to Humbug Mt.: All salmon two salmon per day. Humbug Mt. to OR/CA Border: June 18-24, all salmon except Chinook, two salmon per day; and June 25-August 21 or coho quota, all salmon, two salmon per day. All retained coho must be marked with a healed adipose fin clip. See minimum size limits (B). See gear restrictions and definitions (C.2, C.3).

Any remainder of the mark-selective coho quota may be transferred inseason on an impact neutral basis to the non-selective coho quota from Cape Falcon to Humbug Mountain (C.5).

**Cape Falcon to Humbug Mt.**
Non-mark-selective coho fishery:
- September 3 through the earlier of September 30, or 17,000 non-mark-selective coho quota (C.6). Open days may be modified inseason.

Open seven days per week. All salmon, two salmon per day (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3).

**Humbug Mt. to OR/CA Border (Oregon KMZ)**
- June 25-August 21 (C.6).

Open seven days per week. All salmon except coho, except as listed above for the mark-selective coho fishery.
From Cape Falcon to the OR/CA Border (June 18-August 21). Two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3).

**For Recreational Fisheries from Cape Falcon to Humbug Mt.:** Fishing in the Stonewall Bank yelloweye rockfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (call the halibut fishing hotline 1-800-662-9825 for specific dates) (C.3.b, C.4.d).

TABLE 2. 2022 Recreational management measures for non-Indian ocean salmon fisheries – Council adopted. (Page 3 of 5)

**A. SEASON DESCRIPTIONS**

**OR/CA Border to latitude 40°10' N. (California KMZ)**

- May 1-May 15;
- May 16-31;
- August 1-September 5 (C.6).

Open seven days per week. All salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

Klamath Control Zone closed in August (C.4.e). See California State regulations for additional closures adjacent to the Smith, Eel, and Klamath Rivers.

In 2023, season opens May 1 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); and the same gear restrictions as in 2022 (C.2, C.3). This opening could be modified following Council review at its March or April 2023 meeting.

**Latitude 40°10' N. to Point Arena (Fort Bragg)**

- May 1-15;
- May 16-July 4;
- July 22-September 5 (C.6).

Open seven days per week. All salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2023, season opens April 1 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); and the same gear restrictions as in 2022 (C.2, C.3). This opening could be modified following Council review at its March 2023 meeting.

**Point Arena to Pigeon Point (San Francisco)**

- April 2-May 15 (C.6).

Open seven days per week. All salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3).

- May 16-31;
- June 23-October 31 (C.6).

Open seven days per week. All salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2023, season opens April 1 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); and the same gear restrictions as in 2022 (C.2, C.3). This opening could be modified following Council review at its March 2023 meeting.

**Pigeon Point to U.S./Mexico Border (Monterey)**

- April 2-May 15 (C.6).

Open seven days per week. All salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3).

- May 16-October 2 (C.6).

Open seven days per week. All salmon except coho, two salmon per day (C.1). Chinook minimum size limit 20 inches total length. See gear restrictions and definitions (C.2, C.3).

In 2023, season opens April 1 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); and the same gear restrictions as in 2022 (C.2, C.3). This opening could be modified following Council review at its March 2023 meeting.

California State regulations require all salmon be made available to a CDFW representative for sampling immediately at port of landing. Any person in possession of a salmon with a missing adipose fin, upon request by an authorized agent or employee of the CDFW, shall immediately relinquish the head of the salmon to the State (California Code of Regulations Title 14 Section 1.73).

ABLE 2. 2022 Recreational management measures for non-Indian ocean salmon fisheries – Council adopted. (Page 4 of 5)

**B. MINIMUM SIZE (Inches) (See C.1)**

| Area (when open) | Chinook | Coho | Pink |
|---|---|---|---|
| North of Cape Falcon (Westport and Columbia River) | 22 | 16 | None |
| North of Cape Falcon (Neah Bay and La Push) | 24 | 16 | None |
| Cape Falcon to Humbug Mt. | 24 | 16 | None |
| Humbug Mt. to OR/CA Border | 24 | 16 | None |
| OR/CA Border to Pt. Arena | 20 | - | 20 |
| Pt. Arena to Pigeon Pt. through May 15 | 24 | - | 24 |
| Pt. Arena to Pigeon Pt. beginning May 16 | 20 | - | 20 |
| Pigeon Pt. to U.S./Mexico Border through May 15 | 24 | - | 24 |
| Pigeon Pt. to U.S./Mexico Border beginning May 16 | 20 | - | 20 |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Compliance with Minimum Size and Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught. Salmon may not be filleted prior to landing.
*Ocean Boat Limits*: Off the coast of Washington, Oregon, and California, each fisher aboard a vessel may continue to use angling gear until the combined daily limits of Chinook and coho salmon for all licensed and juvenile anglers aboard have been attained (additional state restrictions may apply).

C.2. Gear Restrictions: Salmon may be taken only by hook and line using barbless hooks. All persons fishing for salmon, and all persons fishing from a boat with salmon on board must meet the gear restrictions listed below for specific areas or seasons.
a. *U.S./Canada Border to Pt. Conception, California*: No more than one rod may be used per angler; and no more than two single point, single shank, barbless hooks are required for all fishing gear.
b. *Latitude 40°10' N. to Pt. Conception, California:* Single point, single shank, barbless circle hooks (see gear definitions below) are required when fishing with bait by any means other than trolling, and no more than two such hooks shall be used. When angling with two hooks, the distance between the hooks must not exceed five inches when measured from the top of the eye of the top hook to the inner base of the curve of the lower hook, and both hooks must be permanently tied in place (hard tied). Circle hooks are not required when artificial lures are used without bait.

C.3. Gear Definitions:
a. *Recreational fishing gear defined*: Off Oregon and Washington, angling tackle consists of a single line that must be attached to a rod and reel held by hand or closely attended; the rod and reel must be held by hand while playing a hooked fish. No person may use more than one rod and line while fishing off Oregon or Washington. Off California, the line must be attached to a rod and reel held by hand or closely attended; weights directly attached to a line may not exceed four pounds (1.8 kg). While fishing off California north of Pt. Conception, no person fishing for salmon, and no person fishing from a boat with salmon on board, may use more than one rod and line. Fishing includes any activity which can reasonably be expected to result in the catching, taking, or harvesting of fish.
b. *Trolling defined*: Angling from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.
c. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

C.4. Control Zone Definitions:

a. *The Bonilla-Tatoosh Line*: A line running from the western end of Cape Flattery to Tatoosh Island Lighthouse (48°23'30" N. lat., 124°44'12" W. long.) to the buoy adjacent to Duntze Rock (48°24'37" N. lat., 124°44'37" W. long.), then in a straight line to Bonilla Pt. (48°35'39" N. lat., 124°42'58" W. long.) on Vancouver Island, British Columbia.

b. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 55'36" N. lat., 124°10'51" W. long.).

c. *Columbia Control Zone*: An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat., 124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°15'48" N. lat., 124°05'20" W. long. and then along the north jetty to the point of intersection with the Buoy #10 line; and on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

d. *Stonewall Bank Yelloweye Rockfish Conservation Area*: The area defined by the following coordinates in the order listed:
   44°37.46' N. lat.; 124°24.92' W. long.
   44°37.46' N. lat.; 124°23.63' W. long.
   44°28.71' N. lat.; 124°21.80' W. long.
   44°28.71' N. lat.; 124°24.10' W. long.
   44°31.42' N. lat.; 124°25.47' W. long.
   and connecting back to 44°37.46' N. lat.; 124°24.92' W. long.

e. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately 6 nautical miles north of the Klamath River mouth); on the west by 124°23'00" W. long. (approximately 12 nautical miles offshore); and, on the south by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

C.5. Inseason Management: Regulatory modifications may become necessary inseason to meet preseason management objectives such as quotas, harvest guidelines, and season duration. In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Actions could include modifications to bag limits, or days open to fishing, and extensions or reductions in areas open to fishing.

b. Coho may be transferred inseason among recreational subareas north of Cape Falcon to help meet the recreational season duration objectives (for each subarea) after conferring with representatives of the affected ports and the Council's SAS recreational representatives north of Cape Falcon, and if the transfer would not result in exceeding preseason impact expectations on any stocks.

c. Chinook and coho may be transferred between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS, and if the transfer would not result in exceeding preseason impact expectations on any stocks.

d. Fishery managers may consider inseason action modifying regulations restricting retention of unmarked (adipose fin intact) coho. To remain consistent with preseason expectations, any inseason action shall consider, if significant, the difference between observed and preseason forecasted (adipose-clipped) mark rates. Such a consideration may also include a change in bag limit of two salmon, no more than one of which may be a coho.

e. Marked coho remaining from the Cape Falcon to OR/CA Border. recreational mark-selective coho quota may be transferred inseason to the Cape Falcon to Humbug Mt. non-mark-selective recreational fishery if the transfer would not result in exceeding preseason impact expectations on any stocks.

C.6. Additional Seasons in State Territorial Waters: Consistent with Council management objectives, the States of Washington, Oregon, and California may establish limited seasons in state waters. Check state regulations for details.

TABLE V-3. 2022 Treaty Indian ocean troll management measures for ocean salmon fisheries - Council adopted. (Page 1 of 2)

| A. SEASON ALTERNATIVE DESCRIPTIONS |
|---|
| **Supplemental Management Information** |
| 1. Overall Treaty-Indian TAC: 40,000 Chinook and 52,000 coho.<br>2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.<br>3. In 2023, the season will open May 1, consistent with all preseason regulations in place for Treaty Indian Troll fisheries during May 16-June 30, 2022. All catch in May 2023 applies against the 2023 Treaty Indian Troll fisheries quota. This opening could be modified following Council review at its March and/or April 2023 meetings. |
| • May 1 through the earlier of June 30 or 20,000 Chinook quota.<br><br>All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C).<br><br>• July 1 through the earlier of September 15, or 20,000 Chinook quota or 52,000 coho quota<br><br>All salmon. See size limit (B) and other restrictions (C). |

**B. MINIMUM LENGTH (TOTAL INCHES)**

| | Chinook | | Coho | | |
|---|---|---|---|---|---|
| Area (when open) | Total Length | Head-off | Total Length | Head-off | Pink |
| North of Cape Falcon | 24.0 (61.0 cm) | 18.0 (45.7 cm) | 16.0 (40.6 cm) | 12.0 (30.5 cm) | None |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Tribe and Area Boundaries. All boundaries may be changed to include such other areas as may hereafter be authorized by a Federal court for that tribe's treaty fishery.

S'KLALLAM - Washington State Statistical Area 4B (defined to include those waters of Puget Sound easterly of a line projected from the Bonilla Point light on Vancouver Island to the Tatoosh Island light, thence to the most westerly point on Cape Flattery and westerly of a line projected true north from the fishing boundary marker at the mouth of the Sekiu River [WAC 220-301-030]).

MAKAH - Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.

QUILEUTE - A polygon commencing at Cape Alava, located at latitude 48°10'00" north, longitude 124°43'56.9" west; then proceeding west approximately forty nautical miles at that latitude to a northwestern point located at latitude 48°10'00" north, longitude 125°44'00" west; then proceeding in a southeasterly direction mirroring the coastline at a distance no farther than forty nautical miles from the mainland Pacific coast shoreline at any line of latitude, to a southwestern point at latitude 47°31'42" north, longitude 125°20'26" west; then proceeding east along that line of latitude to the Pacific coast shoreline at latitude 47°31'42" north, longitude 124°21'9.0" west.

HOH - That portion of the FMA between 47°54'18" N. lat. (Quillayute River) and 47°21'00" N. lat. (Quinault River) and east of 125°44'00" W. long.

QUINAULT - A polygon commencing at the Pacific coast shoreline near Destruction Island, located at latitude 47°40'06" north, longitude 124°23'51.362" west; then proceeding west approximately thirty nautical miles at that latitude to a northwestern point located at latitude 47°40'06" north, longitude 125°08'30" west; then proceeding in a southeasterly direction mirroring the coastline no farther than thirty nautical miles from the mainland Pacific coast shoreline at any line of latitude, to a southwestern point at latitude 46°53'18" north, longitude 124°53'53" west; then proceeding east along that line of latitude to the pacific coast shoreline at latitude 46°53'18" north, longitude 124°7'36.6" west.

C.2. Gear restrictions
- a. Single point, single shank, barbless hooks are required in all fisheries.
- b. No more than eight fixed lines per boat.
- c. No more than four hand-held lines per person in the Makah area fishery (Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.)

C.3. Quotas
- a. The quotas include troll catches by the S'Klallam and Makah Tribes in Washington State Statistical Area 4B from May 1 through September 15.
- b. The Quileute Tribe may continue a ceremonial and subsistence fishery during the time frame of October 1 through October 15 in the same manner as in 2004-2015. Fish taken during this fishery are to be counted against treaty troll quotas established for the 2022 season (estimated harvest during the October ceremonial and subsistence fishery: 20 Chinook; 40 coho).

TABLE 3. 2022 Treaty Indian ocean troll management measures for ocean salmon fisheries - Council adopted. (Page 2 of 2)

C.4. Area Closures
   a. The area within a six nautical mile radius of the mouths of the Queets River (47°31'42" N. lat.) and the Hoh River (47°45'12" N. lat.) will be closed to commercial fishing.
   b. A closure within two nautical miles of the mouth of the Quinault River (47°21'00" N. lat.) may be enacted by the Quinault Nation and/or the State of Washington and will not adversely affect the Secretary of Commerce's management regime.

C.5. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:
   a. Chinook remaining from the May through June treaty-Indian ocean troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline on a fishery impact equivalent basis.

TABLE V-4. 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 forecast 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 *at risk of* approaching an overfished condition or experiencing overfishing are indicated in **bold**. 2023 spawning escapement and exploitation rate estimates are based on preliminary 2023 preseason abundance forecasts and 2022 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 | 84,750 | 81,817 | 91,500 | 122,000 | 0.52 | 0.68 | 0.61 | 0.68 | 0.52 | 0.50 | 0.78 |
| Klamath River Fall | 52,352 | 20,022 | 26,185 | 30,056 | 22,051 | 17,792 | **22,761** | 30,525 | 40,700 | 0.32 | 0.43 | 0.30 | 0.38 | 0.45 | 0.32 | 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 | 0.78 |
| 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 River Bright - Fall[d/] | 58,540 | 77,880 | 98,401 | 86,644 | 53,961 | 99,945 | 77,600 | 19,182 | 39,625 | 0.34 | 0.38 | 0.29 | NA | NA | NA | 0.86 |
| Upper River - Summer[d/] | 38,816 | 41,090 | 70,654 | 52,076 | 64,497 | 57,178 | 57,695 | 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[d/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[d/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[d/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[g/] | 0.22 | NA | NA | NA | 0.78 |
| **Coho** | | | | | | | | | | | | | | | | |
| Willapa Bay[f/] | 17,228 | 15,115 | 16,476 | 31,369 | NA | 28,005 | 24,370 | 8,600 | 17,200 | 0.35 | 0.39 | 0.33 | 0.24 | NA | 0.53 | 0.74 |
| Grays Harbor[f/] | 49,622 | 30,468 | 23,814 | 62,762 | NA | 57,517 | 44,134 | 18,320 | 24,426 | 0.22 | 0.39 | 0.29 | 0.23 | NA | 0.49 | 0.65 |
| Queets | 2,631 | 1,700 | 4,181 | 5,752 | NA | 7,956 | 5,762 | 4,350 | 5,800 | 0.23 | 0.57 | 0.22 | 0.10 | NA | 0.36 | 0.65 |
| Hoh | 2,463 | 2,445 | 2,840 | 6,396 | NA | 3,057 | 3,815 | 1,890 | 2,520 | 0.34 | 0.57 | 0.49 | 0.18 | NA | 0.54 | 0.65 |
| Quillayute Fall | 6,091 | 6,852 | 7,695 | 9,938 | 13,000 | 8,469 | 10,304 | 4,725 | 6,300 | 0.30 | 0.37 | 0.16 | 0.04 | NA | 0.37 | 0.59 |
| Juan de Fuca | 5,470 | 4,625 | 8,548 | 20,837 | NA | 14,094 | 13,591 | 7,000 | 11,000 | 0.08 | 0.12 | 0.07 | 0.07 | NA | 0.10 | 0.60 |
| Hood Canal | 7,512 | 7,884 | 17,312 | 35,178 | NA | 22,872 | 24,061 | 10,750 | 14,350 | 0.57 | 0.46 | 0.29 | 0.25 | NA | 0.40 | 0.65 |
| Skagit | 19,047 | 14,246 | 23,808 | 75,532 | NA | 22,712 | 34,438 | 14,875 | 25,000 | 0.49 | 0.48 | 0.43 | 0.33 | NA | 0.48 | 0.60 |
| Stillaguamish | 23,937 | 12,887 | 21,555 | 38,176 | NA | 23,080 | 26,680 | 6,100 | 10,000 | 0.22 | 0.20 | 0.13 | 0.11 | NA | 0.24 | 0.50 |
| Snohomish | 58,135 | 40,314 | 42,675 | 97,523 | NA | 60,842 | 63,265 | 31,000 | 50,000 | 0.25 | 0.17 | 0.11 | 0.11 | NA | 0.21 | 0.60 |

a/ Preliminary.

b/ Preliminary approximations based on preseason forecasts and the previous year fishing regulations.

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

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

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

TABLE V-5. Postseason $S_{ACL}$, $S_{OFL}$, and spawner escapement estimates for Sacramento River fall Chinook (SRFC), Klamath River fall Chinook (KRFC) and Willapa Bay coho. For the current year, $S_{ACL}$ and $S_{OFL}$ are preseason values. Current year spawner escapements are preseason values based on current abundance forecasts and the previous year fishing regulations. Bolded values indicate instances where the escapement is lower than the $S_{ACL}$ and/or the $S_{OFL}$.

| | SRFC | | | KRFC | | | Willapa Bay Coho | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | $S_{ACL}$ [a/] | $S_{OFL}$ | Escapement [b/] | $S_{ACL}$ [a/] | $S_{OFL}$ | Escapement [c/] | $S_{ACL}$ [a/] | $S_{OFL}$ | Escapement [c/] |
| 2012 | 188,378 | 138,144 | 285,429 | 70,922 | 64,273 | 121,543 | -- | -- | -- |
| 2013 | 260,798 | 191,251 | 406,846 | 52,032 | 47,154 | 59,156 | -- | -- | -- |
| 2014 | 165,355 | 121,260 | 212,476 | 47,674 | 43,205 | 95,104 | -- | -- | -- |
| 2015 | 76,485 | 56,089 | 113,468 | 22,202 | 20,120 | 28,112 | 9,440 | 8,181 | 17,086 |
| 2016 | 61,595 | 45,170 | 89,699 | 7,056 | 6,394 | 13,937 | 14,839 | 12,860 | 30,667 |
| 2017 | 41,119 | 30,154 | 44,329 | 7,113 | 6,446 | 19,904 | 5,180 | 4,489 | 11,379 |
| 2018 | 66,110 | 48,481 | 105,466 | 24,468 | 22,174 | 52,352 | 7,903 | 6,849 | 17,228 |
| 2019 | 152,116 | 111,551 | 163,767 | 11,314 | 10,253 | 20,022 | 7,458 | 6,464 | 15,115 |
| 2020 | 105,746 | 77,547 | 138,091 | 12,014 | 10,887 | 26,185 | 7,399 | 6,413 | 16,476 |
| 2021 | 96,809 | 70,994 | 104,483 | 15,608 | 14,145 | 30,056 | 12,432 | 10,774 | 31,369 |
| 2022 | **75,357** | 55,262 | **61,850** | 12,917 | 11,706 | 22,051 | NA | NA | NA |
| 2023 | 50,930 | 37,349 | 84,750 | 8,396 | 7,609 | 17,792 | 17,825 | 15,448 | 28,005 |

a/ $S_{ACL} = S_{ABC.}$

b/ Hatchery and natural area adult spawners.

c/ Natural area adult spawners.

TABLE V-6. Comparison of projected ocean escapements and exploitation rates for critical natural and Columbia River hatchery coho stocks (thousands of fish) resulting from application of 2022 Council-adopted regulations to 2022 and 2023 ocean abundance forecasts.[a/]

| | Ocean Escapement and ER Estimates Under 2022 Regulations[b/] | | | | |
|---|---|---|---|---|---|
| | 2022 Abundance Forecasts | | 2023 Abundance Forecasts | | |
| Stock | Ocean Escapement | Exploitation Rate | Ocean Escapement | Exploitation Rate | 2023 FMP Conservation Objective[c/] |
| **Natural Coho Stocks** | | | | | |
| Skagit | 75.8 | 43.2% | 40.7 | 47.6% | Exploitation Rate ≤35.0%[d/] |
| Stillaguamish | 63.4 | 35.9% | 75.4 | 23.9% | Exploitation Rate ≤50.0%[d/] |
| Snohomish | 61.7 | 33.5% | 73.5 | 20.7% | Exploitation Rate ≤40.0%[d/] |
| Hood Canal | 18.9 | 44.1% | 35.4 | 39.9% | Exploitation Rate ≤45.0%[d/] |
| Strait of Juan de Fuca | 6.9 | 10.9% | 14.8 | 10.1% | Exploitation Rate ≤40.0%[d/] |
| Quillayute Fall | 11.6 | 37.4% | 12.6 | 37.4% | 6.3 - 15.8 Spawners |
| Hoh | 3.9 | 53.6% | 5.5 | 53.5% | 2.0 - 5.0 Spawners |
| Queets | 15.2 | 36.3% | 10.4 | 36.5% | 5.8 - 14.5 Spawners |
| Grays Harbor[f/] | 118.9 | 49.6% | 103.7 | 49.5% | 35.4 Spawners |
| LCN | 55.0 | 17.5% | 37.5 | 18.8% | Exploitation Rate ≤23.0[e/] |
| OCN | 190.0 | 15.0% | 202.9 | 15.4% | Exploitation Rate ≤20.0%[e/] |
| SONCC | | | | | |
| Trinity Natural | -- | 13.5% | -- | 13.5% | Exploitation Rate ≤16.0%[e/] |
| Klamath Natural | -- | 8.7% | -- | 8.7% | Exploitation Rate ≤15.0%[e/] |
| Rogue Natural | -- | 7.8% | -- | 7.8% | Exploitation Rate ≤15.0%[e/] |
| Other Natural | -- | 2.9% | -- | 2.9% | Exploitation Rate ≤15.0%[e/] |
| **Hatchery Coho Stocks** | | | | | |
| Columbia Early | 379.2 | 50.6% | 302.7 | 50.3% | 6.2 Hatchery Escapement |
| Columbia Late | 241.1 | 46.6% | 223.6 | 50.9% | 14.2 Hatchery Escapement |

a/ Quota levels include harvest and hooking mortality estimates used in planning the Council's 2022 ocean fisheries and a coho catch for the Canadian troll fishery off the West Coast of Vancouver Island (WCVI).

b/ 2022 preseason regulations with the following coho quotas: U.S. Canada Border to Cape Falcon: Treaty Indian troll-52,000; non-Indian troll-32,000 selective; recreational-168,000 selective; Cape Falcon to OR/CA border: recreational-100,000 selective and 17,000 non-selective; troll-10,000 selective. Ocean escapement is generally the estimated number of coho escaping ocean fisheries and entering freshwater. For Puget Sound stocks, ocean escapement is the total abundance minus ocean fisheries (ie outside Puget Sound). For the OCN coho stock, this value represents the estimated spawner escapement in SRS accounting. For Columbia R. hatchery and LCN stocks, ocean escapement represents the number of coho after the Buoy 10 fishery; the LCN exploitation rates shown are total marine and mainstem Columbia R. fishery ERs.

c/ Goals represent FMP conservation objectives, ESA consultation standards, or hatchery escapement needs. Spawning escapement goals are not directly comparable to ocean escapement because the latter occur before inside fisheries.

d/ Assumed exploitation rate based on preliminary abundance forecasts.

e/ Pending confirmation of 2023 ESA consultation standard.

f/ Grays Harbor escapements and exploitation rate estimates based on natural area adult spawners.

TABLE V-7. Comparison of Lower Columbia natural (LCN), Oregon coastal natural (OCN), and Southern Oregon/Northern California Coastal (SONCC) coho projected harvest mortality and exploitation rates by fishery under Council-adopted 2022 regulations and preliminary 2023 preseason abundance estimates.

| | Projected Harvest Mortality and Exploitation Rate | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | LCN | | OCN | | SONCC Natural[a/] | | | |
| Fishery | Number | Percent | Number | Percent | Trinity | Klamath | Rogue | Other |
| **SOUTHEAST ALASKA** | 0 | 0.0% | 0 | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| **BRITISH COLUMBIA** | 62 | 0.1% | 699 | 0.3% | 0.1% | 0.1% | 0.1% | 0.1% |
| **PUGET SOUND/STRAITS** | 73 | 0.2% | 58 | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| **NORTH OF CAPE FALCON** | | | | | | | | |
| Recreational | 2,233 | 4.9% | 2,210 | 0.9% | 0.0% | 0.0% | 0.0% | 0.0% |
| Treaty Indian Troll | 946 | 2.1% | 1,168 | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% |
| Non-Indian Troll | 744 | 1.6% | 796 | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% |
| **SOUTH OF CAPE FALCON** | | | | | | | | |
| Recreational: | | | | | | | | |
| Cape Falcon to Humbug Mt. | 1,943 | 4.3% | 19,473 | 8.1% | 0.6% | 0.6% | 0.6% | 0.6% |
| Humbug Mt. to Horse Mt. (KMZ) | 43 | 0.1% | 896 | 0.4% | 1.1% | 1.1% | 1.1% | 1.1% |
| Fort Bragg | 12 | 0.0% | 445 | 0.2% | 0.4% | 0.4% | 0.4% | 0.4% |
| South of Pt. Arena | 4 | 0.0% | 229 | 0.1% | 0.2% | 0.2% | 0.2% | 0.2% |
| Troll: | | | | | | | | |
| Cape Falcon to Humbug Mt. | 444 | 1.0% | 2,326 | 1.0% | 0.1% | 0.1% | 0.1% | 0.1% |
| Humbug Mt. to Horse Mt. (KMZ) | 3 | 0.0% | 47 | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Fort Bragg | 2 | 0.0% | 225 | 0.1% | 0.2% | 0.2% | 0.2% | 0.2% |
| South of Pt. Arena | 8 | 0.0% | 323 | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% |
| **BUOY 10** | 1,295 | 2.9% | 388 | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% |
| **ESTUARY/FRESHWATER** | 718 | 1.6% | 7,769 | 3.2% | 10.6% | 5.8% | 4.9% | 0.0% |
| **TOTAL** | 8,530 | 18.8% | 37,052 | 15.4% | 13.5% | 8.7% | 7.8% | 2.9% |

a/ Harvest mortality estimates not available.

TABLE V-8 Maximum allowable fishery impact rate for OCN coho under Amendment 13 matrix and the revised OCN work group matrix based on parent escapement levels by stock component and marine survival category.[a/]

| | OCN Coho Spawners by Stock Component | | | | Marine Survival Indicator | | Amendment 13 Matrix | | | OCN Work Group Matrix[a/] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fishery Year (t) | Parent Spawner Year (t-3) | Northern | North-Central | South-Central | Hatchery Jack Survival | Predicted OCN Adult Survival | Marine Survival Category | Parental Spawner Category | Maximum Allowable Impacts | Marine Survival Category[b/c/] | Parental Spawner Category | Maximum Allowable Impacts |
| 1998 | 1995 | 3,900 | 13,600 | 36,500 | 0.04% | - | Low | Very Low | ≤10-13% | Extremely Low | Very Low | ≤8% |
| 1999 | 1996 | 3,300 | 18,100 | 52,600 | 0.10% | - | Med | Very Low | ≤15% | Low | Critical | 0-8% |
| 2000 | 1997 | 2,100 | 2,800 | 18,400 | 0.12% | - | Med | Very Low | ≤15% | Low | Critical | 0-8% |
| 2001 | 1998 | 2,600 | 3,300 | 25,900 | 0.27% | - | Med | Very Low | ≤15% | Medium | Critical | 0-8% |
| 2002 | 1999 | 8,900 | 11,800 | 29,200 | 0.09% | - | Med | Low | ≤15% | Low | Low | ≤15% |
| 2003 | 2000 | 17,900 | 14,300 | 36,500 | 0.20% | - | Med | Low | ≤15% | Med | Low | ≤15% |
| 2004 | 2001 | 33,500 | 25,200 | 112,000 | 0.14% | - | Med | Low | ≤15% | Med | Low | ≤15% |
| 2005 | 2002 | 52,500 | 104,000 | 104,100 | 0.11% | - | Med | High | ≤20% | Low | High | ≤15% |
| 2006 | 2003 | 59,600 | 68,900 | 99,800 | 0.12% | - | Med | High | ≤20% | Low | High | ≤15% |
| 2007 | 2004 | 28,800 | 42,100 | 101,900 | 0.17% | - | Med | Med | ≤20% | Med | Med | ≤20% |
| 2008 | 2005 | 16,500 | 51,400 | 86,700 | 0.07% | - | Low | High | ≤15% | Extremely Low | High | ≤8% |
| 2009 | 2006 | 24,100 | 21,200 | 83,500 | 0.27% | - | Med | Low | ≤15% | Med | Low | ≤15% |
| 2010 | 2007 | 17,500 | 12,300 | 36,500 | 0.12% | - | Med | Low | ≤15% | Low | Low | ≤15% |
| 2011 | 2008 | 25,600 | 68,100 | 86,000 | 0.12% | - | Med | High | ≤20% | Low | High | ≤15% |
| 2012 | 2009 | 48,100 | 86,400 | 128,200 | 0.09% | - | Med | High | ≤20% | Low | High | ≤15% |
| 2013 | 2010 | 55,000 | 56,500 | 171,900 | 0.14% | 6.8% | Med | High | ≤20% | Med | High | ≤30% |
| 2014 | 2011 | 45,900 | 119,100 | 191,300 | 0.26% | 7.1% | Med | High | ≤20% | Med | High | ≤30% |
| 2015 | 2012 | 7,500 | 33,800 | 57,800 | 0.20% | 7.5% | Med | Low | ≤15% | Med | Low | ≤15% |
| 2016 | 2013 | 11,000 | 39,700 | 73,700 | 0.10% | 6.2% | Med | Med | ≤20% | Med | Med | ≤20% |
| 2017 | 2014 | 67,400 | 121,900 | 170,400 | 0.13% | 5.6% | Med | High | ≤30% | Med | High | ≤30% |
| 2018 | 2015 | 6,700 | 22,700 | 27,700 | 0.11% | 4.3% | Low | Low | ≤15% | Low | Low | ≤15% |
| 2019 | 2016 | 18,700 | 26,500 | 30,700 | 0.27% | 3.80% | Low | Low | ≤15% | Low | Low | ≤15% |
| 2020 | 2017 | 13,600 | 22,800 | 24,900 | 0.09% | 4.10% | Low | Low | ≤15% | Low | Low | ≤15% |
| 2021 | 2018 | 8,000 | 22,000 | 44,500 | 0.45% | 7.72% | High | Low | ≤15% | Med | Low | ≤15% |
| 2022 | 2019 | 22,300 | 20,100 | 52,800 | 0.31% | 6.98% | Med | Low | ≤15% | Med | Low | ≤15% |
| 2023 | 2020 | 21,500 | 30,800 | 57,600 | 0.30% | 7.87% | Med | Med | ≤20% | Med | Med | ≤20% |
| 2024[a/] | 2021 | 42,800 | 88,600 | 110,800 | - | - | - | High | - | - | High | - |
| 2025[a/] | 2022 | 46,700 | 70,000 | 45,300 | - | - | - | High | - | - | High | - |

a/ Developed by the OCN Coho Work Group as a result of the 2000 Review of Amendment 13. See Appendix A, tables A-2 and A-4 for details

b/ OCN workgroup matrix was modified during the 2012 methodology review. For 2013, the marine survival category is determined by a predicted OCN adult survival rate that is based on the natural smolt to jack relationship at Mill Creek in the Yaquina River basin.

c/ OCN workgroup matrix was modified during the 2013 methodology review. Beginning in 2014, the marine survival category is determined by a predicted OCN adult survival rate that is based on biologic and oceanographic indicators.

d/ Preliminary.

## REFERENCES


DeFilippo, L.B., Buehrens, T.W., Scheuerell, M., Kendall, N.W., and D.E. Schindler. 2021. Improving short-term recruitment forecasts for coho salmon using a spatiotemporal integrated population model. Fisheries Research 242. https://doi.org/10.1016/j.fishres.2021.106014

O'Farrell, M., Hendrix, N., and Mohr, M. 2016. An evaluation of preseason abundance forecasts for Sacramento River winter Chinook salmon. Report prepared for the 2016 Salmon Methodology Review. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/documents/2016/11/agenda-item-d-2-attachment-1-an-evaluation-of-preseason-abundance-forecasts.pdf/

PFMC. 2014. Preseason Report I: Stock Abundance Analysis and Environmental Assessment - Part 1 for 2015 Ocean Salmon Fishery Regulations. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/documents/2014/02/2014-preseason-report-i.pdf/

PFMC. 2021. Southern Oregon/Northern California Coast coho Salmon Workgroup Report: Fishery Harvest Control Rule. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/documents/2021/10/f-3-a-soncc-workgroup-report-1-electronic-only-fishery-harvest-control-rule-risk-assessment.pdf/

PFMC. 2022a. Preseason Report I: Stock Abundance Analysis and Environmental Assessment - Part 1 for 2022 Ocean Salmon Fishery Regulations. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/documents/2022/03/2022-preseason-report-i.pdf/

PFMC. 2022b. Preseason Report II: Proposed Alternatives and Environmental Assessment - Part 2 for 2022 Ocean Salmon Fishery Regulations. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/documents/2022/03/2022-preseason-report-ii.pdf/

PFMC. 2022c. Preseason Report III: Council Adopted Management Measures and Environmental Assessment Part 3 for 2022 Ocean Salmon Fisheries. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/salmon-management-documents/#safe

PFMC. 2023. Review of 2022 Ocean Salmon Fisheries: Stock Assessment and Fishery Evaluation Document for the Pacific Coast Salmon Fishery Management Plan. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/salmon-management-documents/#safe

WDFW. 2023. 2023 Wild Coho Forecasts for Puget Sound, Washington Coast, and Lower Columbia. Washington Department of Fish and Wildlife, Olympia, Washington. https://wdfw.wa.gov/publications/02406

## APPENDIX A
## SUMMARY OF COUNCIL STOCK MANAGEMENT GOALS

### LIST OF TABLES



### LIST OF FIGURES

TABLE A-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes[a/] (Page 1 of 6)

| 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 |
| Central Valley Spring ESA Threatened | NMFS ESA consultation standard/recovery plan: Conform to Sacramento River Winter Chinook ESA consultation standard (no defined objective for ocean management prior to listing). | Undefined | Undefined | Undefined | ESA consultation standard applies. |
| Sacramento River Winter ESA Endangered | NMFS ESA consultation standard/recovery plan: Recreational seasons: Point Arena to Pigeon Point between the first Saturday in April and the second Sunday in November; Pigeon Point to the U.S./Mexico Border between the first Saturday in April and the first Sunday in October. Minimum size limit ≥ 20 inches total length. Commercial seasons: Point Arena to the U.S./Mexico border between May 1 and September 30, except Point Reyes to Point San Pedro between October 1 and 15 (Monday through Friday). Minimum size limit ≥ 26 inches total length. Guidance from NMFS in 2010 and 2011 required implementation of additional closures and/or increased sized limits in the recreational fishery South of Point Arena. The winter-run management framework and consultation standard is an abundance based age-3 impact rate control rule established in 2018 (NMFS 2018) which sets the maximum allowable age-3 impact rate based on the forecast age-3 escapement in the absence of fisheries: above 3,000, the allowable, impact rate is fixed at 20 percent; between 3,000 and 500, the allowable impact rate declines linearly from 20 percent to 10 percent; between 500 and 0, the allowable impact rate declines linearly from 10 percent to 0 percent. | Undefined | Undefined | Undefined | |
| California Coastal Chinook ESA Threatened | NMFS ESA consultation standard/recovery plan: Limit ocean fisheries to no more than a 16.0% age-4 ocean harvest rate on Klamath River fall Chinook. | Undefined | Undefined | Undefined | |
| 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 |
| Klamath River - Spring | Undefined | Undefined | Undefined | Undefined | Component stock of SONC complex; ACL indicator stock is KRFC |
| Smith River | Undefined | Undefined | Undefined | 78% Proxy (SAC 2011a) | |

TABLE A-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes[a/] (Page 2 of 6)

| CHINOOK | | | | | | |
|---|---|---|---|---|---|---|
| **Stocks In The Fishery** | **Conservation Objective** | | $S_{MSY}$ | MSST | MFMT ($F_{MSY}$) | ACL |
| Southern Oregon | 41,000 escapement at Huntley Park, Gold Beach, Oregon | | 34,992 | 20,500 | 78% Proxy (SAC 2011a) | Indicator stock is KRFC |
| Central and Northern Oregon | Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982) measured by 60-90 fish per mile in index streams. ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council. | | 60 Fish per mile in index streams | 30 Fish per mile in index streams | 78% Proxy (SAC 2011a) | Component stock(s) of FNMC complex; international exception applies, ACLs are not applicable |
| Willapa Bay Fall | Undetermined in FMP. WDFW spawning escapement objective of 4,350. | | 3,393 | 1,697 | 78% Proxy (SAC 2011a) | |
| Grays Harbor Fall Indicator stock for the Far North Migrating Coastal (FNMC) Chinook stock complex | 13,326 natural adult spawners--MSP based on full seeding of spawning and rearing habitat (QDNR & WDFW 2014). | Annual natural spawning escapement targets may vary from FMP conservation objectives if agreed to by WDFW and treaty tribes under the provisions of *Hoh v. Baldrige* and subsequent U.S. District Court orders. | 13,326 | 6,663 | 63% | FNMC complex; international exception applies, ACLs are not applicable. |
| Queets Fall Indicator stock for the FNMC Chinook stock complex | Manage terminal fisheries for 40% harvest rate, but no less than 2,500 natural adult spawners, the MSY level estimated by Cooney (1984). | | 2,500 | 1,250 | 87% (Cooney 1984) | |
| Hoh Fall Indicator stock for the FNMC Chinook stock complex | Manage terminal fisheries for 40% harvest rate, but no less than 1,200 natural adult spawners, the MSY level estimated by Cooney (1984). | | 1,200 | 600 | 90% (Cooney 1984) | |
| Quillayute Fall Indicator stock for the FNMC Chinook stock complex | Manage terminal fisheries for 40% harvest rate, but no less than 3,000 natural adult spawners, the MSY level estimated by Cooney (1984). | | 3,000 | 1,500 | 87% (Cooney 1984) | |
| Hoko Summer/Fall Indicator stock for the FNMC Chinook stock complex | 850 natural adult spawners, the MSP level estimated by Ames and Phinney (1977). May include adults used for supplementation program. | | 850 | 425 | 78% Proxy (SAC 2011a) | |
| Grays Harbor Spring | 1,400 natural adult spawners. | | 1,400 | 700 | 78% Proxy (SAC 2011a) | FNMC complex; international exception applies, ACLs are not applicable. |
| Queets Sp/Su | Manage terminal fisheries for 30% harvest rate, but no less than 700 natural adult spawners. | | 700 | 350 | 78% Proxy (SAC 2011a) | |
| Hoh Spring/Summer | Manage terminal fisheries for 31% harvest rate, but no less than 900 natural adult spawners. | | 900 | 450 | 78% Proxy (SAC 2011a) | |
| Quillayute Spring/Summer | 1,200 natural adult spawners for summer component (MSY). | | 1,200 | 600 | 78% Proxy (SAC 2011a) | |

TABLE A-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes[a/] (Page 3 of 6)

| CHINOOK | | | | | |
|---|---|---|---|---|---|
| **Stocks In The Fishery** | **Conservation Objective** | $S_{MSY}$ | MSST | MFMT ($F_{MSY}$) | ACL |
| Willapa Bay Fall (hatchery) | 8,200 adult return to hatchery. WDFW spawning escapement objective of 9,800 hatchery spawners. | Not applicable to hatchery stocks | | | |
| Quinault Fall (hatchery) | Hatchery production. | | | | |
| North Lewis River Fall | NMFS consultation standard/recovery plan. McIsaac (1990) stock-recruit analysis supports MSY objective of 5,700 natural adult spawners. | 5,700 | ESA consultation standard applies. | 76% | ESA consultation standard applies. |
| Snake River Fall | NMFS consultation standard/recovery plan. No more than 70.0% of 1988-1993 base period AEQ exploitation rate for all ocean fisheries. | Undefined | | Undefined | |
| Upper Willamette Spring | NMFS consultation standard/recovery plan. Not applicable for ocean fisheries. | Undefined | | Undefined | |
| Columbia Upper River Spring | NMFS consultation standard/recovery plan. Not applicable for ocean fisheries. | Undefined | | Undefined | |
| Snake River - Spring/Summer | NMFS consultation standard/recovery plan. Not applicable for ocean fisheries. | Undefined | | Undefined | |
| Columbia Lower River Hatchery - Fall | 12,600 adults for hatchery egg-take. | Not applicable to hatchery stocks | | | |
| Columbia Lower River Hatchery Spring | 2,700 adults to meet Cowlitz, Kalama, and Lewis Rivers broodstock needs. | | | | |
| Columbia Mid-River Bright Hatchery Fall | 4,700 adults for Bonneville Hatchery and 2,000 for Little White Salmon Hatchery egg-take. | | | | |
| Columbia Spring Creek Hatchery Fall | 7,000 adults to meet hatchery egg-take goal. | | | | |
| Columbia Upper River Bright Fall | 40,000 natural bright adults above McNary Dam (MSY proxy adopted in 1984 based on CRFMP). The management goal has been increased to 60,000 by Columbia River managers in recent years. | 39,625 (Langness and Reidinger 2003) | 19,812 | 85.91% (Langness and Reidinger 2003) | International exception applies, ACLs are not applicable. |
| Columbia Upper River Summer | Hold ocean fishery impacts at or below base period; recognize CRFMP objective - MSY proxy of 80,000 to 90,000 adults above Bonneville Dam, including both Columbia and Snake River stocks (state and tribal management entities considering separate objectives for these stocks). | 12,143 (CTC 1999) | 6,071 | 75% (CTC 1999) | |

TABLE A-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes[a/] (Page 4 of 6)

| CHINOOK | | | | | | |
|---|---|---|---|---|---|---|
| **Stocks In The Fishery** | **Conservation Objective** | | $S_{MSY}$ | MSST | MFMT ($F_{MSY}$) | ACL |
| Eastern Strait of Juan de Fuca Summer/Fall | NMFS consultation standard/recovery plan. No more than 10.0% Southern U.S. (SUS) Rebuilding Exploitation Rate (RER) for the Elwha River and for the Dungeness River. 2011 comanagers Resource Management Plan (RMP) | Annual natural spawning escapement targets may vary from FMP conservation objectives if agreed to by WDFW and treaty tribes under the provisions of U.S. v. Washington and subsequent U.S. District Court orders. | Undefined | ESA consultation standard applies | Undefined | ESA Consultation standard applies. |
| Skokomish Summer/Fall | NMFS consultation standard/recovery plan. No more than 50.0% total RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| Mid Hood Canal Summer/Fall | NMFS consultation standard/recovery plan. No more than 15.0% preterminal SUS CERC. 2011 comanagers RMP | | Undefined | | Undefined | |
| Nooksack Spring early | NMFS consultation standard/recovery plan. No more than 7.0% SUS CERC. 2011 comanagers RMP | | Undefined | | Undefined | |
| Skagit Summer/Fall | NMFS consultation standard/recovery plan. No more than 50.0% total RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| Skagit Spring | NMFS consultation standard/recovery plan. No more than 38.0% total RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| Stillaguamish Summer/Fall | NMFS consultation standard/recovery plan. No more than 25.0% total RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| Snohomish Summer/Fall | NMFS consultation standard/recovery plan. No more than 15.0% SUS RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| Cedar River Summer/Fall | NMFS consultation standard/recovery plan. No more than 20.0% SUS RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| White River Spring | NMFS consultation standard/recovery plan. No more than 20.0% total RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| Green River Summer/Fall | NMFS consultation standard/recovery plan. No more than 15.0% preterminal SUS RER, at least 5,800 adult spawners. | | Undefined | | Undefined | |
| Nisqually River Summer/Fall | NMFS consultation standard/recovery plan. No more than 65.0% total RER. 2011 comanagers RMP | | Undefined | | Undefined | |
| Puyallup Summer/Fall | NMFS consultation standard/recovery plan. No more than 50.0% total RER. 2011 comanagers RMP | | Undefined | | Undefined | |

TABLE A-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes[a/] (Page 5 of 6)

| COHO | | | | | |
|---|---|---|---|---|---|
| **Stocks In The Fishery** | **Conservation Objective** | $S_{MSY}$ | MSST | MFMT ($F_{MSY}$) | ACL |
| Central California Coast ESA Threatened | NMFS ESA consultation standard/recovery plan: No retention of coho south of the OR/CA border. | Undefined | ESA consultation standard applies | Undefined | ESA consultation standard applies. |
| Southern Oregon/Northern California Coast ESA Threatened | A total fishery (marine and freshwater) exploitation rate (ER) limit of 15 % for all populations within the SONCC Evolutionary Significant Unit, except the Trinity River coho population unit (Upper Trinity River, Lower Trinity River, SF Trinity River) which has a total fishery ER limit of 16 %, including landed and non-landed mortality of age-3 adult SONCC coho salmon in any individual year. No retention of coho in the EEZ south of the OR/CA border. Freshwater impacts determined using projections provided by co-managing agencies and tribes (i.e., the Oregon Department of Fish and Wildlife, Yurok Tribe, Hoopa Valley Tribe, California Department of Fish and Wildlife). | Undefined | | Undefined | |
| Oregon Coastal Natural ESA Threatened | NMFS ESA consultation standard/recovery plan: Total AEQ exploitation rate limit based on parental seeding level and marine survival matrix in FMP Table 3-2. | Undefined | | Undefined | |
| Lower Columbia Natural ESA Threatened | NMFS ESA consultation standard/recovery plan: AEQ exploitation rate limit on ocean and mainstem Columbia fisheries identified in annual NMFS guidance. | Undefined | | Undefined | |
| Oregon Coast Hatchery | Hatchery production. | Not applicable to hatchery stocks | | | |
| Columbia River Late Hatchery | Hatchery rack return goal of 14,200 adults. | | | | |
| Columbia River Early Hatchery | Hatchery rack return goal of 6,200 adults. | | | | |
| Willapa Bay - Hatchery | Hatchery rack return goal of 6,100 adults. | | | | |
| Quinault - Hatchery | Hatchery production. | | | | |
| Quillayute - Summer Hatchery | Hatchery production. | | | | |
| South Puget Sound Hatchery | Hatchery rack return goal of 52,000 adults. | | | | |
| Willapa Bay Natural | 17,200 natural-area spawners | 17,200 | 8,600 | 74% | Based on $F_{ABC}$ and annual ocean abundance. $F_{ABC}$ is $F_{MSY}$ reduced by Tier 1 (5%) uncertainty |

TABLE A-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes[a/] (Page 6 of 6)

| COHO | | | | | | |
|---|---|---|---|---|---|---|
| **Stocks In The Fishery** | **Conservation Objective** | | $S_{MSY}$ | MSST | MFMT ($F_{MSY}$) | ACL |
| Grays Harbor | 35,400 natural adult spawners (MSP based on WDF [1979]) | Annual natural spawning escapement targets may vary from FMP conservation objectives if agreed to by WDFW and treaty tribes under the provisions of Hoh v. Baldrige, U.S. v. Washington, or subsequent U.S. District Court orders | 24,426 $S_{MSP}$ (FMP) *$F_{SMY}$ (SAC 2010b) | 18,320 (Johnstone et al. 2011) | MFMT=65% (Johnstone et al. 2011) $F_{MSY}$=69% (SAC 2011b) | International exception applies, ACLs are not applicable. |
| Queets | MSY range of 5,800 to 14,500 natural adult spawners (Lestelle et al 1984) | | 5,800 (Johnstone et al. 2011) | 4,350 (Johnstone et al. 2011) | MFMT=65% (Johnstone et al. 2011) $F_{MSY}$=68% (SAC 2011b) | |
| Hoh | MSY range of 2,000 to 5,000 natural adult spawners (Lestelle et al. 1984) | | 2,520 (SAC 2010b) | 1,890 $S_{MSY}$*0.75 | MFMT=65% (Johnstone et al. 2011) $F_{MSY}$=69% (SAC 2011b) | |
| Quillayute - Fall | MSY range of 6,300 to 15,800 natural adult spawners (Lestelle et al. 1984) | | 6,300 (Johnstone et al. 2011) | 4,725 (Johnstone et al. 2011) | MFMT=59%; $F_{MSY}$=59% (SAC 2011b) | |
| Strait of Juan de Fuca | Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 27,445; 0.40 for ocean age-3 abundance >11,679 and ≤27,445; 0.20 for ocean age-3 abundance ≤11,679 | | 11,000 (Bowhay et al. 2009) | 7,000 (Bowhay et al. 2009) | 60% (Bowhay et al. 2009) | |
| Hood Canal | Total allowable MSY exploitation rate of: 0.65 for ocean age-3 abundance > 41,000; 0.45 for ocean age-3 abundance >19,545 and ≤41,000; 0.20 for ocean age-3 abundance ≤19,545 | | 14,350 (Bowhay et al. 2009) | 10,750 (Bowhay et al. 2009) | 65% (Bowhay et al. 2009) | |
| Skagit | Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 62,500; 0.35 for ocean age-3 abundance >22,857 and ≤62,500; 0.20 for ocean age-3 abundance ≤22,857 | | 25,000 (Bowhay et al. 2009) | 14,857 (Bowhay et al. 2009) | 60% (Bowhay et al. 2009) | |
| Stillaguamish | Total allowable MSY exploitation rate of: 0.50 for ocean age-3 abundance > 20,000; 0.35 for ocean age-3 abundance >9,385 and ≤20,000; 0.20 for ocean age-3 abundance ≤9,385 | | 10,000 (Bowhay et al. 2009) | 6,100 (Bowhay et al. 2009) | 50% (Bowhay et al. 2009) | |
| Snohomish | Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 125,000; 0.40 for ocean age-3 abundance >51,667 and ≤125,000; 0.20 for ocean age-3 abundance ≤51,667 | | 50,000 (Bowhay et al. 2009) | 31,000 (Bowhay et al. 2009) | 60% (Bowhay et al. 2009) | |

| PINK (odd-numbered years) | | | | | |
|---|---|---|---|---|---|
| **Stocks In The Fishery** | **Conservation Objective** | $S_{MSY}$ | MSST | MFMT ($F_{MSY}$) | ACL |
| Puget Sound | 900,000 natural spawners or consistent with provisions of the Pacific Salmon Treaty (Fraser River Panel). | 900,000 | 450,000 | Undefined | International exception applies, ACLs are not applicable. |

a/ Some hatchery goals and ESA consultation standards have been updated relative to the version of this table in the FMP.

TABLE A-2. Allowable fishery impact rate criteria for OCN coho stock components under the Salmon Fishery Management Plan Amendment 13.

| | | MARINE SURVIVAL INDEX (based on return of jacks per hatchery smolt) | | |
|---|---|---|---|---|
| | | **Low** (<0.0009) | **Medium** (0.0009 to 0.0034) | **High** (>0.0034) |
| **PARENT SPAWNER STATUS** | | **Allowable Total Fishery Impact Rate** | | |
| **High:** | Parent spawners achieved Level #2 rebuilding criteria; grandparent spawners achieved Level #1 | ≤15% | ≤30% [a/] | ≤35%[a/] |
| **Medium:** | Parent spawners achieved Level #1 or greater rebuilding criteria | ≤15% | ≤20%[a/] | ≤25%[a/] |
| **Low:** | Parent spawners less than Level #1 rebuilding criteria | ≤15%<br>≤10-13%[b/] | ≤15% | ≤15% |

| | OCN Coho Spawners by Stock Component | | | | |
|---|---|---|---|---|---|
| **Rebuilding Criteria** | **Northern** | **North-Central** | **South-Central** | **Southern** | **Total** |
| Full Seeding at Low Marine Survival: | 21,700 | 55,000 | 50,000 | 5,400 | 132,100 |
| Level #2 (75% of full seeding): | 16,400 | 41,300 | 37,500 | 4,100 | 99,300 |
| Level #1 (50% of full seeding): | 10,900 | 27,500 | 25,000 | 2,700 | 66,100 |
| 38% of Level #1 (19% of full seeding): | 4,100 | 10,500 | 9,500 | 1,000 | 25,100 |

| **Stock Component (Boundaries)** | **Full Seeding of Major Basins at Low Marine Survival (Number of Adult Spawners)** | | | | |
|---|---|---|---|---|---|
| **Northern:** (Necanicum River to Neskowin Creek) | Nehalem | Tillamook | Nestucca | Ocean Tribs. | |
| | 17,500 | 2,000 | 1,800 | 400 | |
| **North-Central:** (Salmon River to Siuslaw River) | Siletz | Yaquina | Alsea | Siuslaw | Ocean Tribs. |
| | 4,300 | 7,100 | 15,100 | 22,800 | 5,700 |
| **South-Central:** (Siltcoos River to Sixes River) | Umpqua | Coos | Coquille | Coastal Lakes | |
| | 29,400 | 7,200 | 5,400 | 8,000 | |
| **Southern:** (Elk River to Winchuck River) | Rogue | | | | |
| | 5,400 | | | | |

a/ When a stock component achieves a medium or high parent spawner status under a medium or high marine survival index, but a major basin within the stock component is less than 10% of full seeding, (1) the parent spawner status will be downgraded one level to establish the allowable fishery impact rate for that component, and (2) no coho-directed harvest impacts will be allowed within that particular basin.

b/ This exploitation rate criteria applies when (1) parent spawners are less than 38% of the Level #1 rebuilding criteria, or (2) marine survival conditions are projected to be at an extreme low as in 1994-1996 (<0.0006 jack per hatchery smolt). If parent spawners decline to lower levels than observed through 1998, rates of less than 10% would be considered, recognizing that there is a limit to further bycatch reduction opportunities.

TABLE A-3. Fishery impact rate criteria for OCN coho stock components based on the harvest matrix resulting from the OCN work group 2000 review of Amendment 13.

| Parent Spawner Status [a/] | Marine Survival Index (based on return of jacks per hatchery smolt) | | | |
|---|---|---|---|---|
| | Extremely Low (<0.0008 ) | Low (0.0008 to 0.0014 ) | Medium (>0.0014 to 0.0040) | High (>0.0040 ) |
| **High** Parent Spawners > 75% of full seeding | E ≤ 8% | J ≤ 15% | O ≤ 30% | T ≤ 45% |
| **Medium** Parent Spawners > 50% & ≤ 75% of full seeding | D ≤ 8% | I ≤ 15% | N ≤ 20% | S ≤ 38% |
| **Low** Parent Spawners > 19% & ≤ 50% of full seeding | C ≤ 8% | H ≤ 15% | M ≤ 15% | R ≤ 25% |
| **Very Low** Parent Spawners > 4 fish per mile & ≤ 19% of full seeding | B ≤ 8% | G ≤ 11% | L ≤ 11% | Q ≤ 11% |
| **Critical** [b/] Parental Spawners ≤ 4 fish per mile | A 0 - 8% | F 0 - 8% | K 0 - 8% | P 0 - 8% |

**Sub-aggregate and Basin Specific Spawner Criteria Data**

| Sub-aggregate | Miles of Available Spawning Habitat | 100% of Full Seeding | "Critical" | | Very Low, Low, Medium & High | | |
|---|---|---|---|---|---|---|---|
| | | | 4 Fish per Mile | 12% of Full Seeding | 19% of Full Seeding | 50% of Full Seeding | 75% of full Seeding |
| Northern | 899 | 21,700 | 3,596 | NA | 4,123 | 10,850 | 16,275 |
| North - Central | 1,163 | 55,000 | 4,652 | NA | 10,450 | 27,500 | 41,250 |
| South - Central | 1,685 | 50,000 | 6,740 | NA | 9,500 | 25,000 | 37,500 |
| Southern | 450 | 5,400 | NA | 648 | 1,026 | 2,700 | 4,050 |
| Coastwide Total | 4,197 | 132,100 | 15,636 | | 25,099 | 66,050 | 99,075 |

a/ Parental spawner abundance status for the OCN aggergate assumes the status of the weakest sub-aggregate.

b/ "Critical" parental spawner status is defined as 4 fish per mile for the Northern, North-Central, and South-Central subaggergates. Because the ratio of high quality spawning habitat to total spawning habitat in the Rogue River Basin differs significantly from the rest of the basins on the coast, the spawner density of 4 fish per mile does not represent "Critical" status for that basin. Instead. "Critical" status for the Rogue Basin (Southern Sub-aggergate) is estimated as 12% of full seeding of high quality

TABLE A-4. Fishery impact rate criteria for OCN coho stock components based on the harvest matrix resulting from the OCN work group 2000 review of Amendment 13 including modifications to the marine survival index adopted during the 2012 and 2013 methodology reviews.

| Parent Spawner Status[a/] | Marine Survival Index (*Wild adult coho salmon survival as predicted by the two-variable GAM ensemble forecast*) | | | |
|---|---|---|---|---|
| | **Extremely Low** *<2%* | **Low** *2%-4.5%* | **Medium** *>4.5%-8%* | **High** *>8%* |
| **High** Parent Spawners > 75% of full seeding | E ≤ 8% | J ≤ 15% | O ≤ 30% | T ≤ 45% |
| **Medium** Parent Spawners > 50% & ≤ 75% of full seeding | D ≤ 8% | I ≤ 15% | N ≤ 20% | S ≤ 38% |
| **Low** Parent Spawners > 19% & ≤ 50% of full seeding | C ≤ 8% | H ≤ 15% | M ≤ 15% | R ≤ 25% |
| **Very Low** Parent Spawners > 4 fish per mile & ≤ 19% of full seeding | B ≤ 8% | G ≤ 11% | L ≤ 11% | Q ≤ 11% |
| **Critical** Parent Spawners ≤4 fish per mile | A 0 – 8% | F 0 – 8% | K 0 – 8% | P 0 – 8% |

**Sub-aggregate and Basin Specific Spawner Criteria Data**

| Sub-aggregate | Miles of Available Spawning Habitat | 100% of Full Seeding | "Critical" | | Very Low, Low, Medium & High | | |
|---|---|---|---|---|---|---|---|
| | | | 4 Fish per Mile | 12% of Full Seeding | 19% of Full Seeding | 50% of Full Seeding | 75% of Full Seeding |
| Northern | 899 | 21,700 | 3,596 | NA | 4,123 | 10,850 | 16,275 |
| North-Central | 1,163 | 55,000 | 4,652 | NA | 10,450 | 27,500 | 41,250 |
| South-Central | 1,685 | 50,000 | 6,740 | NA | 9,500 | 25,000 | 37,500 |
| Southern *(Removed per adoption of Amendment 16)* | | | | | | | |
| Coastwide Total | *3,747* | *126,700* | *14,988* | | *24,073* | *63,350* | *95,025* |

a/ Parental spawner abundance status for the OCN aggregate assumes the status of the weakest sub-aggregate.

TABLE A-5. Council adopted management objectives for Puget Sound natural coho management units, expressed as exploitation rate ceilings for critical, low and normal abundance based status categories, with runsize breakpoints (abundances expressed as ocean age-3).

| Status | Management Unit | | | | |
|---|---|---|---|---|---|
| | **Strait of Juan de Fuca** | **Hood Canal** | **Skagit** | **Stillaguamish** | **Snohomish** |
| Critical/Low Runsize Breakpoint | 11,679 | 19,545 | 22,857 | 9,385 | 51,667 |
| Critical Exploitation Rate | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Low/normal runsize breakpoint | 27,445 | 41,000 | 62,500 | 20,000 | 125,000 |
| Low Exploitation Rate | 0.4 | 0.45 | 0.35 | 0.35 | 0.4 |
| Normal Exploitation Rate | 0.6 | 0.65 | 0.6 | 0.5 | 0.6 |

TABLE A-6. Council recommended management objectives for Lower Columbia River natural tule Chinook, expressed as exploitation rate ceilings for abundance based status categories, with runsize forecast bins expressed as adult river mouth return forecasts of Lower Columbia River hatchery tule Chinook.

| **Runsize Forecast Bins** | <30,000 | 30,000 to 40,000 | 40,000 to 85,000 | >85,000 |
|---|---|---|---|---|
| **Maximum Exploitation Rate** | 0.30 | 0.35 | 0.38 | 0.41 |

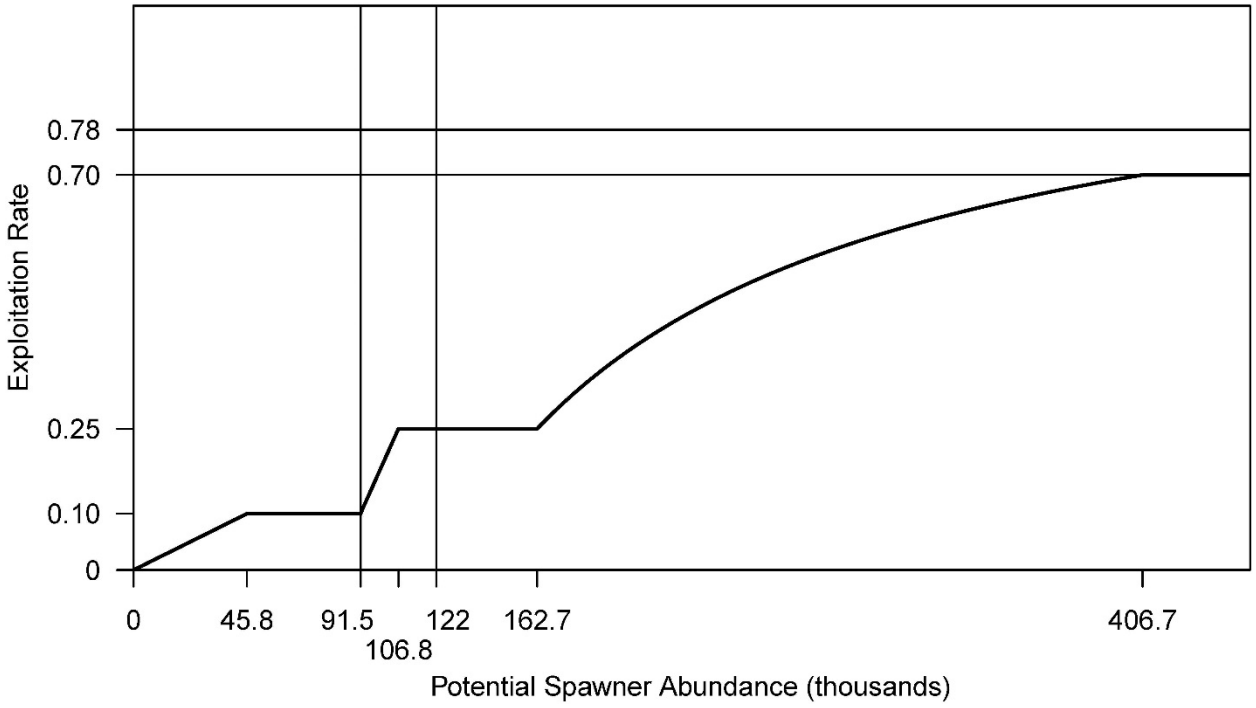



FIGURE A-1. Sacramento River fall Chinook control rule. Potential spawner abundance is the predicted hatchery and natural area adult spawners in the absence of fisheries, which is equivalent to the Sacramento Index. See the salmon FMP, Section 3.3.6, for control rule details.

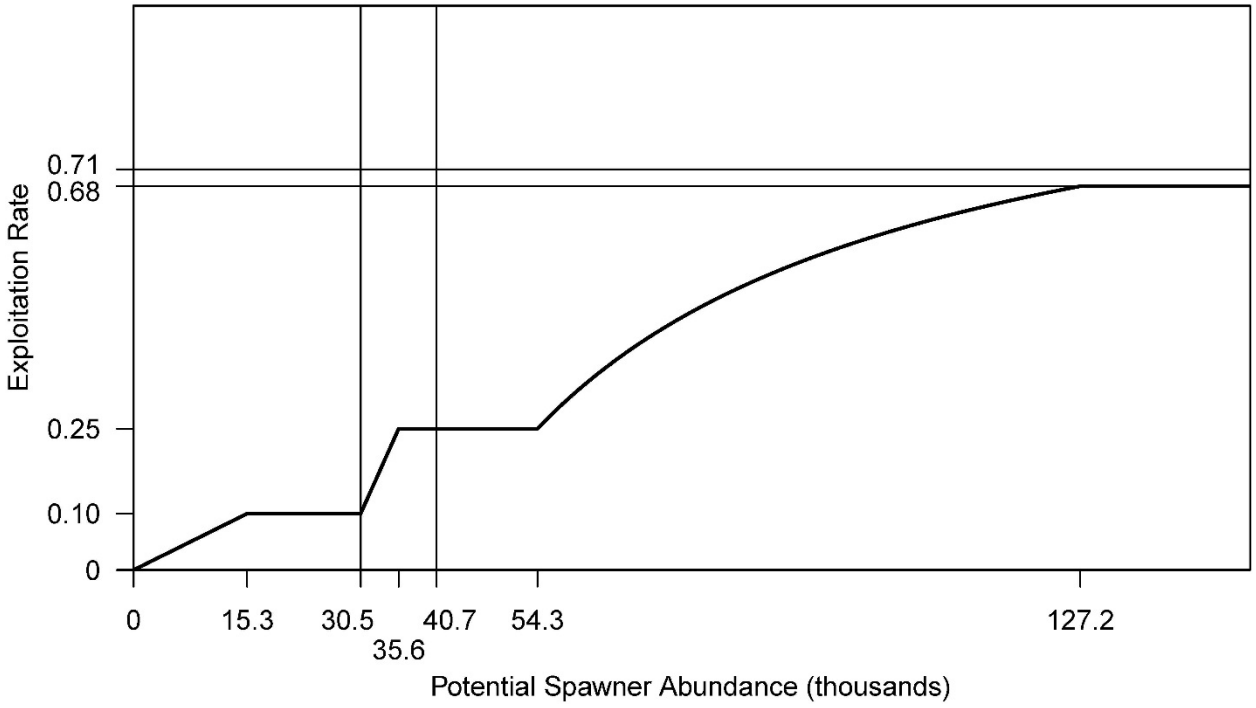



FIGURE A-2. Klamath River fall Chinook control rule. Potential spawner abundance is the predicted natural area adult spawners in the absence of fisheries. See the salmon FMP, Section 3.3.6, for control rule details.

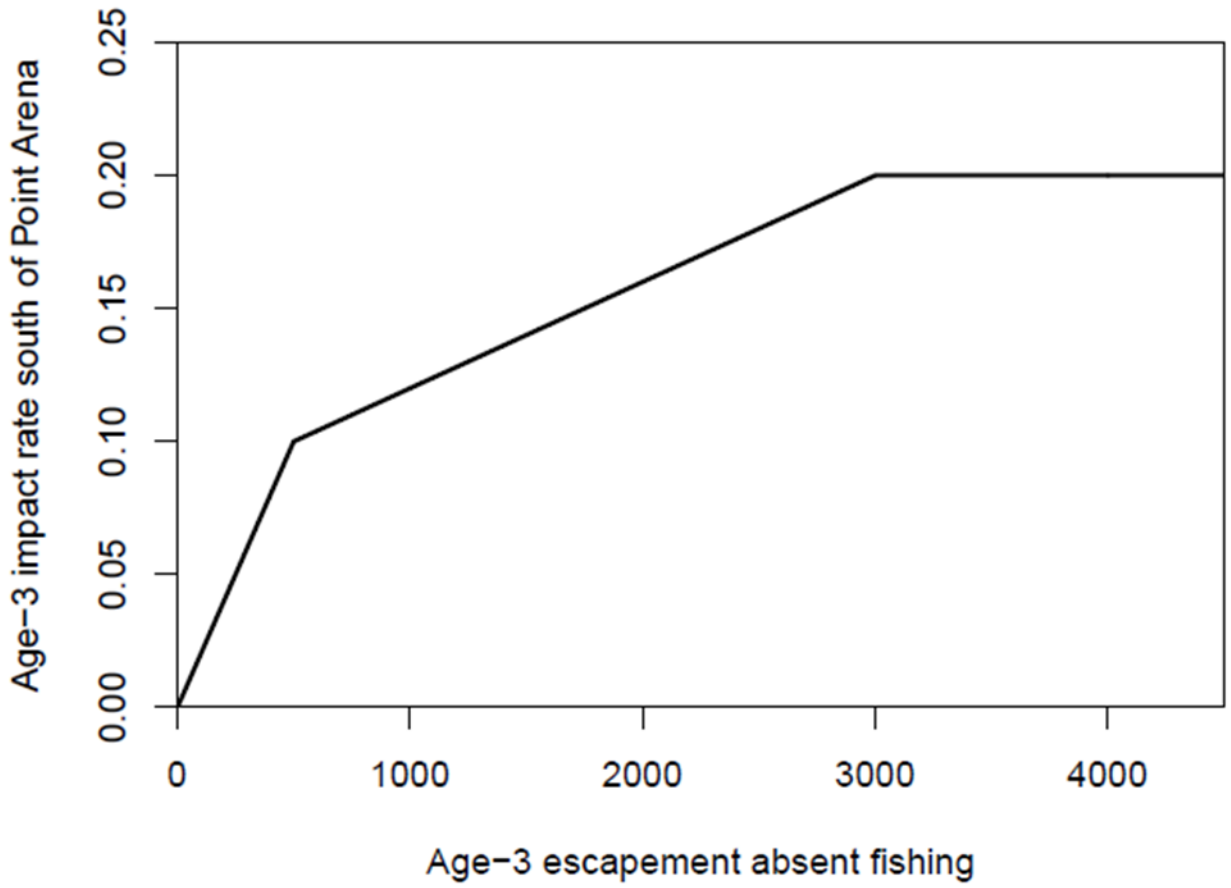



FIGURE A-3. Sacramento River winter Chinook impact rate control rule. The maximum forecast age-3 impact rate for the area south of Point Arena, California, is determined by the forecasted age-3 escapement absent fishing.

## APPENDIX B
## SALMON HARVEST ALLOCATION SCHEDULES

## TABLE OF CONTENTS

## 5.3 ALLOCATION

> *"A Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges."*
>
> *Magnuson-Stevens Act, National Standard 4*

Harvest allocation is required when the number of fish is not adequate to satisfy the perceived needs of the various fishing industry groups and communities, to divide the catch between non-Indian ocean and inside fisheries and among ocean fisheries, and to provide federally recognized treaty Indian fishing opportunity. In allocating the resource between ocean and inside fisheries, the Council considers both in-river harvest and spawner escapement needs. The magnitude of in-river harvest is determined by the states in a variety of ways, depending upon the management area. Some levels of in-river harvests are designed to accommodate federally recognized in-river Indian fishing rights, while others are established to allow for non-Indian harvests of historical magnitudes. Several fora exist to assist this process on an annual basis. The North of Cape Falcon Forum, a state and tribal sponsored forum, convenes the pertinent parties during the Council's preseason process to determine allocation and conservation recommendations for fisheries north of Cape Falcon. The individual states also convene fishery industry meetings to coordinate their input to the Council.

### 5.3.1 Commercial (Non-Tribal) and Recreational Fisheries North of Cape Falcon

#### 5.3.1.1 Goal, Objectives, and Priorities

Harvest allocations will be made from a total allowable ocean harvest, which is maximized to the largest extent possible but still consistent with PST and treaty-Indian obligations, state fishery needs, and spawning escapement requirements, including consultation standards for stocks listed under the ESA. The Council shall make every effort to establish seasons and gear requirements that provide troll and recreational fleets a reasonable opportunity to catch the available harvest. These may include single-species directed fisheries with landing restrictions for other species.

The goal of allocating ocean harvest north of Cape Falcon is to achieve, to the greatest degree possible, the objectives for the commercial and recreational fisheries as follows:

- Provide recreational opportunity by maximizing the duration of the fishing season while minimizing daily and area closures and restrictions on gear and daily limits.

- Maximize the value of the commercial harvest while providing fisheries of reasonable duration.

The priorities listed below will be used to help guide establishment of the final harvest allocation while meeting the overall commercial and recreational fishery objectives.

At total allowable harvest levels up to 300,000 coho and 100,000 Chinook:

- Provide coho to the recreational fishery for a late June through early September all-species season. Provide Chinook to allow (1) access to coho and, if possible, (2) a minimal Chinook-only fishery prior to the all-species season. Adjust days per week and/or institute area restrictions to stabilize season duration.

- Provide Chinook to the troll fishery for a May and early June Chinook season and provide coho to (1) meet coho hooking mortality in June where needed and (2) access a pink salmon fishery in odd years. Attempt to ensure that part of the Chinook season will occur after June 1.

At total allowable harvest levels above 300,000 coho and above 100,000 Chinook:

- Relax any restrictions in the recreational all-species fishery and/or extend the all-species season beyond Labor Day as coho quota allows. Provide Chinook to the recreational fishery for a Memorial Day through late June Chinook-only fishery. Adjust days per week to ensure continuity with the all-species season.

- Provide coho for an all-salmon troll season in late summer and/or access to a pink fishery. Leave adequate Chinook from the May through June season to allow access to coho.

#### *5.3.1.2 Allocation Schedule Between Gear Types*

Initial commercial and recreational allocation will be determined by the schedule of percentages of total allowable harvest as follows:

TABLE 5-1. Initial commercial/recreational harvest allocation schedule north of Cape Falcon.

| Coho | | | Chinook | | |
|---|---|---|---|---|---|
| Harvest (thousands of fish) | Percentage[a/] | | Harvest (thousands of fish) | Percentage[a/] | |
| | Troll | Recreational | | Troll | Recreational |
| 0-300 | 25 | 75 | 0-100 | 50 | 50 |
| >300 | 60 | 40 | >100-150 | 60 | 40 |
| | | | >150 | 70 | 30 |

a/ The allocation must be calculated in additive steps when the harvest level exceeds the initial tier.

This allocation schedule should, on average, allow for meeting the specific fishery allocation priorities described above. The initial allocation may be modified annually by preseason and inseason trades to better achieve (1) the commercial and recreational fishery objectives and (2) the specific fishery allocation priorities. The final preseason allocation adopted by the Council will be expressed in terms of quotas, which are neither guaranteed catches nor inflexible ceilings. Only the total ocean harvest quota is a maximum allowable catch.

To provide flexibility to meet the dynamic nature of the fisheries and to assure achievement of the allocation objectives and fishery priorities, deviations from the allocation schedule will be allowed as provided below and as described in Section 6.5.3.2 for certain selective fisheries.

1. Preseason species trades (Chinook and coho) that vary from the allocation schedule may be made by the Council based upon the recommendation of the pertinent recreational and commercial SAS representatives north of Cape Falcon. The Council will compare the socioeconomic impacts of any such recommendation to those of the standard allocation schedule before adopting the allocation that best meets FMP management objectives.

2. Inseason transfers, including species trades of Chinook and coho, may be permitted in either direction between recreational and commercial fishery allocations to allow for uncatchable fish in one fishery to

be reallocated to the other. Fish will be deemed "uncatchable" by a respective commercial or recreational fishery only after considering all possible annual management actions to allow for their harvest which meet framework harvest management objectives, including single species or exclusive registration fisheries. Implementation of inseason transfers will require (1) consultation with the pertinent recreational and commercial SAS members and the STT, and (2) a clear establishment of available fish and impacts from the transfer.

3. An exchange ratio of four coho to one Chinook shall be considered a desirable guideline for preseason trades. Deviations from this guideline should be clearly justified. Inseason trades and transfers may vary to meet overall fishery objectives. (The exchange ratio of four coho to one Chinook approximately equalizes the species trade in terms of average ex-vessel values of the two salmon species in the commercial fishery. It also represents an average species catch ratio in the recreational fishery.)

4. Any increase or decrease in the recreational or commercial total allowable catch (TAC), resulting from an inseason restructuring of a fishery or other inseason management action, does not require reallocation of the overall north of Cape Falcon non-Indian TAC.

5. The commercial TACs of Chinook and coho derived during the preseason allocation process may be varied by major subareas (i.e., north of Leadbetter Point and south of Leadbetter Point) if there is a need to do so to decrease impacts on weak stocks. Deviations in each major subarea will generally not exceed 50 percent of the TAC of each species that would have been established without a geographic deviation in the distribution of the TAC. Deviation of more than 50 percent will be based on a conservation need to protect weak stocks and will provide larger overall harvest for the entire fishery north of Cape Falcon than would have been possible without the deviation. In addition, the actual harvest of coho may deviate from the initial allocation as provided in Section 6.5.3.2 for certain selective fisheries.

6. The recreational TACs of Chinook and coho derived during the preseason allocation process will be distributed among four major recreational port areas as described for coho and Chinook distribution in Section 5.3.1.3. The Council may deviate from subarea quotas (1) to meet recreational season objectives based on agreement of representatives of the affected ports and/or (2) in accordance with Section 6.5.3.2 with regard to certain selective fisheries. Additionally, based on the recommendations of the SAS members representing the ocean sport fishery north of Cape Falcon, the Council will include criteria in its preseason salmon management recommendations to guide any inseason transfer of coho among the recreational subareas to meet recreational season duration objectives. Inseason redistributions of quotas within the recreational fishery or the distribution of allowable coho catch transfers from the commercial fishery may deviate from the preseason distribution.

### 5.3.1.3 Recreational Subarea Allocations

#### Coho

The north of Cape Falcon preseason recreational TAC of coho will be distributed to provide 50 percent to the area north of Leadbetter Point and 50 percent to the area south of Leadbetter Point. The distribution of the allocation north of Leadbetter point will vary, depending on the existence and magnitude of an inside fishery in Area 4B, which is served by Neah Bay.

In years with no Area 4B fishery, the distribution of coho north of Leadbetter Point (50 percent of the total recreational TAC) will be divided to provide 74 percent to the area between Leadbetter Point and the Queets River (Westport), 5.2 percent to the area between Queets River and Cape Flattery (La Push), and 20.8

percent to the area north of the Queets River (Neah Bay). In years when there is an Area 4B (Neah Bay) fishery under state management, the allocation percentages north of Leadbetter Point will be modified to maintain more equitable fishing opportunity among the ports by decreasing the ocean harvest share for Neah Bay. This will be accomplished by adding 25 percent of the numerical value of the Area 4B fishery to the recreational TAC north of Leadbetter Point prior to calculating the shares for Westport and La Push. The increase to Westport and La Push will be subtracted from the Neah Bay ocean share to maintain the same total harvest allocation north of Leadbetter Point. Table 5-2 displays the resulting percentage allocation of the total recreational coho catch north of Cape Falcon among the four recreational port areas (each port area allocation will be rounded to the nearest hundred fish, with the largest quotas rounded downward if necessary to sum to the TAC).

TABLE 5-2. Percentage allocation of total allowable coho harvest among the four recreational port areas north of Cape Falcon.[a/]

| Port Area | Without Area 4B Add-on | With Area 4B Add-on | |
|---|---|---|---|
| Columbia River | 50.0% | 50.0% | |
| Westport | 37.0% | 37.0% | plus 17.3% of the Area 4B add-on |
| La Push | 2.6% | 2.6% | plus 1.2% of the Area 4B add-on |
| Neah Bay | 10.4% | 10.4% | minus 18.5% of the Area 4B add-on |

a/ The Council may deviate from these percentages as described under #6 in Section 5.3.1.2.

TABLE 5-3. Example distributions of the recreational coho TAC north of Leadbetter Point.

| Sport TAC North of Cape Falcon | Without Area 4B Add-On | | | | With Area 4B Add-On [a/] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Columbia River | Westport | La Push | Neah Bay | Columbia River | Westport | La Push | Neah Bay Ocean | Neah Bay Add-on | Neah Bay Total |
| 50,000 | 25,000 | 18,500 | 1,300 | 5,200 | 25,000 | 19,900 | 1,400 | 3,700 | 8,000 | 11,700 |
| 150,000 | 75,000 | 55,500 | 3,900 | 15,600 | 75,000 | 57,600 | 4,000 | 13,600 | 12,000 | 25,600 |
| 300,000 | 150,000 | 111,000 | 7,800 | 31,200 | 150,000 | 114,500 | 8,000 | 27,500 | 20,000 | 47,500 |

a/ The add-on levels are merely examples. The actual numbers in any year would depend on the particular mix of stock abundances and season determinations.

## Chinook

Subarea distributions of Chinook will be managed as guidelines and shall be calculated by the STT with the primary objective of achieving all-species fisheries without imposing Chinook restrictions (i.e., area closures or bag limit reductions). Chinook in excess of all-species fisheries needs may be utilized by directed Chinook fisheries north of Cape Falcon or by negotiating a Chinook/coho trade with another fishery sector.

Inseason management actions may be taken by the NMFS NW Regional Administrator to assure that the primary objective of the Chinook harvest guidelines for each of the four recreational subareas north of Cape Falcon are met. Such actions might include closures from 0 to 3, or 0 to 6, or 3 to 200, or 5 to 200 nautical miles from shore; closure from a point extending due west from Tatoosh Island for 5 miles, then south to a point due west of Umatilla Reef Buoy, then due east to shore; closure from North Head at the Columbia River mouth north to Leadbetter Point; change species that may be landed; or other actions as prescribed in the annual regulations.

### 5.3.2 Commercial and Recreational Fisheries South of Cape Falcon

The allocation of allowable ocean harvest of coho salmon south of Cape Falcon has been developed to provide a more stable recreational season and increased economic benefits of the ocean salmon fisheries at varying stock abundance levels. When coupled with various recreational harvest reduction measures or the timely transfer of unused recreational allocation to the commercial fishery, the allocation schedule is designed to help secure recreational seasons extending at least from Memorial Day through Labor Day when possible, assist in maintaining commercial markets even at relatively low stock sizes, and fully utilize available harvest. Total ocean catch of coho south of Cape Falcon will be treated as a quota to be allocated between troll and recreational fisheries as provided in Table 5-4.

(Note: The allocation schedule provides guidance only when coho abundance permits a directed coho harvest, not when the allowable impacts are insufficient to allow coho retention south of Cape Falcon. At such low levels, allocation of the allowable impacts will be accomplished during the Council's preseason process.)

TABLE 5-4. Allocation of allowable ocean harvest of coho salmon (thousands of fish) south of Cape Falcon.[a/]

| Total Allowable Ocean Harvest | Recreational Allocation | | Commercial Allocation | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| #100 | #100[b/c/] | 100[b/] | b/ | b/ |
| 200 | 167[b/c/] | 84[b/] | 33[b/] | 17[b/] |
| 300 | 200 | 67 | 100 | 33 |
| 350 | 217 | 62 | 133 | 38 |
| 400 | 224 | 56 | 176 | 44 |
| 500 | 238 | 48 | 262 | 52 |
| 600 | 252 | 42 | 348 | 58 |
| 700 | 266 | 38 | 434 | 62 |
| 800 | 280 | 35 | 520 | 65 |
| 900 | 290 | 32 | 610 | 68 |
| 1,000 | 300 | 30 | 700 | 70 |
| 1,100 | 310 | 28 | 790 | 72 |
| 1,200 | 320 | 27 | 880 | 73 |
| 1,300 | 330 | 25 | 970 | 75 |
| 1,400 | 340 | 24 | 1,060 | 76 |
| 1,500 | 350 | 23 | 1,150 | 77 |
| 1,600 | 360 | 23 | 1,240 | 78 |
| 1,700 | 370 | 22 | 1,330 | 78 |
| 1,800 | 380 | 21 | 1,420 | 79 |
| 1,900 | 390 | 21 | 1,510 | 79 |
| 2,000 | 400 | 20 | 1,600 | 80 |
| 2,500 | 450 | 18 | 2,050 | 82 |
| 3,000 | 500 | 17 | 2,500 | 83 |

a/ The allocation schedule is based on the following formula: first 150,000 coho to the recreational base (this amount may be reduced as provided in footnote b); over 150,000 to 350,000 fish, share at 2:1, 0.667 to troll and 0.333 to recreational; over 350,000 to 800,000 the recreational share is 217,000 plus 14% of the available fish over 350,000; above 800,000 the recreational share is 280,000 plus 10% of the available fish over 800,000.
Note: The allocation schedule provides guidance only when coho abundance permits a directed coho harvest, not when the allowable impacts are insufficient to allow general coho retention south of Cape Falcon. At such low levels, allocation of the allowable impacts will be determined in the Council's preseason process. Deviations from the allocation may also be allowed to meet consultation standards for ESA-listed stocks (e.g., the 1998 biological opinion for California coastal coho requires no retention of coho in fisheries off California).
b/ If the commercial allocation is insufficient to meet the projected hook-and-release mortality associated with the commercial all-salmon-except-coho season, the recreational allocation will be reduced by the number needed to eliminate the deficit.
c/ When the recreational allocation is 167,000 coho or less, special allocation provisions apply to the recreational harvest distribution by geographic area (unless superseded by requirements to meet a consultation standard for ESA-listed stocks); see text of FMP as modified by Amendment 11 allocation provisions.

The allocation schedule is designed to give sufficient coho to the recreational fishery to increase the probability of attaining no less than a Memorial Day to Labor Day season as stock sizes increase. This increased allocation means that, in many years, actual catch in the recreational fishery may fall short of its allowance. In such situations, managers will make an inseason reallocation of unneeded recreational coho to the south of Cape Falcon troll fishery. The reallocation should be structured and timed to allow the commercial fishery sufficient opportunity to harvest any available reallocation prior to September 1, while still assuring completion of the scheduled recreational season (usually near mid-September) and, in any event, the continuation of a recreational fishery through Labor Day. This reallocation process will occur no later than August 15 and will involve projecting the recreational fishery needs for the remainder of the summer season. The remaining projected recreational catch needed to extend the season to its scheduled closing date will be a harvest guideline rather than a quota. If the guideline is met prior to Labor Day, the season may be allowed to continue if further fishing is not expected to result in any considerable danger of impacting the allocation of another fishery or of failing to meet an escapement goal.

The allocation schedule is also designed to assure there are sufficient coho allocated to the troll fishery at low stock levels to ensure a full Chinook troll fishery. This hooking mortality allowance will have first priority within the troll allocation. If the troll allocation is insufficient for this purpose, the remaining number of coho needed for the estimated incidental coho mortality will be deducted from the recreational share. At higher stock sizes, directed coho harvest will be allocated to the troll fishery after hooking mortality needs for Chinook troll fishing have been satisfied.

The allowable harvest south of Cape Falcon may be further partitioned into subareas to meet management objectives of the FMP. Allowable harvests for subareas south of Cape Falcon will be determined by an annual blend of management considerations including:

1. Abundance of contributing stocks
2. Allocation considerations of concern to the Council
3. Relative abundance in the fishery between Chinook and coho
4. Escapement goals
5. Maximizing harvest potential

Troll coho quotas may be developed for subareas south of Cape Falcon consistent with the above criteria. California recreational catches of coho, including projections of the total catch to the end of the season, would be included in the recreational allocation south of Cape Falcon, but the area south of the Oregon-California border would not close when the allocation is met; except as provided below when the recreational allocation is at 167,000 or fewer fish.

When the south of Cape Falcon recreational allocation is equal to or less than 167,000 coho:

1. The recreational fisheries will be divided into two major subareas, as listed in #2 below, with independent quotas (i.e., if one quota is not achieved or is exceeded, the underage or overage will not be added to or deducted from the other quota; except as provided under #3 below).

2. The two major recreational subareas will be managed within the constraints of the following impact quotas, expressed as a percentage of the total recreational allocation (percentages based on avoiding large deviations from the historical harvest shares):

   a. Central Oregon (Cape Falcon to Humbug Mountain) - 70 percent

   b. South of Humbug Mountain - 30 percent

   In addition,
   (1) Horse Mountain to Point Arena will be managed for an impact guideline of 3 percent of the south of Cape Falcon recreational allocation, and

   (2) There will be no coho harvest constraints south of Point Arena. However, the projected harvest in this area (which averaged 1,800 coho from 1986-1990) will be included in the south of Humbug Mountain impact quota.

3. Coho quota transfers can occur on a one-for-one basis between subareas if Chinook constraints preclude access to coho.

### 5.3.3 Tribal Indian Fisheries

#### *5.3.3.1 California*

On October 4, 1993 the Solicitor, Department of Interior, issued a legal opinion in which he concluded that the Yurok and Hoopa Valley Indian tribes of the Klamath River Basin have a federally protected right to the fishery resource of their reservations sufficient to support a moderate standard of living or 50 percent of the total available harvest of Klamath-Trinity basin salmon, whichever is less. The Secretary of Commerce recognized the tribes' federally reserved fishing right as applicable law for the purposes of the MSA (58 FR 68063, December 23, 1993). The Ninth Circuit Court of Appeals upheld the conclusion that the Hoopa Valley and Yurok tribes have a federally reserved right to harvest fish in Parravano v. Babbitt and Brown, 70 F.3d 539 (1995) (Cert. denied in Parravano v. Babbitt and Brown 110, S.Ct 2546 [1996]). The Council must recognize the tribal allocation in setting its projected escapement level for the Klamath River.

#### *5.3.3.2 Columbia River*

Pursuant to a September 1, 1983 Order of the U.S. District Court, the allocation of harvest in the Columbia River was established under the "Columbia River Fish Management Plan" which was implemented in 1988 by the parties of U.S. v. Oregon. This plan replaced the original 1977 plan (pages 16-20 of the 1978 FMP). Since the Columbia River Fishery Management Plan expired on December 31, 1998, fall Chinook in Columbia River fisheries were managed through 2007 under the guidance of annual management agreements among the U.S. v. Oregon parties. In 2008, a new 10 year management agreement was negotiated through the U.S. v. Oregon process, which included revisions to some in-river objectives. A second 10-year plan was negotiated and is in effect for 2018-2027. The 2018-2027 U.S. v Oregon Management Agreement provides a framework within which the relevant parties may exercise their sovereign powers in a coordinated and systematic manner in order to protect, rebuild, and enhance upper Columbia River fish runs while providing harvest for both treaty Indian and non-Indian fisheries. The

parties to the agreement are the United States, the states of Oregon, Washington, and Idaho, and four Columbia River treaty Indian tribes-Warm Springs, Yakama, Nez Perce, and Umatilla.

#### *5.3.3.3 U.S. v. Washington Area*

Treaty Indian tribes have a legal entitlement to the opportunity to take up to 50 percent of the harvestable surplus of stocks which pass through their usual and accustomed fishing areas. The treaty Indian troll harvest which would occur if the tribes chose to take their total 50 percent share of the weakest stock in the ocean, is computed with the current version of the Fishery Regulation Assessment Model (FRAM), assuming this level of harvest did not create conservation or allocation problems on other stocks. A quota may be established in accordance with the objectives of the relevant treaty tribes concerning allocation of the treaty Indian share to ocean and inside fisheries. The total quota does not represent a guaranteed ocean harvest, but a maximum allowable catch.

The requirement for the opportunity to take up to 50 percent of the harvestable surplus determines the treaty shares available to the inside/outside Indian and all-citizen fisheries. Ocean coho harvest ceilings off the Washington coast for treaty Indians and all-citizen fisheries are independent within the constraints that (1) where feasible, conservation needs of all stocks must be met; (2) neither group precludes the other from the opportunity to harvest its share, and; (3) allocation schemes may be established to specify outside/inside sharing for various stocks.

### *6.5 SEASONS AND QUOTAS*

For each management area or subarea, the Council has the option of managing the commercial and recreational fisheries for either coho or Chinook using the following methods: (1) fixed quotas and seasons; (2) adjustable quotas and seasons; and (3) seasons only. The Council may also use harvest guidelines within quotas or seasons to trigger inseason management actions established in the preseason regulatory process.

Quotas provide very precise management targets and work best when accurate estimates of stock abundance and distribution are available, or when needed to ensure protection of depressed stocks from potential overfishing. The Council does not view quotas as guaranteed harvests, but rather the maximum allowable harvest, which assures meeting the conservation objective of the species or stock of concern. While time and area restrictions are not as precise as quotas, they allow flexibility for effort and harvest to vary in response to abundance and distribution.

#### 6.5.1 Preferred Course of Action

Because of the need to use both seasons and quotas, depending on the circumstances, the Council will make the decision regarding seasons and quotas annually during the preseason regulatory process, subject to the limits specified below. Fishing seasons and quotas also may be modified during the season as provided under Section 10.2.

#### 6.5.2 Procedures for Calculating Seasons

Seasons will be calculated using the total allowable ocean harvest determined by procedures described in Chapter 5, and further allocated to the commercial and recreational fishery in accordance with the allocation plan presented in Section 5.3, and after consideration of the estimated amount of effort required to catch the available fish, based on past seasons.

Recreational seasons will be established with the goal of encompassing Memorial Day and/or Labor Day weekends in the season, if feasible. Opening dates will be adjusted to provide reasonable assurance that the recreational fishery is continuous, minimizing the possibility of an in-season closure.

Criteria used to establish commercial seasons, in addition to the estimated allowable ocean harvests, the allocation plan, and the expected effort during the season, will be: (1) bycatch mortality; (2) size, poundage, and value of fish caught; (3) effort shifts between fishing areas; (4) harvest of pink salmon in odd-numbered years; and (5) protection for weak stocks when they frequent the fishing areas at various times of the year.

### 6.5.3 Species-Specific and Other Selective Fisheries

#### *6.5.3.1 Guidelines*

In addition to the all-species and single or limited species seasons established for the commercial and recreational fisheries, other species-limited fisheries, such as "ratio" fisheries and fisheries selective for marked or hatchery fish, may be adopted by the Council during the preseason regulatory process. In adopting such fisheries, the Council will consider the following guidelines:

1. Harvestable fish of the target species are available.
2. Harvest impacts on incidental species will not exceed allowable levels determined in the management plan.
3. Proven, documented, selective gear exists (if not, only an experimental fishery should be considered).
4. Significant wastage of incidental species will not occur, or a written economic analysis demonstrates the landed value of the target species exceeds the potential landed value of the wasted species.
5. The selective fishery will occur in an acceptable time and area where wastage can be minimized and target stocks are maximally available.
6. Implementation of selective fisheries for marked or hatchery fish must be in accordance with U.S. v. Washington stipulation and order concerning co-management and mass marking (Case No. 9213, Subproceeding No. 96-3) and any subsequent stipulations or orders of the U.S. District Court, and consistent with international objectives under the PST (e.g., to ensure the integrity of the coded-wire tag program).

#### *6.5.3.2 Selective Fisheries Which May Change Allocation Percentages North of Cape Falcon*

As a tool to increase management flexibility to respond to changing harvest opportunities, the Council may implement deviations from the specified port area allocations and/or gear allocations to increase harvest opportunity through mark-selective fisheries. The benefits of any mark-selective fishery will vary from year to year and fishery to fishery depending on stock abundance, the mix of marked and unmarked fish, projected hook-and-release mortality rates, and public acceptance. These factors should be considered on an annual and case-by-case basis when utilizing mark-selective fisheries. The deviations for mark-selective fisheries are subordinate to the allocation priorities in Section 5.3.1.1 and may be allowed under the following management constraints:

1. Mark-Selective fisheries will first be considered during the months of May and/or June for Chinook and July through September for coho. However, the Council may consider mark-selective fisheries at other times, depending on year to year circumstances identified in the preceding paragraph.
2. The total impacts within each port area or gear group on the critical natural stocks of management concern are not greater than those under the original allocation without the mark-selective fisheries.

3. Other allocation objectives (i.e., treaty Indian, or ocean and inside allocations) are satisfied during negotiations in the North of Cape Falcon Forum.
4. The mark-selective fishery is assessed against the guidelines in Section 6.5.3.1.
5. Mark-selective fishery proposals need to be made in a timely manner in order to allow sufficient time for analysis and public comment on the proposal before the Council finalizes its fishery recommendations.

If the Council chooses to deviate from specified port and/or gear allocations, the process for establishing a mark-selective fishery would be as follows:

1. Allocate the TAC among the gear groups and port areas according to the basic FMP allocation process described in Section 5.3.1 without the mark-selective fishery.
2. Each gear group or port area may utilize the critical natural stock impacts allocated to its portion of the TAC to access additional harvestable, marked fish, over and above the harvest share established in step one, within the limits of the management constraints listed in the preceding paragraph.

### 6.5.4 Procedures for Calculating Quotas

Quotas will be based on the total allowable ocean harvest and the allocation plan as determined by the procedures of Chapter 5.

To the extent adjustable quotas are used, they may be subject to some or all of the following inseason adjustments:

1. For coho, private hatchery contribution to the ocean fisheries in the OPI area.
2. Unanticipated loss of shakers (bycatch mortality of undersized fish or unauthorized fish of another species that have to be returned to the water) during the season. (Adjustment for coho hooking mortality during any all-salmon-except-coho season will be made when the quotas are established.)
3. Any catch that take place in fisheries within territorial waters that are inconsistent with federal regulations in the EEZ.
4. If the ability to update inseason stock abundance is developed in the future, adjustments to total allowable harvest could be made, where appropriate.
5. The ability to redistribute quotas between subareas depending on the performance toward achieving the overall quota in the area.

Changes in the quotas as a result of the inseason adjustment process will be avoided unless the changes are of such magnitude that they can be validated by the STT and Council, given the precision of the original estimates.

The basis for determining the private hatchery contribution in (1) above will be either coded-wire tag analysis or analysis of scale patterns, whichever is determined by the STT to be more accurate, or another more accurate method that may be developed in the future, as determined by the STT and Council.

In reference to (4) and (5) above, if reliable techniques become available for making inseason estimates of stock abundance, and provision is made in any season for its use, a determination of techniques to be applied will be made by the Council through the Salmon Methodology Review process and discussed during the preseason regulatory process.

### 6.5.5 Procedures for Regulating Ocean Harvests of Pink and Sockeye

Sockeye salmon are only very rarely caught in Council-managed ocean salmon fisheries and no specific procedures have been established to regulate their harvest. Procedures for pink salmon are as follows:

1. All-species seasons will be planned such that harvest of pink salmon can be maximized without exceeding allowable harvests of Chinook and/or coho and within conservation and allocation constraints of the pink stocks.
2. Species specific or ratio fisheries for pink salmon will be considered under the guidelines for species specific fisheries presented in Section 6.5.3, and allocation constraints of the pink stocks.

## APPENDIX C
## OREGON PRODUCTION INDEX DATA

### LIST OF TABLES

Page

TABLE C-1. Millions of coho smolts [a/] released annually into the OPI area by geographic area and rearing agency.

| Year or Average | Columbia River | | | | | | Oregon Coast | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Washington | | | | | | Private | | | |
| | Oregon | Early | Late | Combined | Federal | Total | ODFW[b/] | Yearlings | Total | California | Total OPI |
| 1960-1965 | 5.6 | - | - | 6.1 | 4.5 | 16.2 | 2.0 | - | 2.0 | 0.4 | 18.6 |
| 1966-1970 | 6.0 | 10.2 | 4.9 | 15.1 | 6.5 | 27.6 | 2.9 | 0.0 | 2.9 | 1.3 | 31.8 |
| 1971-1975 | 6.8 | 10.7 | 6.8 | 17.5 | 4.5 | 28.8 | 3.9 | 0.0 | 3.9 | 1.2 | 33.9 |
| 1976-1980 | 8.0 | 7.3 | 10.1 | 17.4 | 4.7 | 30.1 | 3.8 | 1.4 | 5.2 | 0.7 | 36.0 |
| 1981-1985 | 7.1 | 4.3 | 14.4 | 18.7 | 3.2 | 29.0 | 3.9 | 3.3 | 7.2 | 0.7 | 36.9 |
| 1986-1990 | 7.3 | 3.1 | 15.6 | 18.7 | 4.1 | 30.1 | 5.2 | 1.9 | 7.1 | 1.4 | 38.6 |
| 1991-1995 | 9.8 | 3.6 | 13.9 | 17.5 | 3.5 | 30.8 | 4.9 | - | 4.9 | 0.9 | 36.6 |
| 1996-2000 | 7.2 | 4.5 | 10.9 | 15.4 | 4.3 | 26.9 | 2.0 | - | 2.0 | 0.6 | 29.4 |
| 2001 | 7.6 | 4.2 | 9.7 | 13.9 | 3.7 | 25.2 | 0.9 | - | 0.9 | 0.6 | 26.7 |
| 2002 | 7.5 | 3.3 | 8.6 | 11.9 | 4.3 | 23.7 | 1.0 | - | 1.0 | 0.6 | 25.3 |
| 2003 | 8.2 | 3.3 | 8.7 | 12.0 | 3.1 | 23.3 | 0.8 | - | 0.8 | 0.5 | 24.6 |
| 2004 | 6.7 | 3.0 | 8.8 | 11.8 | 3.6 | 22.1 | 0.8 | - | 0.8 | 0.6 | 23.5 |
| 2005 | 6.1 | 2.5 | 9.1 | 11.6 | 2.8 | 20.6 | 0.8 | - | 0.8 | 0.6 | 22.0 |
| 2006 | 6.1 | 2.8 | 9.0 | 11.7 | 2.6 | 20.4 | 0.8 | - | 0.8 | 0.6 | 21.8 |
| 2007 | 6.2 | 3.1 | 9.0 | 12.1 | 3.1 | 21.4 | 0.7 | - | 0.7 | 0.6 | 22.6 |
| 2008 | 6.9 | 2.8 | 9.2 | 12.0 | 2.9 | 21.9 | 0.4 | - | 0.4 | 0.5 | 22.8 |
| 2009 | 6.9 | 2.5 | 8.3 | 10.8 | 3.2 | 20.9 | 0.4 | - | 0.4 | 0.6 | 21.8 |
| 2010 | 5.9 | 2.0 | 7.5 | 9.5 | 3.1 | 18.6 | 0.3 | - | 0.3 | 0.5 | 19.4 |
| 2011 | 5.8 | 1.8 | 8.4 | 10.2 | 3.0 | 19.0 | 0.4 | - | 0.4 | 0.5 | 19.8 |
| 2012 | 5.9 | 2.2 | 7.4 | 9.7 | 2.7 | 18.2 | 0.4 | - | 0.4 | 0.6 | 19.3 |
| 2013 | 6.0 | 2.0 | 7.8 | 9.8 | 2.9 | 18.6 | 0.4 | - | 0.4 | 0.6 | 19.5 |
| 2014 | 6.5 | 1.5 | 7.4 | 8.9 | 3.0 | 18.4 | 0.4 | - | 0.4 | 0.6 | 19.4 |
| 2015 | 5.7 | 2.1 | 7.4 | 9.5 | 3.0 | 18.2 | 0.3 | - | 0.3 | 0.4 | 18.9 |
| 2016 | 5.7 | 2.2 | 6.9 | 9.1 | 3.0 | 17.7 | 0.3 | - | 0.3 | 0.3 | 18.3 |
| 2017 | 5.5 | 1.7 | 7.6 | 9.2 | 1.9 | 16.7 | 0.3 | - | 0.3 | 0.3 | 17.2 |
| 2018 | 6.1 | 2.1 | 7.3 | 9.4 | 3.6 | 19.2 | 0.3 | - | 0.3 | 0.3 | 19.8 |
| 2019 | 5.3 | 1.3 | 7.9 | 9.2 | 3.2 | 17.8 | 0.3 | - | 0.3 | 0.2 | 18.3 |
| 2020 | 5.6 | 1.2 | 8.2 | 9.4 | 3.6 | 18.5 | 0.3 | - | 0.3 | 0.4 | 19.2 |
| 2021 | 5.9 | 1.0 | 7.6 | 8.6 | 3.4 | 17.9 | 0.3 | - | 0.3 | 0.4 | 18.6 |
| 2022[c/] | 4.7 | 0.9 | 8.0 | 8.9 | 3.5 | 17.1 | 0.3 | - | 0.3 | 0.4 | 17.7 |

a/ Defined here as 30 fish per pound or larger and released in February or later.

b/ Beginning in 1989, does not include minor releases from STEP projects.

c/ Preliminary.

TABLE C-2. Data set used in predicting Oregon production index hatchery (OPIH) adult coho. Adults and jacks shown in thousands of fish and smolts in millions of fish.

| Year (t) or Average | Adults (t) | | Jacks (t-1) | | | Columbia River Smolts (t-1) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | OPIH[a/] | MSM[b/] | Total OPI[c/] | Columbia River[d/] | OR Coast/ CA[e/] | Total OPI[f/] | Normal Timed[g/] | Delayed[h/] | Delayed Smolt Adjustment[i/] |
| 1970-1975 | 2,432.6 | - | 119.0 | 113.3 | 5.7 | 32.7 | 26.4 | 1.3 | 4.7 |
| 1976-1980 | 1,879.5 | - | 91.7 | 81.5 | 10.2 | 34.9 | 27.4 | 2.8 | 6.4 |
| 1981-1985[j/] | 867.9 | - | 47.2 | 40.6 | 6.6 | 33.5 | 22.6 | 6.3 | 8.3 |
| 1986-1990 | 1,486.2 | 1,459.0 | 60.6 | 50.6 | 10.0 | 35.9 | 21.0 | 8.9 | 15.5 |
| 1991-1995 | 605.9 | 581.2 | 27.7 | 22.6 | 5.0 | 38.1 | 26.3 | 5.5 | 4.5 |
| 1996-2000 | 320.2 | 329.2 | 22.4 | 18.3 | 4.0 | 28.9 | 22.3 | 3.4 | 2.5 |
| 2001 | 1,417.1 | 1,478.7 | 87.4 | 71.7 | 15.7 | 32.2 | 28.7 | 2.0 | 4.7 |
| 2002 | 649.8 | 689.5 | 25.2 | 18.9 | 6.3 | 26.8 | 23.9 | 1.4 | 1.0 |
| 2003 | 936.6 | 1,009.9 | 49.9 | 41.7 | 8.2 | 25.3 | 23.4 | 0.3 | 0.5 |
| 2004 | 622.1 | 693.6 | 35.4 | 29.4 | 6.0 | 24.5 | 21.2 | 2.0 | 2.5 |
| 2005 | 443.2 | 454.0 | 25.0 | 21.2 | 3.8 | 23.4 | 21.2 | 0.8 | 0.8 |
| 2006 | 440.6 | 523.4 | 25.9 | 20.9 | 5.0 | 22.0 | 20.2 | 0.4 | 0.4 |
| 2007 | 476.6 | 545.3 | 36.3 | 34.2 | 2.2 | 21.8 | 20.3 | 0.1 | 0.2 |
| 2008 | 565.3 | 576.9 | 16.0 | 14.9 | 1.2 | 22.7 | 20.8 | 0.6 | 0.4 |
| 2009 | 1,066.2 | 1,051.0 | 60.4 | 58.4 | 2.0 | 22.8 | 20.8 | 1.1 | 2.9 |
| 2010 | 551.3 | 546.5 | 25.1 | 23.8 | 1.4 | 21.9 | 20.7 | 0.2 | 0.2 |
| 2011 | 442.3 | 454.2 | 23.3 | 22.2 | 1.1 | 19.3 | 18.2 | 0.3 | 0.4 |
| 2012 | 182.3 | 183.1 | 17.9 | 13.9 | 4.0 | 19.9 | 18.1 | 0.9 | 0.7 |
| 2013 | 316.9 | 335.1 | 26.3 | 24.1 | 2.2 | 19.2 | 17.1 | 1.1 | 1.5 |
| 2014 | 1,263.6 | 1,316.5 | 51.4 | 49.4 | 2.0 | 19.6 | 18.0 | 0.6 | 1.6 |
| 2015 | 251.7 | 268.9 | 39.6 | 37.0 | 2.6 | 19.4 | 16.9 | 1.5 | 3.0 |
| 2016 | 233.8 | 247.7 | 19.7 | 18.6 | 1.0 | 18.9 | 16.9 | 1.3 | 1.3 |
| 2017 | 284.8 | 291.8 | 22.9 | 22.4 | 0.4 | 18.4 | 16.5 | 1.3 | 1.6 |
| 2018 | 149.4 | 182.8 | 19.2 | 18.5 | 0.7 | 17.2 | 16.0 | 0.7 | 0.8 |
| 2019 | 300.5 | 340.7 | 47.4 | 46.7 | 0.8 | 19.7 | 18.6 | 0.5 | 1.2 |
| 2020 | 369.6 | 387.7 | 15.2 | 14.9 | 0.3 | 18.3 | 16.8 | 0.2 | 0.2 |
| 2021 | - | 841.3 | 92.3 | 89.1 | 3.2 | 19.2 | 18.1 | 0.4 | 1.9 |
| 2022 | - | 696.0 | 63.7 | 62.4 | 1.3 | 18.6 | 17.6 | 0.3 | 1.0 |
| 2023[k/] | - | 896.9 | 52.7 | 51.9 | 0.8 | 17.6 | 16.8 | 0.3 | 0.9 |

a/ Adult OPIH = Harvest impacts plus escapement for public hatchery stocks originating in the Columbia River, Oregon coastal rivers, and the Klamath River, California.

b/ Adult MSM = Harvest impacts plus escapement for public hatchery stocks originating in the Columbia River, Oregon coastal rivers, and the Klamath River. Estimates derived from the MSM and used for prediction beginning in 2008.

c/ Jack OPI = Total Jack CR and Jack OC.

d/ Jack CR = Columbia River jack returns corrected for small adults.

e/ Jack OC = Oregon coastal and California hatchery jack returns corrected for small adults.

f/ Total OPI = Columbia River (Sm D + Sm CR), Oregon coastal and Klamath Basin.

g/ Sm CR = Columbia River smolt releases from the previous year expected to return as adults in the year listed.

h/ Sm D = Columbia River delayed smolt releases from the previous year expected to return as adults in the year listed.

i/ Correction term for delayed smolts released from Col. R. hatcheries (Col. R. Jacks*(Delayed Smolts/Col. R. Smolts)).

j/ Subsequent to 1983 data not used in predictions due to El Niño impacts.

k/ For MSM: Preseason predicted adults.

TABLE C-3. Estimated coho salmon natural spawner abundance in Oregon coastal basins for each OCN coho management component.

| Component and Basin[a/] | 2001-2005 Ave. | 2006-2010 Ave. | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020[b/] | 2021[b/] | 2022[b/d/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHERN | | | | | | | | | | | | | | |
| Necanicum | 2,534 | 2,102 | 2,120 | 902 | 798 | 5,727 | 847 | 936 | 529 | 393 | 698 | -- | -- | -- |
| Nehalem | 20,159 | 19,364 | 15,322 | 2,963 | 4,539 | 30,577 | 3,079 | 7,549 | 5,486 | 4,190 | 12,383 | -- | -- | -- |
| Tillamook | 6,563 | 9,408 | 19,250 | 1,686 | 4,402 | 20,090 | 1,345 | 7,102 | 2,927 | 2,035 | 3,961 | -- | -- | -- |
| Nestucca | 7,287 | 2,063 | 7,857 | 1,751 | 946 | 6,369 | 1,029 | 2,412 | 4,495 | 1,072 | 4,602 | -- | -- | -- |
| Ind. Tribs. | 573 | 1,132 | 1,341 | 218 | 271 | 4,607 | 440 | 699 | 206 | 262 | 616 | -- | -- | -- |
| TOTAL | 37,116 | 34,068 | 45,890 | 7,520 | 10,956 | 67,370 | 6,740 | 18,698 | 13,643 | 7,952 | 22,260 | 21,480 | 42,811 | 46,692 |
| NORTH CENTRAL | | | | | | | | | | | | | | |
| Salmon | 506 | 672 | 3,636 | 297 | 1,165 | 3,680 | 332 | 1,054 | 450 | 103 | 215 | -- | 571 | 1,780 |
| Siletz | 6,902 | 11,678 | 33,094 | 4,495 | 7,660 | 19,496 | 2,216 | 3,015 | 5,202 | 4,064 | 4,509 | -- | 15,428 | 15,434 |
| Yaquina | 10,571 | 7,618 | 19,074 | 6,268 | 3,553 | 25,582 | 2,400 | 3,730 | 2,491 | 4,672 | 3,452 | -- | 16,721 | 6,477 |
| Beaver Ck. | 3,487 | 1,885 | 2,389 | 1,878 | 2,015 | 6,564 | 332 | 1,709 | 1,553 | 494 | 814 | -- | 2,483 | 1,703 |
| Alsea | 8,344 | 8,353 | 28,337 | 8,470 | 9,283 | 25,855 | 6,185 | 7,375 | 4,377 | 5,112 | 4,915 | -- | 13,633 | 18,462 |
| Siuslaw | 24,138 | 16,700 | 28,082 | 11,946 | 14,118 | 38,896 | 10,352 | 9,141 | 7,129 | 6,635 | 5,881 | -- | 38,031 | 24,578 |
| Ind. Tribs. | 3,279 | 2,017 | 4,487 | 492 | 1,929 | 1,890 | 856 | 464 | 1,646 | 958 | 289 | -- | 1,747 | 1,568 |
| TOTAL | 57,227 | 48,922 | 119,099 | 33,846 | 39,723 | 121,963 | 22,673 | 26,488 | 22,848 | 22,038 | 20,075 | 30,825 | 88,614 | 70,002 |
| SOUTH CENTRAL | | | | | | | | | | | | | | |
| Umpqua | 37,165 | 39,149 | 94,655 | 20,948 | 27,016 | 66,272 | 14,860 | 7,494 | 15,492 | 24,035 | 19,158 | 33,644 | 49,266 | 9,692 |
| Coos | 26,572 | 16,423 | 10,999 | 9,414 | 6,884 | 38,880 | 3,030 | 4,624 | 2,689 | 7,292 | 13,289 | -- | -- | 7,549 |
| Coquille | 15,571 | 19,437 | 55,667 | 5,911 | 23,637 | 41,660 | 3,357 | 9,494 | 4,641 | 5,688 | 11,841 | -- | -- | 18,970 |
| Floras Ck. | 3,568 | 3,352 | 9,217 | 2,502 | 1,936 | 1,022 | 1,585 | 942 | 693 | 628 | 904 | -- | -- | 867 |
| Sixes R. | 157 | 140 | 334 | 34 | 567 | 410 | 168 | 120 | 69 | 174 | 155 | -- | -- | 116 |
| Coastal Lakes | 18,205 | 22,557 | 20,281 | 18,922 | 13,659 | 22,010 | 4,729 | 8,044 | 1,302 | 6,704 | 7,433 | 9,722 | 19,664 | 8,075 |
| Ind. Tribs. | - | 224 | 101 | 48 | 33 | 106 | 0 | 0 | 0 | 10 | 23 | -- | -- | 0 |
| TOTAL | 101,238 | 101,282 | 191,254 | 57,779 | 73,732 | 170,360 | 27,729 | 30,718 | 24,886 | 44,531 | 52,803 | 57,627 | 114,897 | 114,897 |
| SOUTH | | | | | | | | | | | | | | |
| Rogue[c/] | 12,349 | 3,140 | 5,033 | 5,792 | 12,354 | 2,664 | 4,487 | 7,568 | 4,773 | 9,238 | 2,686 | 1,824 | 8,992 | 7,865 |
| COASTWIDE | 207,930 | 187,323 | 361,276 | 104,937 | 136,765 | 362,357 | 61,629 | 83,472 | 66,150 | 83,759 | 97,824 | 111,756 | 255,314 | 239,456 |

a/ The sum of the individual basins may not equal the aggregate totals due to the use of independent estimates at different geographic scales.

b/ (--) Estimates were not made due to low survey rates and sampling levels.

c/ Mark recapture estimate based on seining at Huntley Park in the lower Rogue River.

d/ Preliminary.

TABLE C-4. Data set used in predicting Oregon coastal natural river (OCNR) coho ocean recruits with random survey sampling and Mixed Stock Model (MSM) accounting. All environmental data in year of ocean entry (t-1) except SST-J, which is January of adult return year (t). Spawners is parent brood (t-3). Recruits shown in thousands of fish.

| | Recruits | | Environmental Index-Month(s)[a/] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year (t) | Adults | Spawners | PDO-MJJ | UWI-JAS | UWI-SON | SSH-AMJ | SST-AMJ | SST-J | MEI-ON | SPR.TRN |
| 1970-1975 | 237.5 | 112.3 | -0.7 | 35.5 | -19.7 | -84.8 | 11.6 | 9.0 | -0.7 | 98.3 |
| 1976-1980 | 204.3 | 30.7 | -0.3 | 26.4 | -29.2 | -113.6 | 11.1 | 9.9 | -0.1 | 86.0 |
| 1981-1985 | 148.9 | 26.8 | -0.1 | 28.4 | -30.0 | -96.8 | 11.4 | 10.4 | 0.3 | 85.0 |
| 1986-1990 | 153.8 | 28.9 | 0.1 | 29.6 | -39.2 | -91.0 | 11.6 | 10.4 | 0.2 | 82.0 |
| 1991-1995 | 150.7 | 27.0 | 0.3 | 29.3 | -40.8 | -77.9 | 11.6 | 10.4 | 0.4 | 89.0 |
| 1996-2000 | 131.8 | 25.2 | 0.5 | 31.2 | -49.0 | -61.7 | 11.7 | 10.8 | 0.4 | 94.8 |
| 2000 | 156.6 | 21.5 | 0.4 | 35.8 | -26.8 | -48.2 | 11.4 | 10.2 | -0.7 | 72.0 |
| 2001 | 246.1 | 34.7 | -0.4 | 47.1 | -38.2 | -117.5 | 10.7 | 10.1 | -0.3 | 61.0 |
| 2002 | 227.3 | 61.0 | -0.6 | 50.5 | -25.9 | -139.5 | 10.1 | 11.0 | 0.8 | 80.0 |
| 2003 | 164.0 | 143.1 | -0.2 | 55.5 | -26.4 | -53.8 | 11.1 | 10.3 | 0.3 | 112.0 |
| 2004 | 146.3 | 236.4 | 0.0 | 27.0 | 4.3 | -52.4 | 11.9 | 10.2 | 0.4 | 110.0 |
| 2005 | 113.3 | 213.3 | 0.5 | 51.8 | -9.0 | -14.9 | 12.5 | 11.5 | -0.7 | 145.0 |
| 2006 | 64.9 | 154.1 | 0.8 | 53.6 | -14.1 | -25.1 | 11.2 | 9.8 | 0.8 | 112.0 |
| 2007 | 157.0 | 139.9 | 0.6 | 27.5 | -9.9 | -111.9 | 10.6 | 8.9 | -1.1 | 74.0 |
| 2008 | 262.9 | 104.7 | 0.2 | 32.7 | -10.7 | -100.9 | 9.6 | 9.4 | -1.1 | 89.0 |
| 2009 | 255.6 | 57.3 | -0.3 | 24.3 | -47.1 | -83.1 | 10.5 | 10.8 | 0.8 | 82.0 |
| 2010 | 352.4 | 156.1 | -0.5 | 34.2 | -32.9 | -35.0 | 11.7 | 10.1 | -2.1 | 100.0 |
| 2011 | 98.1 | 245.4 | -0.8 | 29.3 | -26.3 | -32.2 | 10.7 | 9.2 | -1.3 | 100.0 |
| 2012 | 130.2 | 244.7 | -0.7 | 53.6 | -29.9 | -19.9 | 11.0 | 9.9 | -0.1 | 121.0 |
| 2013 | 377.4 | 336.0 | -0.8 | 35.3 | -7.8 | -91.5 | 10.7 | 9.1 | -0.2 | 100.0 |
| 2014 | 64.6 | 80.2 | -0.4 | 41.3 | -40.1 | -14.4 | 11.2 | 12.3 | 0.2 | 101.0 |
| 2015 | 74.3 | 110.8 | 0.2 | 40.4 | -7.9 | -100.8 | 10.3 | 11.0 | 2.0 | 92.0 |
| 2017 | 67.4 | 337.7 | 1.0 | 48.0 | -68.2 | -111.5 | 11.6 | 9.9 | -0.6 | 85.0 |
| 2018 | 74.0 | 52.4 | 1.3 | 46.1 | -36.2 | -52.8 | 11.2 | 11.0 | -0.6 | 116.0 |
| 2019 | 99.2 | 67.9 | 1.0 | 41.1 | -12.4 | -107.8 | 10.8 | 11.1 | 0.3 | 107.0 |
| 2020 | 100.3 | 60.1 | 0.9 | 20.1 | 4.1 | -89.9 | 10.5 | 10.5 | 0.4 | 103.0 |
| 2021 | 251.3 | 67.8 | 0.4 | 25.6 | -18.9 | -74.7 | 11.4 | 10.3 | -1.2 | 140.0 |
| 2022 | 182.0 | 87.7 | -0.1 | 40.8 | -64.1 | -126.7 | 11.0 | 10.2 | -1.4 | 80.0 |
| 2023[b/] | 226.3 | 100.2 | -0.6 | 33.8 | -6.6 | -90.3 | 11.5 | 10.6 | -1.6 | 84.0 |

a/ Environmental Index descriptions:

PDO - Pacific Decadal Oscillation (4-year moving average)

UWI - Upwelling wind index (mean upwelling winds index in months of ocean migration year at 42º N 125º W)

SSH - Sea surface height (South Beach, OR at 44º 37.5´ N, 124 º 02.6´ W)

SST - Sea surface temperature (mean sea surface temperature in January of return year at Charleston, OR)

MEI - Multi-variate ENSO index

SPR.TRN - Spring transition date (Julian)

b/ Adult recruits is a forecasted number.

## APPENDIX D
## KLAMATH RIVER FALL CHINOOK ABUNDANCE FORECAST ANALYSIS

TO: Klamath River Technical Team

FROM: Michael O'Farrell, NMFS/SWFSC

DATE: January 9, 2023

SUBJECT: Klamath River fall Chinook abundance forecast analysis

At the September 14, 2022 meeting of the Klamath River Technical Team (KRTT) Doug Shaftel of Scripps Institute of Oceanography presented results of his capstone project titled Managing Uncertainty: Forecasting Ocean Abundance of Klamath River Fall-Run Chinook Salmon (*Oncorhynchus tshawytscha*). Key results of his capstone analysis were: (1) age-specific Klamath River fall Chinook (KRFC) forecasts have become increasingly inaccurate over time and, relatedly, age-specific maturation rates have increased for age-2 through age-4 KRFC over time. To address the forecast inaccuracy issue, two alternative forecasting approaches were proposed. Model 1 used data from brood years 1990-forward to inform the age-specific sibling regression abundance forecast. Model 2 used a moving window of the ten most recent brood years to inform the age-specific sibling regression abundance forecast. Forecast accuracy was then evaluated for Model 1, Model 2, and the status quo data range. Increased accuracy was observed for age-3 and age-4 forecasts under both Model 1 and Model 2, with larger increase in accuracy for Model 2. The takeaway messages from this analysis were (paraphrased):

1. KRFC are returning to the river earlier in life,
2. The shift toward earlier maturation happened abruptly,
3. Removing data for older broods increased forecast accuracy, and
4. Using the 10 most recent brood years for forecasting may be able to respond to future changes in maturation rates.

To provide some more information on abundance forecast performance I repeated aspects of the Shaftel analysis. I limited the evaluation to forecasts from management years 2012-2021 and considered alternative forecast performance measures. A one-step-ahead cross-validation approach was employed; forecasts were made based on the data available at the time (as would be done in practice), and the forecasts were compared to postseason estimates of abundance. Age-specific forecasts were made for management years 2012-2021 under three scenarios: (1) status quo data range, (2) 1990-forward, and (3) the 10 most recent brood years.

Abundance forecast performance was evaluated for the three data range scenarios using Mean Accuracy (MA), Mean Raw Error (MRE), and Median Log Accuracy Ratio (MLAR). Mean Accuracy was defined in Shaftel (2022) as

$$\text{MA} = \frac{1}{n}\sum_{y=1}^{n}\frac{N_{pre,y}}{N_{post,y}}$$

where $N_{pre,y}$ and $N_{post,y}$ are year $y$ forecast abundance and postseason-estimated abundance, respectively, and $n$ is the total number of pre:post comparisons. MA values that exceed 1.0 indicate that the forecasts, on average, exceeded the postseason estimates and MA values less than 1.0 indicate that the forecasts, on average, were lower than the postseason estimates.

Mean percent error is defined as

$$\text{MPE} = \frac{1}{n}\sum_{y=1}^{n}\frac{N_{pre,y} - N_{post,y}}{N_{post,y}}$$

MPE is also useful for assessing whether forecasts are biased, on average. Positive values of MPE indicate mean over-forecasting, while negative values of MPE indicate mean under-forecasting. The median log accuracy ratio was also considered.

$$\text{MLAR} = median\left[\log\left(\frac{N_{pre}}{N_{post}}\right)\right]$$

Where again, positive values of MLAR indicate overforecasting and negative values indicate underforecasting.

The performance of abundance forecast for age-3, age-4, and total abundance under the three forecast alternatives was compared using MA, MPE, and MLAR. Results for the MA performance measure are found in Table 1. Table 2 displays results for the MPE performance measure and Table 3 displays results for the MLAR performance measure.

Table 1. Mean Accuracy results for the three forecast scenarios.

| | Mean Accuracy | | |
|---|---|---|---|
| Forecast | Age-3 | Age-4 | Total adults |
| Status quo | 1.62 | 2.04 | 1.60 |
| 1990-forward | 1.45 | 1.63 | 1.40 |
| 10-yr running | 1.20 | 1.57 | 1.20 |

Table 2. Mean Percent Error results for the three forecast scenarios.

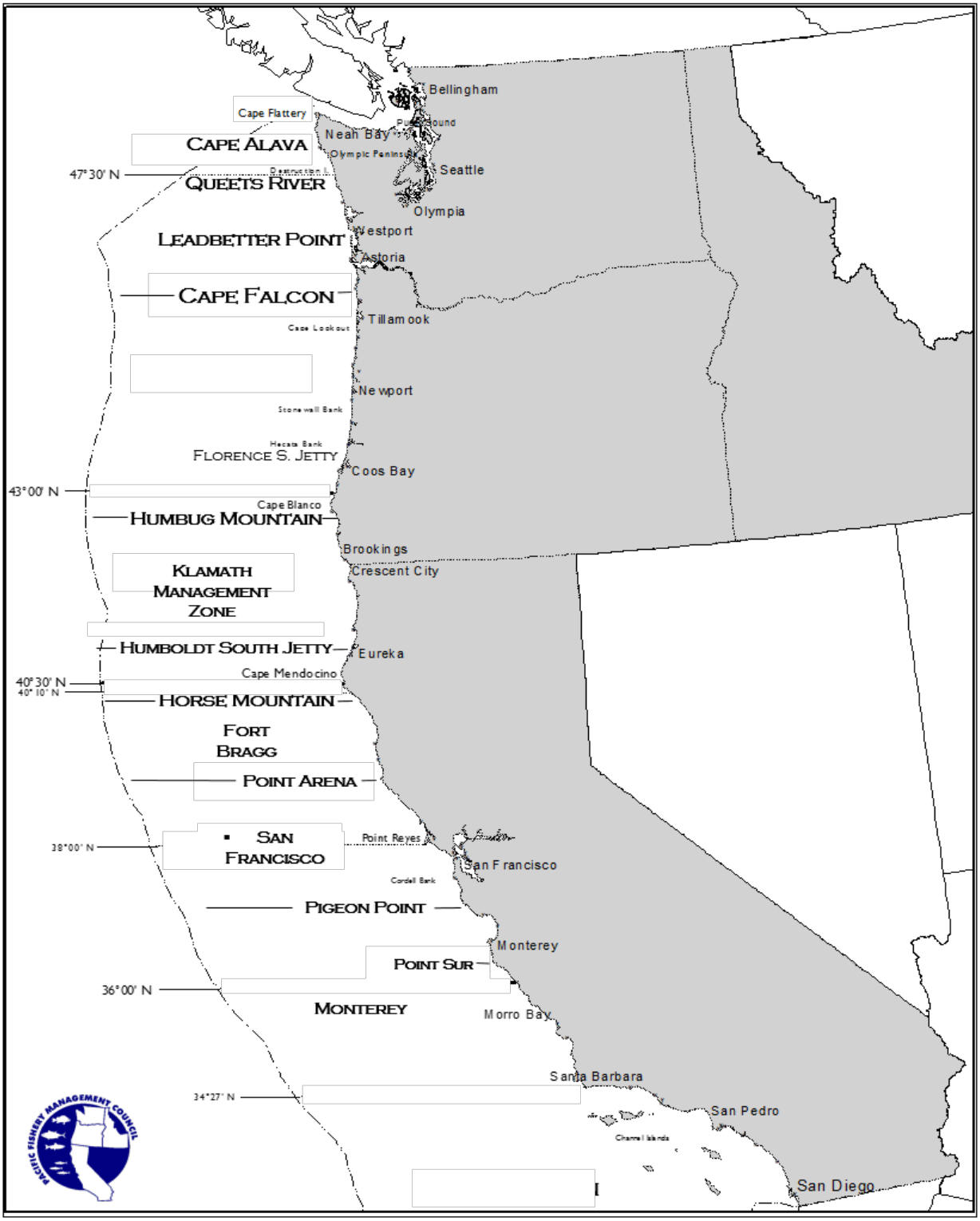
| | Mean Percent Error | | |
|---|---|---|---|
| Forecast | Age-3 | Age-4 | Total adults |
| Status quo | 0.62 | 1.04 | 0.60 |
| 1990-forward | 0.45 | 0.63 | 0.40 |
| 10-yr running | 0.20 | 0.57 | 0.20 |

Table 3. Median Log Accuracy Ratio results for the three forecast scenarios.

| | Median Log Accuracy Ratio | | |
|---|---|---|---|
| Forecast | Age-3 | Age-4 | Total adults |
| Status quo | 0.33 | 0.35 | 0.40 |
| 1990-forward | 0.16 | 0.10 | 0.23 |
| 10-yr running | -0.02 | 0.12 | 0.12 |

The results for the MA and MPE performance measures indicated that the best forecast performance for age-3, age-4, and total adult KRFC occurred when forecasts were made using a 10-year window of data. A similar conclusion could be made when considering the MLAR performance measure. For MLAR the age-3 and total adult forecast performance was highest for the 10-year running forecast alternative. For the age-4 forecast, the 1990-forward alternative had slightly better performance than the 10-year running alternative.

At the September 14, 2022 KRTT meeting, there was some discussion about whether changes to the KRFC abundance forecasting approach should be implemented prior to the planning of 2023 fisheries. The work described here validated the results presented by Doug Shaftel. I propose that time should be provided at our January 24-27, 2022 KRTT meeting to discuss this topic once again, with the goal of resolving the issue.




This map is for reference only and is not intended for use in navigation or fishery regulation.

# PRESEASON REPORT II

## PROPOSED ALTERNATIVES
## AND
## ENVIRONMENTAL ASSESSMENT PART 2
## FOR 2023
## OCEAN SALMON FISHERY
## REGULATIONS

**REGULATION IDENTIFIER NUMBER 0648- BL66**

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384
(503) 820-2280
www.pcouncil.org

MARCH 2023

# PUBLIC HEARINGS ON SALMON ALTERNATIVES

| 2023 Schedule of Salmon Fishery Management Alternative Hearings | | |
|---|---|---|
| WASHINGTON | OREGON | CALIFORNIA |
| **7 p.m. Monday March 20** | **7 p.m. Monday March 20** | **7 p.m. Tuesday March 21** |
| Chateau Westport | The Mill Casino | Courtyard by Marriot Santa Rosa |
| Beach Room | Willow Beargrass Room | Sonoma Ballroom |
| 710 West Hancock | 3201 Tremont Ave. | 175 Railroad St |
| **Westport**, WA | **North Bend**, OR | **Santa Rosa**, CA |
| 98595 | 97459 | 95401 |
| 360-268-9101 | 541-756-8800 | 707-573-9000 |

The Council solicited written public comment on the Alternatives via the Council's (www.pcouncil.org) Public Comment Electronic Portal (E-Portal). The public comment period opened on December 12, 2022, and closed at is 5:00 p.m. Pacific Time, March 30, 2023.

Verbal and written public comment on the Alternatives were also accepted in person or online at the April Council meeting on April 2 during the public comment period for Salmon Agenda Item E.2.

# ACKNOWLEDGMENTS

## SALMON TECHNICAL TEAM

**DR. MICHAEL O'FARRELL, CHAIR**
National Marine Fisheries Service, Santa Cruz, California

**MR. JON CAREY, VICE CHAIR**
National Marine Fisheries Service, Lacey, Washington

**MS. GRACE EASTERBROOK** (*alternate for Ms. Kandice Morgenstern*)
California Department of Fish and Wildlife, Eureka, California

**DR. STEVE HAESEKER**
U.S. Fish and Wildlife Service, Vancouver, Washington

**MS. CASSANDRA LEEMAN**
Oregon Department of Fish and Wildlife, Salem, Oregon

**DR. ALEXANDREA SAFIQ**
Washington Department of Fish and Wildlife, Olympia, Washington

**MS. STEPHANIE THURNER** *(alternate for Ms. Ashton Harp)*
Northwest Indian Fisheries Commission, Olympia, Washington

**DR. RICH ZABEL**
National Marine Fisheries Service, Seattle, Washington

## PACIFIC FISHERY MANAGEMENT COUNCIL STAFF

**MS. ROBIN EHLKE**
**DR. JIM SEGER**

The Salmon Technical Team and the Council staff express their thanks for the expert assistance provided by Mr. Kyle Van de Graff and Ms. Erica Weyland, Washington Department of Fish and Wildlife; Mr. Ian Pritchard and Mr. Lane Jackson, California Department of Fish and Wildlife; Mr. Eric Schindler, Oregon Department of Fish and Wildlife, and numerous other tribal and agency personnel in completing this report.

This document may be cited in the following manner:
Pacific Fishery Management Council. 2023. *Preseason Report II: Proposed Alternatives and Environmental Assessment - Part 2 for 2023 Ocean Salmon Fishery Regulations.* (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.

A report of the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number FNA20NMF4410011.

# TABLE OF CONTENTS

## TABLE OF CONTENTS *(continued)*



## LIST OF TABLES



## LIST OF FIGURES

## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AABM | Aggregate Abundance Based Management |
| ABC | acceptable biological catch |
| ACL | annual catch limit |
| BO | biological opinion |
| BC | British Columbia |
| CCC | California coastal Chinook |
| CCIEA | California Current Integrated Ecosystem Assessment |
| CDFW | California Department of Fish and Wildlife |
| CFGC | California Fish and Game Commission |
| CO | central Oregon (South end of Heceta Bank to Humbug Mountain.) |
| Council | Pacific Fishery Management Council |
| CPUE | catch per unit effort |
| CYER | Calendar year exploitation rate |
| DPS | Distinct Population Segment |
| EA | Environmental Assessment |
| EFH | Essential Fish Habitat |
| EIS | Environmental Impact Statement |
| ENSO | El Niño/Southern Oscillation |
| ESA | Endangered Species Act |
| ESU | Evolutionarily Significant Unit |
| FB | Fort Bragg (southern boundary of California KMZ to Point Arena) |
| FRAM | Fishery Regulation Assessment Model |
| FMA | fishery management area |
| FMP | fishery management plan |
| FONSI | finding of no significant impact |
| GSI | genetic stock identification |
| IPHC | International Pacific Halibut Commission |
| ISBM | Individual Stock Based Management |
| KC | California KMZ (OR/CA border to latitude 40°10'N.) |
| KO | Oregon KMZ (Humbug Mountain to the OR/CA border) |
| KMZ | Klamath Management Zone |
| KRFC | Klamath River fall Chinook |
| LCN | Lower Columbia Natural (wild Columbia River coho below Bonneville Dam) |
| LCR | Lower Columbia River (wild Col. River tule fall Chinook below Bonneville Dam) |
| LRH | Lower River Hatchery (hatchery Col. River tule fall Chinook below Bonneville Dam) |
| LRW | Lower River Wild (Columbia River bright fall wild Chinook below Bonneville Dam) |
| MSST | minimum stock size threshold |
| MO | Monterey (Pigeon Point to the U.S./Mexico border) |
| NEPA | National Environmental Policy Act |
| MSA | Magnuson-Stevens Act |
| MSY | maximum sustainable yield |
| NMFS | National Marine Fisheries Service |
| NO | northern Oregon (Cape Falcon to south end of Heceta Bank) |
| NAO | National Oceanic and Atmospheric Administration Administrative Order |
| NOAA | National Oceanic and Atmospheric Administration |

## LIST OF ACRONYMS AND ABBREVIATIONS (continued)

| | |
|---|---|
| ODFW | Oregon Department of Fish and Wildlife |
| OCN | Oregon coastal natural (coho) |
| OFL | overfishing limit |
| OLE | Office of Law Enforcement (NOAA) |
| OPI | Oregon Production Index |
| OSP | Oregon State Police |
| PDO | Pacific (inter) Decadal Oscillation |
| PFMC | Pacific Fishery Management Council |
| PSC | Pacific Salmon Commission |
| PST | Pacific Salmon Treaty |
| $S_{ABC}$ | spawning escapement associated with ABC |
| $S_{ACL}$ | spawning escapement associated with ACL (= $S_{ABC}$) |
| SCH | Spring Creek Hatchery (Col. R. tule fall Chinook returning to Spring Creek Hatchery [above Bonneville Dam]) |
| SEAK | Southeast Alaska |
| $S_{MSY}$ | MSY spawning escapement |
| SF | San Francisco (Point Arena to Pigeon Point) |
| SONCC | Southern Oregon/Northern California Coast (coho ESU) |
| SRFC | Sacramento River fall Chinook |
| SRFI | Snake River fall (Chinook) Index |
| SRKW | Southern Resident Killer Whale |
| SRW | Snake River wild (fall Chinook) |
| SRWC | Sacramento River winter Chinook |
| STT | Salmon Technical Team |
| SWO | State Waters Only (fisheries off Oregon south of Cape Falcon) |
| USCG | United States Coast Guard |
| USFWS | United States Fish and Wildlife Service |
| WCVI | West Coast Vancouver Island |
| WDFW | Washington Department of Fish and Wildlife |

## 1.0 INTRODUCTION

This report, referred to as Preseason Report II, is the third in an annual series of four reports prepared by the Salmon Technical Team (STT) of the Pacific Fishery Management Council (Council) to document and help guide ocean salmon fishery management off the coasts of Washington, Oregon, and California. This report describes the Council's proposed ocean salmon management alternatives for 2023[1] (Alternatives) and characterizes the expected impacts on ocean salmon fisheries and the stocks that support them. The Council solicited public comments on the proposed Alternatives in preparation for adopting final management recommendations at its annual April meeting. Three public hearings were scheduled to provide opportunity for public comments on the proposed Alternatives (information is displayed on the inside front cover of this report). In addition, opportunity for public comments was provided at the April Council meeting. Written public comments could be submitted to the PFMC Public Comment Electronic Portal (E-Portal). The deadline for submitting written comments was 5:00 p.m. Pacific Time, March 30, 2023. Oral public comment on the Alternatives were also accepted in person or online at the April Council meeting on April 2 during the public comment period for Agenda Item E.2.

This report constitutes the second part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2023 ocean salmon management measures. The first part of this EA (Preseason Report I; PFMC 2023a, incorporated herein by reference), includes a statement of the purpose and need for the proposed action, a description of the affected environment, a description of the No-Action Alternative, and an evaluation of the No-Action Alternative's effects on the salmon stocks included in the Council's Fishery Management Plan (FMP). This second part of the EA includes an additional description of the affected environment relevant to the Council's proposed Alternatives, a description of the action Alternatives, and an analysis of the environmental consequences of the Alternatives, including short term and long-term impacts of the Alternatives.

## 2.0 SELECTION OF FINAL MANAGEMENT MEASURES

The Council's final ocean salmon season recommendations were selected based on the range of Alternatives presented in this report and guidance received from deliberations at management fora such as the north of Cape Falcon planning process (sponsored by the States of Washington and Oregon and the treaty Indian tribes in that area), Pacific Salmon Commission (PSC), and from public hearings sponsored by the Council and the States of Washington, Oregon, and California. Final recommendations concerning season dates, catch quotas, and exploitation rates may vary from the Alternatives presented in this report depending upon determination of allocations, allowable harvest levels, public comment, and/or the final impact analyses completed by the STT. For example, elements of the Alternatives may be recombined to alter season patterns and quotas, or measures such as bag limits, days of fishing per week, special landing restrictions, and other specific regulatory details may also change. In addition, inseason modification of management measures may be used to ensure achievement of the Council's management objectives.

Specific details pertaining to season structure and special management measures for the treaty Indian troll fishery north of Cape Falcon are established in tribal regulations. Chinook and coho quota levels for the treaty Indian troll fishery may be adjusted if substantial changes in incidental fishing mortality result from tribal regulations, preseason or inseason.

The impact analyses presented in this document reflect uncertainties and limitations of information available at the time of the March 2023 Council meeting. At that point in the planning cycle, the STT's

[1] The fishery management measures under consideration would cover the period May 16, 2023 through May 15, 2024 (86 FR 26426). For ease of reference, we refer to this time period as 2023.

impact assessments reflect five key assumptions relative to stocks impacted by Canadian and Alaskan fisheries:

1) abundance levels for Canadian Chinook and coho stocks identical to 2022 forecasts;
2) for Chinook fisheries managed under the aggregate abundance-based management (AABM) provisions of the 2019 Pacific Salmon Treaty (PST) Agreement, including Southeast Alaska (SEAK), Northern British Columbia (NBC), and West Coast Vancouver Island (WCVI), 2023 fisheries were modeled using fishing effort scalars from the final 2022 preseason model run;
3) for Canadian Chinook fisheries managed under individual stock-based management (ISBM) regimes, the 2023 fishery inputs were modeled using recent two-year average catches to reflect anticipated fishing levels consistent with the 2019 PST Agreement;
4) for Canadian coho fisheries, all fisheries were modeled using 2022 final preseason fishery inputs;
5) for Southern U.S. inside fisheries for Chinook and inside and coastal terminal fisheries for coho, the 2022 final preseason modeled fisheries were used.

In mid-March, U.S. and Canadian fishery managers exchanged information regarding preseason expectations for fisheries and the status of Chinook and coho stocks. In addition, the PSC's Chinook Model was calibrated by the PSC Chinook Technical to determine the annual catch limits for each of the AABM fisheries under the 2019 PST Agreement. Abundances and fishery expectations were adjusted in the Council's fishery planning models prior to the April Council meeting, and inside fisheries were shaped by state and tribal co-managers both prior to and during the April Council meeting.

Any Alternative considered for adoption that deviates from Salmon FMP objectives or other applicable laws requires implementation by emergency rule. If an emergency rule appears to be necessary, the Council must clearly identify and justify the need for such an action consistent with emergency criteria established by the Council and the National Marine Fisheries Service (NMFS).

## 3.0 SALMON TECHNICAL TEAM CONCERNS

The Salmon Technical Team has no concerns to report in this document.

## 4.0 SALMON FISHERY MANAGEMENT PLAN REQUIREMENTS

The Council's Salmon FMP includes objectives for setting annual management measures to regulate ocean salmon fisheries between the U.S./Canada border and the U.S./Mexico border. The objectives include biological, administrative, and allocation requirements. In recommending final management measures, the Council attempts to meet all objectives in a fair and balanced manner, while maintaining established priorities.

Biological objectives for stocks originating in the Council area and impacted by Council area ocean fisheries are listed in Table 3-1 of the Salmon FMP. The objectives generally consist of meeting spawning escapement numbers associated with maximum sustainable yield ($S_{MSY}$), overfishing limits (OFL), acceptable biological catch (ABC), and annual catch limits (ACL), or exploitation rate limits designed to support recovery of depressed stocks or to rebuild overfished stocks, while encompassing a long-term average harvest approximating maximum sustainable yield (MSY).

Administrative objectives are requirements for meeting other applicable law outside of the Salmon FMP. These requirements include the Endangered Species Act (ESA), international treaties, and tribal trust responsibilities. The Salmon FMP defers to measures needed to protect ESA-listed species analyzed in or required by biological opinions issued by NMFS under ESA section 7(a)(2) or section 4(d) (referred to in

the Salmon FMP as "consultation standards"). Section 5.0 of this document provides greater detail on ESA listed species, while impacts of the proposed Alternatives on ESA listed species are included in Table 5.

The Salmon FMP requires compliance with relevant terms of the PST. Section 6.0 of this document provides greater detail on PST provisions and stocks, while impacts of the Council adopted proposed Alternatives on those stocks are included in Table 5.

Treaty trust responsibilities of the Salmon FMP require the Council to abide by Court orders in the *U.S. v. Washington* (Puget Sound), *Hoh v. Baldrige* (Washington coast), and *U.S. v. Oregon* (Columbia River) cases, and the Solicitor General opinion (Klamath River) governing allocation and management of shared salmon resources. Much of the North of Falcon forum is dedicated to annual negotiations establishing allocation among the tribes, non-Indian fishing sectors, and ocean and inside interests. The results of these negotiations allow the Council to complete final management measure recommendations while meeting its biological, administrative, and allocation objectives.

The Columbia River Treaty Tribes establish periodic management agreements with the state co-managers and Federal agencies. These agreements are approved pursuant to provisions of *U.S. v. Oregon* procedures. Recent agreements have included an entitlement for the treaty tribes of 50 percent of the coho return destined for areas upstream from Bonneville Dam. Council area fisheries are shaped in order to meet this requirement in some years.

The Yurok and Hoopa Valley Tribes are entitled to 50 percent of the total Klamath River fall Chinook (KRFC) harvest, which is calculated as a harvest of KRFC equal to that taken in all non-Indian fisheries. The Council must account for all harvest impacts when assessing the achievement of KRFC conservation objectives.

## 5.0 SALMON SPECIES LISTED UNDER THE ENDANGERED SPECIES ACT

Since 1989, NMFS has listed the following 17 Evolutionarily Significant Units (ESUs) of salmon under the ESA:

| Species | ESU | Status | Federal Register Notice | | | |
|---|---|---|---|---|---|---|
| | | | Most Recent | | Original Listing | |
| | **Chinook** | | | | | |
| Chinook Salmon (*O. tshawytscha*) | Sacramento River Winter | Endangered | 81 FR 33468 | 5/26/2016 | 54 FR 32085 | 8/1/1989 |
| | Snake River Fall | Threatened | 81 FR 33468 | 5/26/2016 | 57 FR 14653 | 4/22/1992 |
| | Snake River Spring/Summer | Threatened | 81 FR 33468 | 5/26/2016 | 57 FR 14653 | 4/22/1992 |
| | Puget Sound | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 14308 | 3/24/1999 |
| | Lower Columbia River | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 14308 | 3/24/1999 |
| | Upper Willamette River | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 14308 | 3/24/1999 |
| | Upper Columbia River Spring | Endangered | 81 FR 33468 | 5/26/2016 | 64 FR 14308 | 3/24/1999 |
| | Central Valley Spring | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 50394 | 9/16/1999 |
| | California Coast | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 50394 | 9/16/1999 |
| | **Chum** | | | | | |
| Chum Salmon (*O. keta*) | Hood Canal Summer-Run | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 14508 | 3/25/1999 |
| | Columbia River | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 14508 | 3/25/1999 |
| | **Coho** | | | | | |
| Coho Salmon (*O. kisutch*) | Central California Coast | Endangered | 81 FR 33468 | 5/26/2016 | 61 FR 56138 | 10/31/1996 |
| | S. Oregon/ N. California Coast | Threatened | 81 FR 33468 | 5/26/2016 | 62 FR 24588 | 6/5/1997 |
| | Oregon Coast | Threatened | 81 FR 33468 | 5/26/2016 | 63 FR 42587 | 8/10/1998 |
| | Lower Columbia River | Threatened | 81 FR 33468 | 5/26/2016 | 70 FR 37160 | 6/28/2005 |
| | **Sockeye** | | | | | |
| Sockeye Salmon (*O. nerka*) | Snake River | Endangered | 81 FR 33468 | 5/26/2016 | 56 FR 58619 | 11/20/1991 |
| | Ozette Lake | Threatened | 81 FR 33468 | 5/26/2016 | 64 FR 14528 | 3/25/1999 |

As the listings have occurred, NMFS has initiated formal consultations and issued biological opinions (BOs) that consider the impacts resulting from implementation of the Salmon FMP and annual management measures to listed salmonid species. NMFS has also reinitiated consultation on certain ESUs when required due to pertinent new information becoming available on the status of the stocks or on the impacts of the Salmon FMP on the stocks. The consultation standards referred to in this document are derived from those consultations and include: (1) reasonable and prudent alternatives and/or reasonable and prudent measures, (2) conservation objectives that were included as part of the proposed action subject to Section 7 consultations , and (3) NMFS requirements under ESA Section 4(d) determinations.

A list of current BOs in effect, the species they apply to, and their duration follows:

| Date | Evolutionarily Significant Unit covered and effective period |
|---|---|
| 3/8/1996 | Snake River spring/summer and fall Chinook and sockeye (until reinitiated) |
| 4/28/1999 | Oregon Coastal natural coho, Southern Oregon/ Northern California coastal coho, Central California coastal coho (until reinitiated) |
| 4/28/2000 | Central Valley spring Chinook (until reinitiated) |
| 4/27/2001 | Hood Canal summer chum 4(d) limit (until reinitiated) |
| 4/30/2001 | Upper Willamette Chinook, Upper Columbia spring Chinook, Lake Ozette sockeye, Columbia River chum, and 10 steelhead ESUs (until reinitiated) |
| 4/30/2004 | Puget Sound Chinook (until reinitiated) |
| 2/28/2023 | California coastal Chinook (until reinitiated) |
| 4/26/2012 | Lower Columbia River Chinook (until reinitiated) |
| 4/9/2015 | Lower Columbia River natural coho (until reinitiated) |
| 4/26/2018 | Sacramento River winter Chinook (until reinitiated) |

Amendment 12 to the Salmon FMP added the generic category "species listed under the ESA" to the list of stocks in the salmon management unit and modified respective escapement goals to include "manage consistent with NMFS jeopardy [consultation] standards or recovery plans to meet immediate conservation needs and long-term recovery of the species." Amendment 14 specified those listed ESUs and clarified which stocks in the FMP management unit were representative of the ESUs.

In a letter received by the Council (dated March 3, 2023), NMFS summarized existing consultation standards and provided guidance on measures needed to protect species listed under the ESA during the 2023 fishing season. The letter summarized the measures analyzed and/or recommended in the relevant NMFS' BOs on the effects of fisheries managed under the salmon FMP on listed salmon and specified limits applicable for the 2023 fishing season given abundance forecasts and other season-specific information. The letter also provides NMFS' recommendations for certain non-ESA listed stocks in the fishery.

The ESA consultation standards, exploitation rates, and other criteria in place for the 2023 management season are presented in Table 5. Some listed species are either rarely incidentally caught in Council fisheries (e.g., spring Chinook from the upper Columbia River) or already receive sufficient protection from measures implemented to limit impacts to other stocks (e.g., Central Valley spring Chinook). NMFS has determined that management actions designed to limit catch from these ESUs, beyond what will be provided by harvest constraints for other stocks, are not necessary.

Of the listed Chinook and coho, Council-managed fisheries have substantive impacts on the Sacramento River winter Chinook ESU (SRWC), Central Valley spring Chinook ESU, California coastal Chinook ESU (CCC), the natural component of the Snake River fall Chinook ESU (referred to in the FMP as Snake River wild fall Chinook (SRW), lower Columbia River (LCR) fall Chinook ESU, and all of the coho ESUs.

Additional listed salmonid ESUs found within the Council area, but not substantively impacted by Council managed fisheries, include:

| **Chinook** | **Steelhead** |
|---|---|
| Snake River spring/summer (threatened) | Southern California (endangered) |
| Upper Willamette (threatened) | South-central California coast (threatened) |
| Puget Sound (threatened) | Upper Columbia River (endangered) |
| Upper Columbia River spring (endangered) | Middle Columbia River (threatened) |
| | Snake River Basin (threatened) |
| **Sockeye** | Puget Sound (threatened) |
| Snake River (endangered) | Central Valley, California (threatened) |
| Ozette Lake Sockeye (threatened) | Central California coast (threatened) |
| | Upper Willamette River (threatened) |
| **Chum** | Lower Columbia River (threatened) |
| Columbia River (threatened) | Northern California (threatened) |
| Hood Canal summer (threatened) | |

## 6.0 OBLIGATIONS UNDER THE PACIFIC SALMON TREATY

In 1985 the PST was signed, setting long-term goals for the benefit of the shared salmon resources of the United States and Canada. The PSC is the body formed by the governments of Canada and the United States to implement the PST.

## 6.1 Chinook Salmon Management

A new ten-year agreement under the PST was adopted by both the U.S. and Canada and implemented beginning with the 2019 fishing year. The new agreement includes reductions to catch ceilings for the SEAK and WCVI AABM fisheries relative to the prior 2009 Agreement. For SEAK, the reductions range from 1.5 percent in years of high abundance to 7.5 percent in years of low abundance. For WCVI, the reductions range from 2.4 percent in years of high abundance to 12.5 percent in years of low abundance. Additionally, beginning with the 2019 Agreement, while annual catch limits continue to be determined using the AI from the PSC Chinook Model for the NBC and WCVI AABM fisheries, the annual catch limits for SEAK fisheries have been set using a catch-per-unit-effort (CPUE) estimate from the early winter power troll fishery (see Tables 1 and 2 in Chapter 3 of the 2019 Agreement for specifics). For 2023, the PSC approved the use of a new method for setting the annual catch limit in the SEAK AABM fishery, which incorporates both the empirical CPUE information in addition to PSC Chinook Model-based abundance projections in a multivariate approach.

Fisheries not subject to AABM regimes, including Council area fisheries, are subject to a new set of ISBM obligations under the 2019 agreement. These provisions require the calendar year exploitation rate (CYER) by all U.S. fisheries south of the U.S./Canada border on specific indicator stocks to be below some level of the average 2009 – 2015 CYER if they do not achieve their management objectives (see Attachment I in Chapter 3 of the 2019 Agreement for specifics). Similar to previous ISBM obligations, these limits are taken into account during preseason planning processes, however, relative to meeting the provisions of the PST, the CYER limits are evaluated on a postseason basis only. Canadian fisheries that are not included in AABM complexes are managed under ISBM constraints, which, similar to U.S. ISBM fisheries, require the CYER by Canadian ISBM fisheries on specific indicator stocks to be below some level of the average 2009 – 2015 CYER if they do not achieve their management objectives. Expectations for Canadian and Alaskan fisheries harvest and stock abundance forecasts are incorporated into the Chinook FRAM to estimate total exploitation rate impacts from all marine fisheries (Table 5).

Key considerations for Canadian domestic fishery management for Chinook in 2023 include: (1) meeting domestic conservation obligations for WCVI, Lower Strait of Georgia, Fraser River Spring 4.2 and 5.2, Fraser Summer 5.2, Fraser Summer 4.1 and Fraser Fall 4.1 (Harrison River) stocks; (2) meeting First Nations Food, Social and Ceremonial and treaty obligations for Chinook harvests in native fisheries; and (3) monitoring of incidental impacts during commercial and native fisheries directed at sockeye, and chum salmon. It is anticipated that the details of the fishery regulatory package off WCVI and in the Juan de Fuca-Strait of Georgia areas will be driven by levels of allowable impact on WCVI, Lower Strait of Georgia and Fraser River Chinook stocks, in addition to Interior Fraser (Thompson River) coho, and potentially Thompson and/or Chilcotin River Steelhead. Increasing the availability of Chinook salmon in key foraging areas of Southern Resident Killer Whales in the southern British Columbia (BC) region is an additional consideration which will be supported through conservation actions implemented for Fraser River and other Chinook salmon.

## 6.2 Coho Salmon Management

In 2002, the PSC adopted a management plan for coho salmon originating in Washington and Southern British Columbia river systems. The plan is directed at the conservation of key management units, four from Southern British Columbia (Interior Fraser, Lower Fraser, Strait of Georgia Mainland, and Strait of Georgia Vancouver Island) and nine from Washington (Skagit, Stillaguamish, Snohomish, Hood Canal, Strait of Juan de Fuca, Quillayute, Hoh, Queets, and Grays Harbor). Exploitation rate limits for intercepting fisheries are established for individual management units through formulas specified in the 2019 PST Southern Coho Management Plan and are based on total allowable fishery exploitation rates.

The categorical status of U.S. coho management units are reported to comply with obligations pursuant to the 2019 PST Southern Coho Management Plan. Categorical status is employed by the PSC under the 2019 PST Southern Coho Management Plan to indicate general ranges of allowable total exploitation rates for U.S. and Canadian coho management units. Three categories are employed: low (total exploitation rate less than 20 percent), moderate (total exploitation rate 20 percent to 40 percent), and abundant (total exploitation rate greater than 40 percent). For the Puget Sound management units, the 2019 PST Southern Coho Management Plan uses the thresholds and stepped harvest rate goals from the Comprehensive Coho Agreement, developed by Washington and the Puget Sound tribes, and adopted by the Council as FMP conservation objectives in November 2009. Actual exploitation rate constraints for Canadian fisheries on U.S. coho management units are determined by formulas that specify sharing of allowable exploitation rates and a "composite rule." The composite rule adjusts constraints for Canadian fishery exploitation rates based on the number of U.S. management units which fall in a given category. For example, if only one Washington coastal or Puget Sound coho management unit is in low status, Canadian fisheries are constrained to a total exploitation rate on that unit of 12 percent; if two or more Washington coastal management units are in low status, the constraint becomes 10 percent. The most restrictive exploitation rate limit for Canadian fishery impacts on U.S. coho management units is 10 percent.

For several Washington coastal coho management units, management objectives are expressed as a range of spawning escapements expected to produce MSY. Allowable exploitation rates are calculated from the forecast abundance and the lower end of the escapement range and used to classify the categorical status of the management units. This rate is the maximum allowed under the PST when the management unit is in the moderate or abundant status, but exploitation rates up to 20 percent are allowed if the management unit is in the low abundance status.

For 2023, Puget Sound and Washington coast coho constraints are as follows:

**FMP**

| FMP Stock | Total Exploitation Rate Constraint[a/] | Categorical Status[a/] |
|---|---|---|
| Skagit | 35% | Low |
| Stillaguamish | 50% | Normal |
| Snohomish | 40% | Low |
| Hood Canal | 45% | Low |
| Strait of Juan de Fuca | 40% | Low |
| Quillayute Fall | 59% | |
| Hoh | 65% | |
| Queets | 65% | |
| Grays Harbor | 65% | |

**PST Southern Coho Management Plan**

| U.S. Management Unit | Total Exploitation Rate Constraint[b/] | Categorical Status[c/] |
|---|---|---|
| Skagit | 35% | Moderate |
| Stillaguamish | 50% | Abundant |
| Snohomish | 40% | Moderate |
| Hood Canal | 45% | Moderate |
| Strait of Juan de Fuca | 40% | Moderate |
| Quillayute Fall[c/] | 53% | Abundant |
| Hoh[c/] | 69% | Abundant |
| Queets[c/] | 53% | Abundant |
| Grays Harbor[c/d/] | 69% | Abundant |

a/ Preliminary. For Puget Sound stocks, the exploitation rate constraints and categorical status (Normal, Low, Critical) reflect application of Comprehensive Coho Agreement rules, as adopted in the FMP. For Washington Coast stocks, exploitation rate constraints represent MFMT. Note that under *U.S. v. Washington* and *Hoh v. Baldrige* case law, the management objectives can differ from FMP objectives provided there is an annual agreement among the state and tribal comanagers; therefore, the exploitation rates used to report categorical status do not necessarily represent maximum allowable rates for these stocks.

b/ Preliminary. For Puget Sound and Washington Coast management units, the exploitation rate constraints reflect application of the 2019 PST Southern Coho Management Plan.
c/ Categories (Abundant, Moderate, Low) correspond to the general exploitation rate ranges depicted in paragraph 8(b)(iii) of the 2019 PST Southern Coho Management Plan. For Washington Coast stocks, categorical status is determined by the exploitation rate associated with meeting the escapement goal (or the lower end of the escapement goal range). As Washington Coast stocks are managed to achieve agreed escapement goals, this exploitation rate also becomes an approximation of the maximum allowable rate unless the stock is in the "Low" status. In that case, an ER of up to 20% is allowed.
d/ Based on projected natural area spawners (wild plus hatchery strays) and MSP escapement goal of 35,400. Exploitation rate constraint subject to change should comanagers agree to a modified escapement goal under *U.S. v. Washington* and *Hoh v. Baldrige* case law.

Key considerations for Canadian fishery management for coho in 2023 are expected to include: (1) meeting domestic conservation obligations for Interior Fraser (including Thompson River) coho; (2) coho harvests by First Nations fisheries; (3) incidental impacts during commercial and First Nations fisheries directed at Chinook, chum, and especially Fraser sockeye salmon which will see a dominant late run return in 2023. The Canadian fishery regimes affecting coho are expected to be driven by Canadian domestic allowable impacts on the Thompson River component of the Interior Fraser management unit, Fraser Chinook concerns and Fraser sockeye stocks of concern co-migrating with the late run.

In years prior to 2014, Canadian fisheries were managed so as not to exceed a three percent maximum exploitation rate. In May 2014, Canada decided to permit up to a 16 percent exploitation rate on upper Fraser coho in Canadian fisheries to allow for impacts in fisheries directed at a record Fraser sockeye forecast. Since 2015, upper Fraser coho in Canadian fisheries have been managed per low status limitations. The projected status of Canadian coho management units in 2023 indicates continuing concerns for the condition of Interior Fraser coho. The Interior Fraser coho management unit is anticipated to remain in low abundance status, resulting in a requirement to constrain the total mortality fishery exploitation rate for 2023 Southern U.S. fisheries to a maximum of 10.0 percent.

## 7.0 DESCRIPTION OF THE ALTERNATIVES

Detailed information on the proposed 2023 ocean salmon management measure action Alternatives is presented in Table 1 (non-Indian commercial), Table 2 (recreational), and Table 3 (treaty Indian). Notable changes from recent seasons that are reflected in the action Alternatives are highlighted below. Table 5 and Appendix A also include information on the Alternatives. The 'no action' Alternative (2022 fishery structure) are detailed in Preseason Report I (PFMC 2023a), with some information also included in this report in Appendix A.

Fisheries scheduled to occur prior to May 16, 2023, which were adopted as part of the 2022 management measures, may have been modified by inseason action at the March 2023 Council meeting. Any such modifications are incorporated into the 2023 season proposed Alternatives described below. The Alternatives under consideration by the Council only cover the period beginning May 16, 2023.

### *7.1 Commercial*

Alternatives for the area north of Cape Falcon reflect an increased total abundance of Columbia River Chinook and marginally reduced abundance of Columbia River hatchery coho compared to 2022 forecasts. In 2023, allowable catch of Chinook will likely be increased from 2022 due to improved forecasts for some of the key stocks that contribute to ocean fisheries north of Cape Falcon and an identical total exploitation rate limit on LCR natural tule fall Chinook. Coho catch quotas may be comparable to 2022 due to only slightly less harvestable surplus of Columbia River hatchery coho and a similar forecast of Washington coastal coho abundance.

Alternatives I and II north of Cape Falcon assign 67 percent of the troll Chinook quota to the May-June Chinook directed fishery; Alternative III assigns 50 percent of the troll Chinook quota to the May-June Chinook directed fishery. In Alternatives I and II, the May-June fishery opens May 1 seven days per week,

while the May-June fishery opens May 1 five days per week in Alternative III. In all Alternatives, sub-quotas in the areas north of the Queets River and in the area south of Leadbetter Point are in place during the May-June time period. In Alternatives I and II, there is a per week (Thursday-Wednesday) landing and possession limit in all areas, while Alternative III contains a five day per week (Friday-Tuesday) open period with landing and possession limits in all areas. The summer all-salmon fishery in Alternatives I and II opens seven days per week beginning July 1 while Alternative III opens five days per week beginning July 14 with Chinook landing and possession limits in place for Alternatives I and II and coho landing and possession limits in place for all Alternatives. Also in all Alternatives, the Chinook minimum size limit is 27 inches total length, all retained coho must be marked with a healed adipose fin clip, and the fishery is scheduled to open in 2024 on May 1.

Commercial fisheries south of Cape Falcon will be heavily constrained or closed owing to very low abundance forecasts for Sacramento River fall Chinook (SRFC) and Klamath River fall Chinook (KRFC). KRFC continue to be categorized as overfished, and SRFC are currently at risk of approaching an overfished condition. All Alternatives were structured to achieve the FMP guidance for KRFC under a *de minimis* fishing regime resulting in a maximum allowable exploitation rate of 10.0 percent and an expected natural area escapement of 23,614 adults.

For the area between Cape Falcon and Humbug Mountain the fishery would open either September 1 or October 1 and run through October 31 in Alternatives I and II and would be closed under Alternative III. In Alternative I, the fishery is open for all salmon from September 1 through September 30, and all salmon except coho for the month of October. Under Alternative I, there is a non-mark-selective coho retention during the month of September that is managed under a 10,000 non-marked-selected coho quota with a limit of 50 coho allowed per vessel per landing week and no more than 100 Chinook salmon allowed per vessel per landing week. In Alternative II, the fishery is open shoreward of the 40-fathom regulatory line for all salmon except coho October 1-31, with no more than 75 Chinook salmon allowed per vessel per landing week. Alternative III is closed for 2023.

The area between Humbug Mountain and OR/CA border (Oregon KMZ) is closed under all three Alternatives in response to updated salmon stock forecast for 2023. These fisheries were evaluated in the no-action alternative.

Under all Alternatives for California management areas commercial ocean salmon fisheries are closed in response to updated salmon stock forecast for 2023. These fisheries were evaluated in the no-action alternative.

7.2 Recreational

North of Cape Falcon under Alternative I areas north of the Queets River would open June 17 and areas south of the Queets River would open June 24 for all salmon species seven days per week. The daily bag limit north of the Queets River is two salmon only one of which may be a Chinook, plus one additional pink salmon, and the daily bag limit south of the Queets River is two salmon, only one of which may be a Chinook. The closing date in all areas would be September 30, with the exception of the area between Cape Alava and the Queets River, which would reopen for a limited area fishery October 3-7 with a daily bag limit of one salmon, Chinook only.

North of Cape Falcon under Alternative II, the areas north of the Queets River and south of Leadbetter Point would open June 24 while the area between the Queets River and Leadbetter Point would open July 1; all areas would be open for all salmon species, seven days per week. The daily bag limit in all areas would be two salmon, only one of which may be a Chinook. The closing date in all areas would be September 30.

In Alternative III, the area south of Leadbetter Point would open June 26 for all salmon species; seven days per week with a daily bag limit identical to Alternative I. The areas north of the Queets River would open July 1 for all salmon species; seven days per week with a daily bag limit of two salmon. The area between the Queets River and Leadbetter Point would open July 2, five days per week (Sunday-Thursday) with a daily bag limit identical to Alternatives I and II. The closing date in all areas would be September 24, except for the area between the Queets River and Leadbetter Point that has a closing date of September 30.

In all Alternatives north of Cape Falcon, all retained coho must be marked with a healed adipose fin clip, and an impact neutral non-selective coho fishery may be considered through inseason management action later in the season.

South of Cape Falcon between Cape Falcon and the OR/CA border under Alternatives I and II the area would be open for all salmon except Chinook salmon from June 17 through August 31 with a 110,000 and 100,000 marked coho quota, respectively. Under Alternative III the area would be open for all salmon except Chinook salmon from June 17 through August 31 with a 90,000 marked coho quota in the area between Cape Falcon and Humbug Mountain and closed in the Oregon KMZ. A non-mark-selective coho fishery would be open from September 1 through September 30 from Cape Falcon to Humbug Mountain in all three Alternatives with different quotas for each Alternative.

In the area between Cape Falcon and Humbug Mountain, Chinook salmon fisheries would open September 1 and run through October 31 in Alternatives I and II and are closed under Alternative III.

Under all Alternatives for California management areas recreational ocean salmon fisheries are closed.

### *7.3 Treaty Indian*

Tribal troll Alternatives were proposed and will be evaluated during the North of Falcon process.

The proposed Alternatives include a May-June Chinook directed fishery and an all-species fishery targeting coho and Chinook from July 1 to September 15. All Alternatives assign 50 percent of the Chinook quota to each fishing season. The May-June Chinook fishery opens May 1 and allows for the retention of all salmon except coho. The minimum total lengths for Chinook and Coho are 24 inches and 16 inches, respectively.

Any balance of fish remaining from the Chinook directed fishery may be transferred to the all-species fishery on an impact neutral basis.

## 8.0 AFFECTED ENVIRONMENT AND ANALYSIS OF IMPACTS

The affected environment consists of the following components:

- Target (FMP) species
- Social or economic environments
- Non-target species, including ESA-listed salmonids
- Essential Fish Habitat
- Public health or safety
- ESA listed non-salmonid species or critical habitat, including ESA-listed marine mammals
- Non-ESA-listed marine mammals
- Biodiversity or ecosystem function

## *8.1 Salmon Stocks in the Fishery*

Target stocks include Chinook, coho, and pink salmon stocks identified in Appendix A, Table A-1 of Preseason Report I (Part 1 of this EA; PFMC 2023a). ESA-listed Chinook and coho species are not targeted in Council area salmon fisheries but will be included in the analysis of effects on target species because they are impacted coincidentally with targeted salmon stocks and frequently constrain access to targeted stocks. Environmental impacts to other ESA listed species (e.g., marine mammals) from the Alternatives will be analyzed in a later section of this EA.

A description of the historical baseline for this component of the affected environment is presented in the Review of 2022 Ocean Salmon Fisheries (PFMC 2023a). The current status (2023 ocean abundance forecasts) of the environmental components expected to be affected by the 2023 ocean salmon fisheries regulation Alternatives (FMP salmon stocks) are described in the 2023 Preseason Report I (PFMC 2023b). The criteria used to evaluate whether there are significant effects from the Alternatives on target stocks are achievement of conservation objectives, ACLs, and rebuilding criteria. For ESA listed species (also referred to as 'stocks' in this document) impacted by the fishery, ESA consultation standards are applied to determine whether there are significant effects. The Salmon FMP conservation objectives are based on the best available science and are intended to prevent overfishing while achieving optimum sustainable yield from West Coast salmon fisheries as required by the Magnuson-Stevens Act (MSA). The ESA consultation standards are likewise based on the best available science and are intended to ensure that fishery impacts do not appreciably reduce the likelihood of survival and recovery of listed species. FMP conservation objectives also include criteria for rebuilding overfished stocks. Therefore, conservation objectives and consultation standards are appropriate indicators for determining the significance of fishery management actions.

### 8.1.1 Chinook Salmon

Fishery quotas under all of the of Alternatives are presented in Table 4. Stock-specific management criteria and their forecast values under the Alternatives are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality under the Alternatives are summarized in Table 6. Table 7 provide a breakdown of impacts by fishery and area for LCR natural tule Chinook. Appendix A presents tables of adult SRFC impacts, KRFC impacts, and the SRWC age-3 impact rate, stratified by fishery, month, and management area under the three Alternatives. Also included in Appendix A are impacts or impact rates expected under the 'No Action' Alternative (2022 fisheries).

#### *8.1.1.1 North of Cape Falcon*

Abundance projections important to Chinook harvest management north of Cape Falcon in 2023 are:

- *Columbia River hatchery tules*. Combined production of Lower River Hatchery (LRH) and Spring Creek Hatchery (SCH) stocks returning to the Columbia River is forecasted to be 213,200, which is higher than the 2022 preseason expectation of 164,200. The LRH forecast is 77,100, which is greater than the forecast of 73,000 in 2022. The SCH forecast is 136,100, which is greater than the 2022 forecast of 91,200.

The primary Chinook salmon management objective shaping the Alternatives north of Cape Falcon is:

- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant ESA-listed stocks for the area north of Cape Falcon include LCR natural tule Chinook, LRW fall Chinook, and SRW fall Chinook.

Descriptions pertaining to the achievement of key objectives for Chinook salmon management north of Cape Falcon are found below.

- *LCR natural tule fall Chinook.* The Alternatives have exploitation rates on LCR natural tule fall Chinook that range from 36.4 percent to 39.1 percent when combined with 2022 preseason harvest rates for Columbia River fisheries. In-river fisheries have yet to be shaped for 2023. In Alternative I, the exploitation rate exceeds the 38.0 percent NMFS consultation standard maximum for 2023. Additional shaping of PSC and inriver fisheries prior to the April Council meeting may result in changes to the anticipated ERs presented in the Alternatives. LCR tules are the constraining Chinook stock for fisheries north of Cape Falcon in 2023.

- *LRW fall Chinook.* The Alternatives have ocean escapement values ranging from 8,600 to 8,700, which exceeds the 6,900 minimum ocean escapement needed to attain the ESA consultation standard of 5,700 spawners in the North Fork Lewis River. LRW Chinook will not constrain ocean fisheries north of Cape Falcon in 2023.

- *SRW fall Chinook.* The Alternatives have ocean exploitation rates ranging from 41.7 percent to 51.3 percent of the base period exploitation rate, which is less than the ESA consultation standard of no more than 70 percent of the 1988-1993 base period exploitation rate for all ocean fisheries. SRW Chinook will not constrain ocean fisheries north of Cape Falcon in 2023.

For Chinook fisheries north of Cape Falcon, Alternatives II and III satisfy NMFS's ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for relevant Chinook stocks (Table 5). The NMFS's ESA consultation standard for LCR natural tule fall Chinook is exceeded in Alternative I.

#### *8.1.1.2 South of Cape Falcon*

Status of Chinook stocks important to 2023 Chinook harvest management south of Cape Falcon are:

- *SRFC.* The Sacramento Index forecast is 169,767, which is lower than the 2022 forecast of 396,458.
- *KRFC.* The ocean abundance forecast for this stock is 75,256 age-3, 27,198 age-4, and 1,339 age-5 fish. These compare to the 2022 forecasts of 154,998 age-3, 43,211 age-4, and 1,908 age-5 fish.
- *SRWC.* The forecast of age-3 escapement absent fishing is 4,540, which is less than the 2022 forecast of 5,971.

Key Chinook salmon management objectives shaping the Alternatives south of Cape Falcon are:

- A KRFC natural area spawner escapement of at least 23,614 adults, which is produced, in expectation, by a maximum exploitation rate of 10.0 percent (FMP control rule).
- A SRFC hatchery and natural area spawner escapement of at least 122,000 adults (FMP control rule).
- NMFS consultation standards and annual guidance for ESA listed species as provided in Section 5.0 above. Relevant ESA-listed ESUs for the area south of Cape Falcon include SRWC, California coastal Chinook, SRW fall Chinook, and the natural tule component of LCR Chinook ESU.

The maximum allowable exploitation rate for KRFC in 2023 is 10.0 percent, which is a *de minimis* exploitation rate. In such cases, the FMP stipulates:

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

The Salmon Technical Team has assessed these circumstances, with the exception of indicators of marine and freshwater environmental conditions and minimal needs for Tribal fisheries.

*Potential for low spawner abundance*
The potential for critically low natural spawner abundance is considered high. The 2023 minimum natural-area spawner escapement of 23,614 adults is below the minimum stock size threshold (MSST; 30,525). A natural-area escapement of 23,614 adults would represent the 12th lowest value over the past 45 years of data.

*Substocks*
To assess the potential for critically low abundance of substocks, a statistical model (PFMC 2007, Appendix D) was applied to historical run size data to assess the probability that escapement to either the Salmon, Scott, or Shasta rivers would fall below 720 adults, given a total, basin-wide natural area escapement of 23,614 adults in 2023. The 720 escapement threshold for these substocks was based on effective population size (genetic) considerations. Application of the model suggested that at least one of the substocks would fall below the 720 adult threshold with a probability of 0.39.

*Recent spawner abundance*
The natural-area adult spawner escapement has been lower than MSST in seven of the last ten years and four of the last five years. The 2023 forecast of natural-area spawners in the absence of fishing is 26,238 adults, which is below the maximum sustainable yield spawner escapement ($S_{MSY}$; 40,700) and the MSST. If fishing seasons are structured such that the maximum allowable exploitation rate of 10 percent is met, the natural-area adult spawner expectation is 23,614, which is lower than the MSST and $S_{MSY}$.

*Comingled stocks*
With regard to co-mingled stocks, Sacramento River fall Chinook have a low abundance forecast and are likely to constrain fisheries in 2023.

*Approaching an overfished condition*
The KRFC stock currently meets the criteria for being at risk of approaching an overfished condition.

*Overfished status*
KRFC was declared overfished following the 2017 escapement and continues to meet the criteria for overfished status in 2023.

Descriptions pertaining to the achievement of key objectives for Chinook salmon management south of Cape Falcon are found below.

- *SRFC*. The control rule-defined minimum of 122,000 hatchery and natural area adult spawners is met by each of the Alternatives.
- *KRFC*. The control rule-defined minimum of 23,614 natural area adult spawners is met by each of the Alternatives.
- *SRWC*. The ESA consultation standard that (1) limits the forecast age-3 impact rate in 2023 fisheries south of Point Arena to a maximum of 20.0 percent and (2) specifies time/area closures and minimum size limit constraints south of Point Arena, is met by each of the Alternatives.
- *California coastal Chinook*. NMFS guidance to limit the forecast KRFC age-4 ocean harvest rate to a maximum of 10.0 percent is met by each of the Alternatives.

Each of the Alternatives for Chinook fisheries south of Cape Falcon satisfies NMFS ESA consultation standards and guidance. The projected exploitation rates for SRFC and KRFC are lower than the maximum levels specified by their control rules in for 2023. However, KRFC does not meet its conservation objective of 40,700 natural area adult spawners under any of the Alternatives (Table 5).

### 8.1.2 Coho Salmon

Fishery quotas under the Alternatives are presented in Table 4. Stock-specific management criteria and their forecast values under the Alternatives are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality under the Alternatives are summarized in Table 6. Table 7 provides a breakdown of impacts by fishery and area for Lower Columbia Natural (LCN), Oregon Coastal Natural (OCN), and Southern Oregon/Northern California Coastal (SONCC) coho ESUs. Table 8 provides expected coho mark rates for west coast fisheries by month.

Abundance projections important to coho harvest management in Council area fisheries in 2023 are:

- *Oregon Production Index (OPI) Hatchery coho.* The forecast for hatchery coho from the Columbia River and the coast south of Cape Falcon of 896,900 is lower than the 2022 forecast of 1,003,500. The Columbia River early coho forecast is 481,800 compared to the 2022 forecast of 592,500, and the Columbia River late coho forecast is 404,300 compared to the 2022 forecast of 404,700.
- *OCN coho.* The OCN forecast is 238,800 compared to the 2022 forecast of 222,400.
- *LCN coho.* The LCN forecast is 45,500 compared to the 2022 forecast of 65,700.
- *Puget Sound coho.* Among Puget Sound natural stocks, Skagit, Snohomish, Hood Canal, and Strait of Juan de Fuca coho are in the low category. Stillaguamish coho are in the normal category.
- *Interior Fraser (Thompson River) coho.* This Canadian stock continues to be depressed and will continue to constrain ocean coho fisheries north of Cape Falcon.
- *Washington coastal coho.* Forecasts for Washington coastal coho stocks as an aggregate are similar for natural stocks and increased for hatchery stocks compared to 2022. Among Washington coastal natural stocks, Quillayute fall, Queets, Hoh and Grays Harbor coho are all in the abundant category under the PST Southern Coho Management Plan.

Key coho salmon management objectives shaping the Alternatives are:

- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant species components include Central California Coast coho (south of the Oregon/California border), SONCC coho, OCN coho, and LCN coho. The maximum allowable

exploitation rates for 2023 are: (1) a combined marine/freshwater exploitation rate not to exceed 20.0 percent for OCN coho, (2) a combined exploitation rate in marine-area and mainstem Columbia River fisheries not to exceed 23.0 percent for LCN coho, and (3) a total exploitation rate not to exceed 16.0 percent for the Trinity River component of SONCC coho and a total exploitation rate not to exceed 15.0 percent for all other components of the SONCC coho ESU. Furthermore, coho retention is prohibited in all California ocean fisheries.

- Salmon FMP conservation objectives and obligations under the PST Southern Coho Management Plan for stocks originating along the Washington coast, Puget Sound, and British Columbia as provided in Section 6.2 above. The forecasts for Washington coastal coho stocks are abundant in 2023; these stocks contribute to fisheries off Washington. Forecasts for some Puget Sound and Interior Fraser coho stocks in 2023 are low; however, the majority of the exploitation on these stocks occurs in Puget Sound and will be addressed in development of fishing seasons for inside waters during the North of Falcon co-management process by the state and tribes of Washington prior to the April Council meeting. Because of their abundance status, Interior Fraser coho are subject to an exploitation rate ceiling of 10.0 percent in southern U.S. fisheries under the PST Southern Coho Management Plan.

Descriptions pertaining to the achievement of key objectives for coho salmon management are found below.

- *LCN coho.* All Alternatives satisfy the maximum 23.0 percent exploitation rate when 2023 projected marine impacts are combined with projected impacts, based on historic sharing agreements, for mainstem Columbia River fisheries. In-river fisheries have yet to be shaped for 2023. Marine exploitation rates projected for the 2023 Alternatives range from 14.9 percent to 10.9 percent.
- *Queets natural coho.* The FMP MSY adult spawner objective for Queets natural coho is 5,800; projected ocean escapement values for the 2023 Alternatives range from 10,300 to 10,700. The preseason ocean age 3 forecast for Queets natural coho is 12,400.
- *Interior Fraser coho*. In Alternative I, the Southern U.S. exploitation rate exceeds the 10.0 percent limit required by the PST Southern Coho Management Plan when 2023 projected marine impacts are combined with the 2022 preseason modeled impacts for Puget Sound fisheries. Shaping of the State and Tribal inside fisheries will occur during the North of Falcon process, and ocean fisheries may require further shaping before final management measures are adopted in order to comply with the PST limit.
- *Puget Sound coho*. Total exploitation rates for all Puget Sound stocks, except Skagit natural, are less than the maximum allowed under the FMP matrix in all Alternatives when 2023 projected marine impacts are combined with the 2022 preseason modeled impacts for Puget Sound fisheries. In all Alternatives, Skagit natural coho exceed the maximum total exploitation rate allowed under the FMP matrix when 2023 projected marine impacts are combined with the 2022 preseason modeled impacts for Puget Sound fisheries. Shaping of the State and Tribal inside fisheries will occur during the North of Falcon process, and ocean fisheries may require further shaping before final management measures are adopted in order to comply with the FMP limits.

In Alternative I, the Southern U.S. exploitation rate on Interior Fraser coho exceeds the limit of 10.0 percent under the PST Southern Coho Management Plan. Additionally, the total exploitation rate on Skagit natural coho exceeds the FMP limit of 35.0 percent in all three Alternatives (Table 5).

### 8.1.3 Pink Salmon

Pink salmon merit management consideration in 2023. Impacts on Chinook and coho in pink-directed fisheries may be part of negotiations to reach a final agreement in North of Cape Falcon ocean and Puget Sound fisheries.

### 8.1.4 Summary of Environmental Impacts on Target Stocks

Stock forecasts for some Canadian Chinook and coho stocks, Oregon Coast Chinook stocks, and the annual catch limits for the SEAK, NBC, and WCVI AABM Chinook fisheries are not known at this time, and preliminary values have been used in the analyses presented in this report. These forecasts and limits are expected to be available prior to the April Council meeting. Negotiations in the North of Falcon process will not be completed until the April Council meeting. These negotiations affect allocation of stock impacts primarily among inside fisheries (State, Tribal, recreational, various commercial sectors, etc.) but also between inside and ocean fisheries.

Environmental impacts on salmon stocks are assessed based on compliance with conservation objectives, ACLs, rebuilding plans, and ESA consultation standards. As noted in the description of the Alternatives (Tables 1, 2, and 3), if analyses using the updated values and the results of these negotiations do not result in compliance with FMP conservation objectives or ESA consultation standards, some Alternatives will not be viable and impacts in Council area fisheries will need to be modified to comply with all applicable objectives and standards. If updated values and negotiations result in compliance with applicable objectives and standards, Council area fishery impacts would not increase; therefore, the analysis of effects would include the upper bound of a reasonable range of effects under the Alternatives considered for 2023 Council area ocean salmon fisheries.

#### *8.1.4.1 Targeted Salmon Stocks*

Based on current assumptions regarding Canadian, and inside fishery impacts, all target salmon stocks (non-ESA listed) meet their FMP conservation objectives under Alternatives I, II, and III, with the exception of Skagit natural coho in all three Alternatives (Table 5).

#### *8.1.4.2 ESA Listed Salmon Species*

Based on current assumptions regarding Canadian and inside fishery impacts, impacts on all ESA listed salmon species meet their ESA consultation standards, except for LCR natural tule Chinook, which exceeds the allowable limit under Alternative I when combined with projections for AABM Chinook fisheries and 2022 preseason harvest rates for Columbia River fisheries (Table 5).

Council area fisheries have a minor impact on ESA-listed Puget Sound Chinook and on most Chinook stocks subject to the 2019 PST Agreement. At this point there appears to be sufficient flexibility within Council and inside area fisheries as a whole to achieve protection for the Puget Sound Chinook ESU.

## *8.2 Socioeconomics*

In general, Council-area ocean salmon fisheries are managed to meet conservation objectives for stocks that are expected to achieve optimum yields while minimizing impacts on depressed stocks. While analysis of biological impacts is organized around salmon stocks that spawn in particular rivers, socioeconomic impacts under the regulatory Alternatives are analyzed by ocean fishery management areas as described in the Salmon FMP. Although most stocks range across several areas, the abundance of individual stocks varies by time and area, thus the use of management areas facilitates more optimal management of each stock than would be possible with coastwide regulations. From north to south, the fishery management areas are: (1) from the U.S./Canada border to Cape Falcon (45°46' N. lat.), which is on the Oregon coast south of the Columbia River mouth; (2) between Cape Falcon and Humbug Mountain (42°40' N. lat.) on

Oregon's southern coast; (3) the Oregon KMZ, which covers ocean waters from Humbug Mountain to the Oregon/California border (42° N. lat.); (4) the California KMZ includes the area from the Oregon/California border to Latitude 40°10' N. in northern California, (5) from Latitude 40°10' N. to Point Arena (38°57' N. lat.) in Mendocino County; (6) from Point Arena to Pigeon Point (37°11' N. lat.) north of Santa Cruz; and (7) from Pigeon Point to the U.S./Mexico border. There are also numerous subdivisions within these areas that are used to further balance stock conservation and harvest allocation needs. The following analysis of impacts on users of the resource and fishing communities is organized around these seven broad management areas. Figure 3 provides a map of the boundaries of these areas, also showing the main salmon ports.

Tribal ocean fisheries (including Washington State statistical area 4B) occur only in the area north of Cape Falcon. The Lower Elwha Klallam, Jamestown S'Klallam, Port Gamble S'Kallam, Makah, Quileute, Hoh, and Quinault Tribes all have fishery areas in the northern part of the area north of Cape Falcon (Table 3). Other federally-recognized tribes participate in in-river fisheries.

The Review of 2022 Ocean Salmon Fisheries (PFMC 2023a) provides an historical description of the salmon fishery affected environment. In addition to stock status assessments, the document reports socioeconomic impacts of historical fisheries and analyzes the current socioeconomic status of West Coast salmon fisheries. For the purpose of characterizing the socioeconomic impact of non-tribal Council-area ocean salmon fisheries, commercial ex vessel value, recreational fishing trips, and community level personal income impacts resulting from both commercial and recreational fishing activities are used.

The short-term economic effects of the regulatory Alternatives for non-Indian fisheries are shown in Tables 9 and 10. Table 9 shows projected commercial troll impacts expressed in terms of estimated potential exvessel value by catch area. Table 10 shows projected recreational fisheries impacts in terms of the number of projected angler-trips and community personal income impacts associated with those activities by port area. Note that exvessel values shown under the Alternatives for the commercial troll fishery in Table 9 and income impact values shown for the recreational fishery in Table 10 are not directly comparable. More directly comparable measures of short-term economic impacts from commercial and recreational salmon fisheries appear in Figures 1 and 2, which show estimated community income impacts under the respective sets of commercial troll and recreational fishery Alternatives, compared to historical impacts in real (inflation-adjusted) dollars. Both commercial and recreational income impact estimates provided in these figures are based on landing ports. In general, income impacts are estimates of the amount of personal income generated by the economic linkages associated with a particular activity (see Chapter IV of the Review of 2022 Ocean Salmon Fisheries for additional description of income impact estimates). Income impacts are a measure of relative economic activity. Differences in income impacts between an Alternative and the value for the 2022 fishery indicate the expected short-term impact of the Alternative compared with taking no action, (i.e., if 2022 regulations were to remain in place). Differences in income impacts between an Alternative and recent inflation-adjusted average values provide context for the current estimates within recent historical trends. While reductions in income impacts associated with an activity may not necessarily reflect net losses in a particular community (depending on the degree to which there is compensating activity), they are likely to indicate losses to the community's businesses and individuals that depend on the lost activity for their livelihood.

Total economic effects for non-Indian fisheries under the Alternatives may vary more or less than is indicated by the short-term impacts on ocean fisheries reported below. Salmon that are not harvested in the ocean do not necessarily result in an economic loss, as they may become available for additional inside harvest in non-Indian commercial, tribal, and recreational fisheries or may provide additional spawning escapement. Thus, Alternatives that restrict ocean harvests may increase opportunities for inside harvesters (e.g., higher commercial revenue or more angler trips) or contribute to higher inside CPUE (i.e., lower costs for commercial harvesters and/or higher success rates for recreational fishers). Additionally, harvest

forgone by both ocean fisheries and inside fisheries may impact future production, although the magnitude of that effect is uncertain and depends on the resulting escapement level compared to MSY escapement and the nature of the spawner-recruit relationship, both of which are influenced by habitat conditions in the ocean and in the spawning grounds.

Ex vessel revenues in Table 9 are based on estimated harvest by catch area while commercial income impacts in Figure 1 are based on projected deliveries by landing area. Historically, there has been a divergence between these two measures. The difference is due to salmon caught in certain catch areas being delivered to ports in neighboring catch areas. In an attempt to account for this effect and assign income impacts to the "correct" landing area, adjustments to projections are made based on historical patterns. The patterns are typically inferred from the most recent year's catch and landings data. For example, 2022 data shows there were deliveries of salmon: (1) caught north of Cape Falcon to landing ports between Cape Falcon and Humbug Mountain; (2) caught between Cape Falcon and Humbug Mountain to landing ports in the Oregon KMZ region; (3) caught between 40°10' N. Lat. and Point Arena (Fort Bragg Region) to landing ports in the California KMZ region (Crescent City and Eureka); (4) a small amount caught between Point Arena and Pigeon Point (San Francisco Region) to landing ports south of Pigeon Point (Monterey region); and (5) caught south of Pigeon Point to landing ports in the San Francisco region and also a small amount delivered in the California KMZ region.

The expected harvest levels used to model commercial fishery impacts are taken from Table 6. Estimated harvests do not include a relatively small amount that often occurs in the state-waters-only (SWO) fishery off southern Oregon. These total harvest estimates combined with the prior year's average Chinook weights per fish and ex vessel prices per pound were assumed to be the best indicators of expected revenues per fish in the coming season. Coastwide average Chinook weight per fish in 2022 was approximately seven percent below the prior year and three percent below the recent five-year average weight; while coastwide average Chinook ex vessel prices in 2022 were 14 percent below the prior year and 12 percent below the recent five-year average in inflation-adjusted terms. If this year's actual average weight per fish or ex vessel prices diverge significantly from what was observed last year, then salmon ex vessel revenues and resulting commercial fisheries income impacts projected in this document may prove to be correspondingly biased.

Fishing effort estimates for the recreational fishery south of Cape Falcon are based on measures developed by the STT for modeling biological impacts. STT estimates for south of Cape Falcon use multi-year averages to predict effort for the coming year. Consequently, if the multi-year average for a particular time period and area happens to be higher than last year's effort level, then the model may forecast an increase in effort for the coming year even if management measures did not change from the previous year. Estimated recreational effort does not include a relatively small amount that often occurs in the SWO fishery off southern Oregon. Recreational fishery effort north of Cape Falcon was estimated using historical CPUE estimates ("success rates") applied to salmon quotas and expected harvest levels under the Alternatives. Projections of recreational catch north of Cape Falcon were made by multiplying the proposed quotas for the two species under each Alternative by the historic ratios of actual catch to the actual quotas. Effort and economic impacts were then estimated by summing recent year weighted average coho and Chinook angler success rates multiplied by the projected coho and Chinook catch under each Alternative. Unless otherwise noted, the economic effects of the commercial and recreational fisheries Alternatives summarized below are compared in terms of estimated community income impacts.

### 8.2.1 Alternative I

Under Alternative I, total coastwide community personal income impacts from commercial salmon fisheries are projected to be 84 percent below last year's (2022) level and 82 percent below the recent (2018-2022) inflation-adjusted average. Coastwide income impacts from recreational fishing are projected to be 532 percent below last year's level and 47 percent below the 2018-2022 inflation-adjusted average.

Commercial fishery income impacts north of Cape Falcon are projected to be 74 percent above last year and 69 percent above the 2018-2022 inflation-adjusted average.

South of Cape Falcon, total commercial fishery income impacts are projected to fall below last year's level and the 2018-2022 inflation-adjusted average by 98 percent. Due to the near complete closure of commercial Chinook harvest south of Cape Falcon under the Alternative, all areas south of Cape Falcon are projected to see decreases in commercial fishery income impacts compared with last year ranging from 87 percent for areas between Cape Falcon and Humbug Mountain, to 98 percent between Humbug Mountain and the Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in commercial fishery income impacts in areas south of Cape Falcon are 84 percent, 99 percent and 100 percent, respectively. Landings between Humbug Mountain and the Oregon/California border (Oregon KMZ) are projected to occur based on catch to the north of this area.

Income impacts from recreational fisheries north of Cape Falcon are projected to be 11 percent above last year and 45 percent above the 2018-2022 inflation-adjusted average.

Total recreational fishery income impacts south of Cape Falcon are projected to be 83 percent below last year and 82 percent below the 2018-2022 inflation-adjusted average. Due to the near compete closure of recreational Chinook harvest south of Cape Falcon under the Alternative, all areas south of Cape Falcon are projected to see decreases in recreational fishery income impacts compared with last year ranging from 24 percent for areas between Cape Falcon and Humbug Mountain, to 100 percent between Humbug Mountain and the Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in recreational fishery income impacts in areas south of Cape Falcon are 15 percent, 100 percent and 100 percent, respectively.

Under Alternative I overall coastwide income impacts for combined non-Indian commercial and recreational ocean salmon fisheries are projected to be 69 percent below last year's level and 65 percent below the 2018-2022 inflation-adjusted average. Combined income impacts north of Cape Falcon are projected to be 25 percent above last year's level and 52 percent above the 2018-2022 inflation-adjusted average. In aggregate, combined income impacts south of Cape Falcon are projected to be 92 percent below last year's level and the 2018-2022 inflation-adjusted average. Due to the near complete closure of commercial and recreational Chinook harvest south of Cape Falcon under the Alternative, combined income impacts are projected to be below last year's levels in all areas south of Cape Falcon, ranging from decreases of 51 percent for areas between Cape Falcon to Humbug Mountain, to 99 percent for areas between Humbug Mountain and Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in combined coastwide income impacts in areas south of Cape Falcon are 42 percent, 99 percent and 100 percent, respectively.

Tribal ocean fisheries north of Cape Falcon would be allocated 50,000 Chinook and 62,000 coho for ocean area harvest under Alternative I. These compare with the actual 2022 allocation of 40,000 Chinook and 52,000 coho.

### 8.2.2 Alternative II

Under Alternative II, total coastwide community personal income impacts from commercial salmon fisheries are projected to be 86 percent below last year's (2022) level and 85 percent below the recent (2018-2022) inflation-adjusted average. Coastwide income impacts from recreational fishing are projected to be 58 percent below last year's level and 52 percent below the 2018-2022 inflation-adjusted average.

Commercial fishery income impacts north of Cape Falcon are projected to be 55 percent above last year and 50 percent above the 2018-2022 inflation-adjusted average.

South of Cape Falcon, total commercial fishery income impacts are projected to fall below last year's level and the 2018-2022 inflation-adjusted average by 99 percent. Due to the near complete closure of commercial Chinook harvest south of Cape Falcon under the Alternative, all areas south of Cape Falcon are projected to see decreases in commercial fishery income impacts compared with last year ranging from 95 percent for areas between Cape Falcon and Humbug Mountain, to 99 percent between Humbug Mountain and the Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in commercial fishery income impacts in areas south of Cape Falcon are 93 percent, 99 percent and 100 percent, respectively. Landings between Humbug Mountain and the Oregon/California border (Oregon KMZ) are projected to occur based on catch to the north of this area.

Income impacts from recreational fisheries north of Cape Falcon are projected to be one percent above last year and 31 percent above the 2018-2022 inflation-adjusted average.

Total recreational fishery income impacts south of Cape Falcon are projected to be 85 percent below last year and 84 percent below the 2018-2022 inflation-adjusted average. Due to the near complete closure of recreational Chinook harvest south of Cape Falcon under the Alternative, all areas south of Cape Falcon are projected to see decreases in recreational fishery income impacts compared with last year ranging from 31 percent for areas between Cape Falcon and Humbug Mountain, to 100 percent between Humbug Mountain and the Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in recreational fishery income impacts in areas south of Cape Falcon are 22 percent, 100 percent and 100 percent, respectively.

Under Alternative II overall coastwide income impacts for combined non-Indian commercial and recreational ocean salmon fisheries are projected to be 72 percent below last year's level and 69 percent below the 2018-2022 inflation-adjusted average. Combined income impacts north of Cape Falcon are projected to be 12 percent above last year's level and 36 percent above the 2018-2022 inflation-adjusted average. In aggregate, combined income impacts south of Cape Falcon are projected to be 93 percent below last year's level and the 2018-2022 inflation-adjusted average. Due to the near complete closure of commercial and recreational Chinook harvest south of Cape Falcon under the Alternative, combined income impacts are projected to be below last year's levels in all areas south of Cape Falcon, ranging from decreases of 58 percent for areas between Cape Falcon to Humbug Mountain, to 99 percent for areas between Humbug Mountain and Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in combined coastwide income impacts in areas south of Cape Falcon are 50 percent, 100 percent and 100 percent, respectively.

Tribal ocean fisheries north of Cape Falcon would be allocated 40,000 Chinook and 52,000 coho for ocean area harvest under Alternative II. These compare with the actual 2022 allocation of 40,000 Chinook and 52,000 coho.

### 8.2.3 Alternative III

Under Alternative III, total coastwide community personal income impacts from commercial salmon fisheries are projected to be 88 percent below last year's (2022) level and 87 percent below the recent (2018-2022) inflation-adjusted average. Coastwide income impacts from recreational fishing are projected to be 62 percent below last year's level and 57 percent below the 2018-2022 inflation-adjusted average.

Commercial fishery income impacts north of Cape Falcon are projected to be 35 percent above last year and 31 percent above the 2018-2022 inflation-adjusted average.

South of Cape Falcon, total commercial fishery income impacts are projected to fall below last year's level and the 2018-2022 inflation-adjusted average by almost 100 percent. Due to closure of commercial Chinook harvest south of Cape Falcon under the Alternative, all areas south of Cape Falcon are projected to see decreases in commercial fishery income impacts compared with last year ranging from 98 percent for areas between Cape Falcon and Humbug Mountain, to 100 percent between Humbug Mountain and the Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in commercial fishery income impacts in areas south of Cape Falcon are 97 percent, 100 percent and 100 percent, respectively.

Income impacts from recreational fisheries north of Cape Falcon are projected to be 10 percent below last year but 17 percent above the 2018-2022 inflation-adjusted average.

Total recreational fishery income impacts south of Cape Falcon are projected to be 86 percent below last year and 85 percent below the 2018-2022 inflation-adjusted average. Due to closure of recreational Chinook harvest south of Cape Falcon under the Alternative, all sub-areas south of Cape Falcon are projected to see decreases in recreational fishery income impacts compared with last year of 38 percent for areas between Cape Falcon and Humbug Mountain, 100 percent between Humbug Mountain and the Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in recreational fishery income impacts in areas south of Cape Falcon are 30 percent, 100 percent and 100 percent, respectively.

Under Alternative III overall coastwide income impacts for combined non-Indian commercial and recreational ocean salmon fisheries are projected to be 75 percent below last year's level and 73 percent below the 2018-2022 inflation-adjusted average. Combined income impacts north of Cape Falcon are projected to be less than one percent below last year's level but 21 percent above the 2018-2022 inflation-adjusted average. In aggregate, combined income impacts south of Cape Falcon are projected to be 94 percent below last year's level and the 2018-2022 inflation-adjusted average. Due to closure of commercial and recreational Chinook harvest in all areas south of Cape Falcon under the alternative, combined income impacts are projected to be below last year's levels in all areas south of Cape Falcon, ranging from decreases of 63 percent for areas between Cape Falcon to Humbug Mountain, to 100 percent for areas between Humbug Mountain and Oregon/California border (Oregon KMZ), and 100 percent for all areas in California. Relative to the 2018-2022 inflation-adjusted average, the corresponding decreases in combined coastwide income impacts in areas south of Cape Falcon are 57 percent, 100 percent and 100 percent, respectively

Tribal ocean fisheries north of Cape Falcon would be allocated 30,000 Chinook and 42,000 coho for ocean area harvest under Alternative III. These compare with the actual 2022 allocation of 40,000 Chinook and 52,000 coho.

### 8.2.4 Summary of Impacts on the Socioeconomic Environment

Coastwide combined commercial and recreational salmon fishery income impacts under the Alternatives are projected to be well below last year's (2022) levels, with reductions ranging from 69 percent under Alternative I, and 72 percent under Alternative II, to 75 percent under Alternative III. These levels also represent reductions relative to the recent (2018-2022) inflation-adjusted averages ranging from 65 percent under Alternative I, 69 percent under Alternative II, and 73 percent under Alternative III.

Coastwide income impacts from commercial salmon fisheries are projected to be below last year and the 2018-2022 inflation-adjusted average under all three Alternatives. Reductions compared with last year range from 84 percent under Alternative I, 86 percent under Alternative II and 88 percent under Alternative III. Reductions compared with the 2018-2022 inflation-adjusted average range from 82 percent under Alternative I, 85 percent under Alternative II and 87 percent under Alternative III. North of Cape Falcon, commercial salmon fisheries income impacts are projected to be above last year and the 2018-2022 inflation-adjusted average under all three Alternatives. Increases compared with last year range from 74 percent under Alternative I, 55 percent under Alternative II and 35 percent under Alternative III. Increases compared with the 2018-2022 inflation-adjusted average range from 69 percent under Alternative I, 50 percent under Alternative II and 31 percent under Alternative III. All areas south of Cape Falcon would see reductions in commercial fisheries income impacts compared with last year and the 2018-2022 inflation-adjusted average under all three Alternatives. Compared with last year the reductions in areas south of Cape Falcon range from 87 percent for Cape Falcon to Humbug Mountain under Alternative I and 98 percent in areas between Humbug Mountain and Oregon/California border (Oregon KMZ) under Alternative I, to 100 percent reductions in all areas in California under all three Alternatives due to the complete closure of the commercial Chinook fishery in those areas. Relative to the 2018-2022 inflation-adjusted average, corresponding reductions in commercial fisheries income impacts range from 84 percent for Cape Falcon to Humbug Mountain under Alternative I and 99 percent in areas between Humbug Mountain and Oregon/California border (Oregon KMZ) under Alternative I, to 100 percent reductions in all areas in California under all three Alternatives. Landings between Humbug Mountain and the Oregon/California border (Oregon KMZ) under the Alternatives are projected to occur based on catch to the north of this area.

Coastwide income impacts from recreational salmon fisheries are projected to be below last year and the 2018-2022 inflation-adjusted average under all three Alternatives. Reductions compared with last year range from 53 percent under Alternative I and 58 percent under Alternative II to 62 percent under Alternative III. Compared with the 2018-2022 inflation-adjusted average, corresponding reductions in coastwide income impacts from recreational salmon fisheries range from 47 percent under Alternative I and 52 percent under Alternative II to 57 percent under Alternative III. Income impacts from recreational salmon fisheries north of Cape Falcon, are projected to be above last year under Alternative I (11 percent) and Alternative II (less than one percent), but 10 percent below last year under Alternative III. Compared with the 2018-2022 inflation-adjusted average, areas north of Cape Falcon are projected to see increases in recreational salmon fisheries income impacts under all three Alternatives ranging from 45 percent under Alternative I, 31 percent under Alternative II, and 17 percent under Alternative III. All areas south of Cape Falcon would see decreases in recreational fisheries income impacts compared with last year ranging from reductions of 24 percent for Cape Falcon to Humbug Mountain under Alternative I to 100 percent reductions in areas between Humbug Mountain and the Oregon/California border (Oregon KMZ) and in all areas in California under all three Alternatives due to the complete closure of the recreational salmon fishery in those areas. Relative to the 2018-2022 inflation-adjusted average, corresponding reductions in recreational fisheries income impacts range from 15 percent for Cape Falcon to Humbug Mountain under Alternative I to 100 percent reductions in areas between Humbug Mountain and Oregon/California border (Oregon KMZ) and in all areas in California under all three Alternatives.

Among the Alternatives, projections for Alternative I show the most positive or least negative coastwide combined commercial and recreational fisheries income impacts overall and for three of the seven management areas: North of Cape Falcon, Cape Falcon to Humbug Mountain, and Humbug Mountain to the Oregon/California border (Oregon KMZ) (although the latter are reductions of 99 percent). Projections for Alternative III include the least positive or most negative combined commercial and recreational fisheries income impacts coastwide and for areas North of Cape Falcon and from Cape Falcon to Humbug Mountain. All commercial and recreational ocean salmon fisheries in the areas between Humbug Mountain and the Oregon/California border (Oregon KMZ), between Oregon/California border and 40º10’ N. Lat.

(California KMZ), between 40º10' N. Lat. and Point Arena, between Point Arena and Pigeon Point, and south of Pigeon Point would be closed under all three Alternatives.

Under the three action Alternatives, ocean tribal fisheries occurring north of Cape Falcon would be allocated a maximum of 50,000 Chinook and 62,000 coho under Alternative I, 40,000 Chinook and 52,000 coho under Alternative II, and 30,000 Chinook and 42,000 coho under Alternative III. These compare with the no-action Alternative, which is the actual 2022 allocation of 40,000 Chinook and 52,000 coho.

## *8.3 Non-target, Non-ESA Listed, Fish Species*

Prior NEPA analyses have considered the effects of the ocean salmon fisheries on non-target, non-ESA listed fish species. Since then, ocean salmon fisheries have not changed substantially in terms of season length, areas, depth, bag limits, etc. Nor is there any new information to suggest that the incidental nature of encounters of non-target species in ocean salmon fisheries has changed. Therefore, conclusions from previous environmental analyses indicating that effects on non-target fish species are low and not significant are still applicable, as discussed below. The differences between the Alternatives for the 2023 salmon fishery are not discernible with respect to their effect on non-target fish species.

Impacts to groundfish stocks from salmon troll fisheries continue to be managed as part of the open access groundfish fishery sector and are at similar levels compared to recent years. Previous environmental analysis concluded that the amount of groundfish taken incidentally in the salmon fishery is very low and is not substantially altered by changes in the salmon fishery. The 2023 ocean salmon regulation Alternatives are not expected to differ substantially from fisheries analyzed previously with respect to groundfish impacts; therefore, effects from the Alternatives to groundfish stocks are not significant.

Impacts to Pacific halibut from salmon troll fisheries continue to be managed under limits established through the International Pacific Halibut Commission (IPHC) process and under the Area 2A (Council area) catch sharing plan. Previous environmental analysis stated that data on the commercial segment of salmon fisheries show the co-occurrence rates for salmon and halibut, coastal pelagic species, highly migratory species, and non-Council managed fish species are low. The 2023 ocean salmon regulation Alternatives include Pacific halibut landing restrictions within the range enacted in the past and are not expected to differ substantially from earlier analyses with respect to Pacific halibut impacts; therefore, effects from the Alternatives to Pacific halibut are not significant. Likewise, there are no changes to the salmon fishery for 2023 that would change impacts to other non-salmon fish species compared to previous analyses, therefore, effects from the Alternatives to these species are not expected to be significant.

## *8.4 Non-ESA Listed Marine Mammals*

The commercial salmon troll fisheries off the coasts of Washington, Oregon, and California are classified as Category III fisheries, indicating a remote or no likelihood of causing incidental mortality or serious injury to marine mammals (86 FR 3028, January 14, 2021). Recreational salmon fisheries use similar gear and techniques as the commercial fisheries and are assumed to have similar encounter rates and impacts. The non-ESA listed marine mammal species that are known to interact with ocean salmon fisheries are California sea lion and harbor seals. Populations of both these species are at stable and historically high levels. There is no new information to suggest that the nature of interactions between California sea lions or harbor seals in ocean salmon fisheries has changed since the Category III determination. Therefore, the impacts from the 2023 salmon regulation Alternatives to non-ESA listed marine mammals are not expected to be significant, and there is no discernible difference between the effects of the Alternatives on these resources.

## 8.5 ESA Listed Species

ESA-listed salmonid species present in Council area waters are described in Chapter 5 of this document. ESA-listed sockeye and chum salmon, and steelhead trout are rarely encountered in ocean salmon fisheries, and the Alternatives for Council area ocean salmon fisheries are in compliance with applicable BOs for listed ESUs of these species as listed in Chapter 5 of this document. Because anticipated impacts are negligible, there are no significant impacts expected on listed sockeye or chum salmon or steelhead trout from the Alternatives analyzed in this EA, and there is no discernible difference between the effects of the Alternatives on these resources.

There is no record of injury or mortality of Guadalupe fur seals in Pacific Coast salmon fisheries. No sea turtles have been reported taken by the ocean salmon fisheries off Washington, Oregon, or California, and NMFS has determined that commercial fishing by Pacific Coast salmon fisheries would pose a negligible threat to Pacific turtle species. There is no discernible difference between the effects of the Alternatives on these resources.

Of the ESA-listed marine mammals that occur in Council area waters, only Southern Resident killer whales (SRKW), a distinct population segment (DPS) of *Orcinus orca*, are likely to be affected by salmon fisheries. The "resident" killer whale ecotype is dependent on fish as a prey item; the primary prey for the SRKW DPS is Chinook salmon (SRKW Workgroup 2020). The SRKW DPS occurs regularly throughout the coastal waters of the states of Washington, Oregon, and Vancouver Island, British Columbia, Canada; individuals are known to travel as far south as central California and as far north as Southeast Alaska (SRKW Workgroup 2020).

Salmon fisheries conducted under the FMP may directly affect SRKW through interactions with vessels and gear, and indirectly affect them by reducing prey availability. The risk assessment report, prepared by the Council's Ad-Hoc Southern Resident Killer Whale Workgroup (SRKW Workgroup 2020), presented at the Council's March 2020 meeting, provides information on SRKW and their predator-prey interaction with Pacific salmon. The report can be found online at: https://www.pcouncil.org/documents/2020/02/e-3-a-srkw-workgroup-report-1-electronic-only.pdf/.

At its November 2020 meeting, based on the information compiled and analysis developed by the SRKW Workgroup, the Council adopted a final preferred Alternative for a subsequent amendment to the FMP to include management provisions responsive to the needs of SRKW. These management provisions were incorporated into Amendment 21 of the FMP and set a Chinook salmon annual abundance management threshold below which the Council and NMFS would implement specific steps to limit ocean salmon fishery impacts on Chinook salmon in order to increase salmon prey availability for SRKW. This threshold is compared to the projected pre-fishing Chinook abundance in the north of Cape Falcon area calculated annually using forecasts compiled by the STT. The specific steps the Council would implement should the threshold be triggered include time and area closures and temporal shifts in fishing. In April 2020, NMFS completed a BO on the effects of implementing Amendment 21 of the FMP and concluded that the effects were not likely to jeopardize the continued existence of the SRKW DPS or destroy or adversely modify its designated or proposed critical habitat. Amendment 21 also provides for technical review and consideration of new data by the Council, the STT, and the SSC that may result in an updated threshold (PFMC 2021).

At their March 2022 meeting, the Council was informed of recent updates to models that may warrant an update to the numerical value of the Chinook abundance threshold. Based on these developments, the Council followed the process outlined in Amendment 21 to the FMP and adopted a change to numerical value of the Chinook abundance threshold at their November 2022 Council meeting. The change was informed by a technical review of recent updates to models, and the STT provided a report to aid the Council in determining the appropriate numerical value of the threshold. The threshold continues to be based on

the arithmetic mean of the seven years identified in section 6.6.8 of the salmon FMP representing pre-fishing Chinook salmon abundance in the area North of Cape Falcon (1994-1996, 1998-2000, and 2007). The updated Chinook abundance threshold is 623,000 Chinook.

As mentioned above, the annual management measures for Council salmon fisheries are developed to be consistent with all ESA BOs. In 2023, the projected pre-fishing Chinook abundance in the north of Cape Falcon area is 888,300 across all action Alternatives, which is greater than the threshold value (Table 5) .

## *8.6 Seabirds*

The types of vessels used in ocean salmon fisheries and the conduct of the vessels are not conducive to collisions or the introduction of rats or other non-indigenous species to seabird breeding colonies. Other types of accidental bird encounters are a rare event for commercial and recreational ocean salmon fisheries. Therefore, there are no significant impacts expected on seabirds from the Alternatives analyzed in this EA, and there is no discernible difference between the effects of the Alternatives on seabirds.

## *8.7 Biodiversity and Ecosystem Function*

The removal of adult salmon by the ocean fisheries is not considered to significantly affect the lower trophic levels or the overall marine ecosystem because salmon are not the only or primary predator in the marine environment. Therefore, no significant impacts are expected on biodiversity or ecosystem function from the Alternatives analyzed in this EA, and there is no discernible difference between the effects of the Alternatives on these resources.

## *8.8 Ocean and Coastal Habitats*

Council Area salmon fisheries do not employ bottom contact gear, and there is no evidence of direct gear effects on fish habitat from Council-managed salmon fisheries on essential fish habitat (EFH) for salmon or other managed species. Critical habitat for ESA listed salmon does not include Council area ocean water. Because Council area salmon fisheries are conducted at sea and without bottom contact gear, there is no interaction with unique geographic characteristics or other cultural, scientific, or historical resources such as those that might be listed on the National Register of Historical Places. Therefore, no significant impacts are expected on ocean and coastal habitats from the Alternatives analyzed in this EA, and there is no discernible difference between the effects of the Alternatives on these resources.

## *8.9 Public Health and Safety*

Fisheries management can affect safety if, for example, season openings make it more likely that fishermen will have to go out in bad weather because fishing opportunities are limited. The Salmon FMP, however, has provisions to adjust management measures if unsafe weather affected fishery access. The Alternatives for 2023 ocean salmon regulations have season structures similar to those employed in previous salmon seasons and are not expected to result in any significant increase in the risk to human health or safety at sea. There are also no discernible differences between the effects of the Alternatives on the risk to human health or safety at sea.

## *8.10 Short-term and Long-term Impacts*

The purpose of long term and short-term impacts analysis is to consider the combined effects of many actions on the human environment over time that would be missed if each action were evaluated separately.

### 8.10.1 Consideration of the Affected Resource

The affected resources that relate to the Pacific Coast salmon fishery are described in the Affected Environment sections of Preseason Report I and in Section 8.0 of this report. The significance of impacts will be discussed in relation to these affected resources listed below.

- Fishery and Fish Resources,
- Protected Resources,
- Biodiversity/Ecosystem Function and Habitats,
- Socioeconomics.

### 8.10.2 Geographic Boundaries

The analysis focuses on actions related to Council-managed ocean salmon commercial and recreational fisheries. Council-managed ocean fisheries occur in the exclusive economic zone (EEZ), from three to 200 miles offshore, off the coasts of the states of Washington, Oregon, and California as well as the ports in these states that receive landings from the ocean salmon fisheries. Since salmon are anadromous and spend part of their lifecycle in fresh water, the geographic scope also includes internal waters (e.g., Puget Sound) and rivers that salmon use to migrate towards their spawning grounds.

### 8.10.3 Temporal Boundaries

The temporal scope of past and present actions for the affected resources is primarily focused on actions that have occurred after framework FMP implementation (1984). The temporal scope of future actions for all affected resources extends about five years into the future. This period was chosen because the dynamic nature of resource management and lack of information on future projects make it very difficult to predict impacts beyond this timeframe with any certainty.

### 8.10.4 Past, Present, and Reasonably Foreseeable Future Actions

***Fishery Actions***

The Council sets management measures for ocean salmon fisheries annually based on stock forecasts and in accordance with conservation objectives set in the FMP and guidance provided by NMFS for managing impacts to ESA listed stocks. The Council manages ocean salmon fisheries through an intensive preseason analysis process to shape salmon fisheries impacts on salmon stocks within the parameters of the FMP conservation measures and ESA requirements.

Fisheries outside of the Council's jurisdiction also impact the Council area salmon fishery. The Council considers fisheries managed by the states and treaty Indian tribes in the North of Falcon management process and Columbia River fisheries managed under *U.S. v. Oregon* Management Plan, as well as obligations for fisheries off Alaska and Canada under the PST. Additionally, the Council and NMFS manage ocean salmon fisheries inseason to keep fisheries impacts within the constraints set preseason. The Council also conducts annual methodology reviews to improve models and other tools for assessing salmon stocks.

***Non-Fishing Related Actions***

Because salmon spend part of their lifecycle in fresh water, they are more vulnerable to a broad range of human activities (since humans spend most of their time on land) that affect the quantity and quality of these freshwater environments. These effects are generally well known and diverse. They include physical barriers to migration (dams), changes in water flow and temperature (often a secondary effect of dams or water diversion projects), and degradation of spawning environments (such as increased silt in the water from adjacent land use). Non-fishing activities in the marine environment can introduce chemical pollutants and sewage; and result in changes in water temperature, salinity, dissolved oxygen, and suspended sediment which poses a risk to the affected resources. Human-induced non-fishing activities tend to be localized in

nearshore areas and marine project areas. When these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability tends to reduce the tolerance of affected species to the impacts of fishing effort. Mitigation through regulations that would reduce fishing effort could negatively impact human communities. The overall impact to the affected species and their habitats on a population level is unknown, but likely neutral to low negative, since a large portion of these species have a limited or minor exposure to the localized non-fishing perturbations.

For many of the proposed non-fishing activities to be permitted by other Federal agencies, those agencies would examine the potential impacts on the affected resources. The Magnuson-Stevens Act (50 CFR 600.930) imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH. The eight fishery management councils engage in the review process by making comments and recommendations on any Federal or state action that may affect habitat, including EFH, for their managed species and by commenting on actions likely to substantially affect habitat, including EFH. In addition, under the Fish and Wildlife Coordination Act (Section 662), "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the U.S., or by any public or private agency under Federal permit or license, such department or agency first shall consult with the U.S. Fish and Wildlife Service (USFWS), Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular state wherein the" activity is taking place. This act provides another avenue for review of actions by other Federal and state agencies that may impact resources that NMFS manages in the reasonably foreseeable future. In addition, NMFS and the USFWS share responsibility for implementing the ESA. ESA requires NMFS to designate "critical habitat", to the maximum extent prudent and determinable, for any species it lists under the ESA (i.e., areas that contain physical or biological features essential to conservation, which may require special management considerations or protection) and to develop and implement recovery plans for threatened and endangered species. The ESA provides another avenue for NMFS to review actions by other entities that may impact endangered and protected resources whose management units are under NMFS' jurisdiction.

The effects of climate on the biota of the California Current ecosystem have been recognized for some time. The El Niño-Southern Oscillation (ENSO) is widely recognized to be the dominant mode of inter-annual variability in the equatorial Pacific, with impacts throughout the rest of the Pacific basin and the globe. During the negative (El Niño) phase of the ENSO cycle, jet stream winds are typically diverted northward, often resulting in increased exposure of the Pacific Coast of the U.S. to subtropical weather systems. The impacts of these events to the coastal ocean generally include reduced upwelling winds, deepening of the thermocline, intrusion of offshore (subtropical) waters, dramatic declines in primary and secondary production, poor recruitment, reduced growth, and survival of many resident species (such as salmon and groundfish), and northward extensions in the range of many tropical species. Concurrently, top predators such as seabirds and pinnipeds often exhibit reproductive failure. In addition to inter-annual variability in ocean conditions, the North Pacific seems to exhibit substantial inter-decadal variability, which is referred to as the Pacific (inter) Decadal Oscillation (PDO).

Anomalously warm sea surface temperatures in the northeast Pacific Ocean developed in 2013 and continued to persist through much of 2015; this phenomenon was termed "the Blob." During the persistence of the Blob, distribution of marine species was affected (e.g., tropical, and subtropical species were documented far north of their usual ranges), marine mammals and seabirds starved, and a coastwide algal bloom that developed in the summer of 2015 resulted in domoic acid poisoning of animals at various trophic levels, from crustaceans to marine mammals. In 2015-2016, a very strong El Niño event disrupted the Blob, which was declared "dead" by climatologists in December 2015. The extent of the impact of The Blob on salmon and salmon fisheries has not yet been fully determined. It is also uncertain if or when

environmental conditions would cause a repeat of this event, although evidence of resurgent blob-like conditions emerged in late 2019. NMFS' Northwest and Southwest Fisheries Science Centers presented information to the Council indicating that the broods that will contribute to 2023 harvest and escapement encountered generally poor to average ocean conditions (with some exceptions) in the California Current Ecosystem.

Within the California Current itself, scientists have described long-term warming trends in the upper 50 to 75 meters of the water column. Recent paleoecological studies from marine sediments have indicated that 20th century warming trends in the California Current have exceeded natural variability in ocean temperatures over the last 1,400 years. Statistical analyses of past climate data have improved our understanding of how climate has affected North Pacific ecosystems and associated marine species productivities.

In addition, changes in river flows and flow variability may affect population growth of anadromous fishes. Ward et al. (2015) found that increases in variability in freshwater flows may have a more negative effect than any other climate signal included in their model. Some climate change models predict that in the Pacific Northwest, there will be warmer winters and more variable river flows, which may affect the ability of anadromous fishes to recover in the future (Ward et al. 2015). However, our ability to predict future impacts on a large-scale ecosystem stemming from climate forcing events remains uncertain.

### 8.10.5 Magnitude and Significance of Proposed Action

The following section presents the short term and long term impacts of past, present, and reasonably foreseeable future actions on each of the managed resources. This is followed by a discussion on the synergistic effects of the proposed action, as well as past, present, and reasonably foreseeable future actions.

#### *8.10.5.1 Fishery and Fish Resources*

Past, present, and reasonably foreseeable future actions that affect the salmon fishery and fish resources are considered annually when the Council sets management measures for ocean salmon fisheries based on stock forecasts and in accordance with conservation objectives set in the FMP and guidance provided by NMFS for managing impacts to ESA-listed stocks. The Council also considers fisheries managed by the states and treaty Indian tribes in the North of Falcon management process and Columbia River fisheries managed under *U.S. v. Oregon* Management Plan, as well as obligations under the PST. Additionally, the Council and NMFS manage ocean salmon fisheries inseason to keep fisheries impacts within the constraints set preseason. The Council also conducts annual methodology reviews to improve models and other tools for assessing salmon stocks. Therefore, the degree of both short term and long term effects, including the proposed action, on the salmon fishery and fish resources are expected to be low positive and not significant.

#### *8.10.5.2 Protected Resources*

Past, present, and foreseeable future actions that affect ESA-listed salmon are considered annually when the Council sets management measures for ocean salmon fisheries; NMFS provides guidance for managing impacts to ESA-listed stocks based on BOs and stock productivity information provided by the states and analyzed by the STT. Fishery management actions have been taken to manage impacts on ESA-listed salmon, and the states have developed information to better inform fishery management decisions. Therefore, the magnitude and significance of cumulative effects, including the proposed action on ESA-listed salmon are expected to be low positive and not significant.

#### *8.10.5.3 Biodiversity/Ecosystem Function and Habitats*

Past, present, and foreseeable future actions that affect biodiversity/ecosystem function and habitats are considered to the extent practicable annually. When considering the proposed action's removal of adult salmon by the ocean fisheries in addition to past, present, and reasonably foreseeable future actions, such

removal of these salmon is not considered to significantly affect the lower trophic levels or the overall marine ecosystem because salmon are not the only primary predator. In addition, Council area salmon fisheries are conducted at sea with hook-and-line gear and thus, there is no to negligible interactions expected with EFH for salmon or other managed species.

Salmon escapement to fresh water provides for spawning and for carrying marine derived nutrients to freshwater habitats. The importance of salmon carcasses in the transport of marine derived nutrients to freshwater habitats is described in Appendix A of the FMP and the related EA (see Final Environmental Assessment and Regulatory Impact Review; Pacific Coast Salmon Plan Amendment 18: Incorporating Revisions to Pacific Salmon Essential Fish Habitat, available on the Council's website: www.pcouncil.org) and also in the EIS for Puget Sound Chinook Harvest Resource Management Plan (Puget Sound Chinook Harvest Resource Management Plan FEIS. NMFS Northwest Region with Assistance from the Puget Sound Treaty Tribes and Washington Department of Fish and Wildlife. December 2004. 2 volumes, available on the NMFS West Coast Region website: http://www.westcoast.fisheries.noaa.gov/). Council fisheries are designed to provide escapement of salmon to provide for natural spawning and transport of marine derived nutrients.

#### *8.10.5.4 Socioeconomic Environment*

Each year the Council evaluates the socioeconomic impact of past salmon fisheries in the stock assessment and fishery evaluation document (e.g., PFMC 2023a) and also evaluates foreseeable future impacts in the annual preseason reports; these documents are also used as the basis for the NEPA analysis for the annual management measures. The magnitude and significance of cumulative effects, including the proposed action on the socioeconomic environment, is expected to be low positive, and not significant.

## 9.0 CONCLUSION

This analysis has identified no significant environmental impacts that would result from the 2023 ocean salmon regulation Alternatives, from final regulations selected from within the range presented in these Alternatives.

## 10.0 LIST OF AGENCIES AND PERSONS CONSULTED

The following public meetings were held as part of the salmon management process (Council-sponsored meetings in bold):

| | |
|---|---|
| November 2-8, 2022: | **Pacific Fishery Management Council meeting**, Orange County, CA. |
| January 17-20, 2023: | **Salmon Technical Team meeting** (Review preparation), Portland OR. |
| February 8-9: | California Fish and Game Commission meeting, on-line. |
| February 21-24: | **Salmon Technical Team meeting** (Preseason Report I preparation), Portland, OR. |
| February 27: | Oregon Ocean Salmon public meeting, hybrid meeting in Newport, OR and via webinar. |
| March 1: | California Department of Fish and Wildlife public meeting, on-line. |
| March 3 : | Washington Department of Fish and Wildlife hybrid public meeting. |
| March 4-10: | **Pacific Fishery Management Council meeting**, in Seattle, WA. |
| March 15: | North of Falcon hybrid meeting. Discussion of management objectives and preliminary fishery proposals for sport and commercial fisheries in Puget Sound and coastal Washington, with limited discussion of the Columbia River and ocean fisheries. |
| March 20-21: | **Public hearings on management options,** on-line meetings with focused discussions in Washington; Oregon; California. |
| March 21 | North of Falcon, Ocean fisheries and Columbia River fisheries hybrid meeting. |
| March 29 | North of Falcon, Puget Sound forum hybrid meeting. |
| April 1-7: | **Pacific Fishery Management Council meeting**, in Foster City, CA. |
| April 19-20: | California Fish and Game Commission meeting, on-line. |
| April 21 | Oregon Fish and Wildlife Commission meeting Welches, OR. |

The following organizations were consulted and/or participated in preparation of supporting documents:

Northwest Indian Fisheries Commission
Columbia River Intertribal Fish Commission
West Coast Indian Tribes

National Marine Fisheries Service, West Coast Region, Sustainable Fisheries Division
National Marine Fisheries Service, Northwest Fisheries Science Center
National Marine Fisheries Service, Southwest Fisheries Science Center
U.S. Fish and Wildlife Service, Columbia River Fisheries Program Office
United States Coast Guard

California Department of Fish and Wildlife
Oregon Department of Fish and Wildlife
Washington Department of Fish and Wildlife

## 11.0 REFERENCES

PFMC. 2007. Final Environmental Assessment for Pacific Coast Salmon Plan Amendment 15: An Initiative to Provide for *De Minimis* Fishing Opportunity for Klamath River Fall-run Chinook Salmon. (Document prepared by the Pacific Fishery Management Council and National Marine Fisheries Service.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.

PFMC. 2023a. Review of 2022 ocean salmon fisheries. Pacific Fishery Management Council, Portland, Oregon.

PFMC. 2023b. Preseason Report I: Stock abundance analysis and environmental assessment part 1 for 2023 ocean salmon fishery management measures. Pacific Fishery Management Council, Portland, Oregon.

SRKW Workgroup. 2020. Pacific Fishery Management Council Salmon Fishery Management Plan Impacts to Southern Resident Killer Whales: Final Draft Risk Assessment. PFMC Briefing Book for March 2020. Available at https://www.pcouncil.org/documents/2020/02/e-3-a-srkw-workgroup-report-1-electronic-only.pdf/ (website accessed November 6, 2020).

Ward, E.J., J.H. Anderson, T.J. Beechie, G.R. Pess, and M.J. Ford. 2015. Increasing hydrologic variability threatens depleted anadromous fish populations. Global Change Biology DOI: 10.1111/gcb.12847

TABLE 1. 2023 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council adopted. (Page 1 of 11)

| A. SEASON ALTERNATIVE DESCRIPTIONS | | |
|---|---|---|
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **North of Cape Falcon** | **North of Cape Falcon** | **North of Cape Falcon** |
| **Supplemental Management Information** | **Supplemental Management Information** | **Supplemental Management Information** |
| Model #: Coho-2304, Chinook-0423 | Model #: Coho-2305, Chinook-0523 | Model #: Coho-2306, Chinook-0623 |
| 1. Overall non-Indian TAC: 85,000 Chinook and 200,000 coho marked with a healed adipose fin clip (marked).<br>2. Non-Indian commercial troll TAC: 42,500 Chinook and 32,000 marked coho.<br>3.Trade: May be considered at the April Council meeting.<br>4. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries. | 1. Overall non-Indian TAC: 75,000 Chinook and 185,000 coho marked with a healed adipose fin clip (marked).<br>2. Non-Indian commercial troll TAC: 37,500 Chinook and 29,600 marked coho.<br>3. Trade: Same as Alternative I.<br>4. Same as Alternative I. | 1. Overall non-Indian TAC: 65,000 Chinook and 170,000 coho marked with a healed adipose fin clip (marked).<br>2. Non-Indian commercial troll TAC: 32,500 Chinook and 27,200 marked coho.<br>3. Trade: Same as Alternative I.<br>4. Same as Alternative I. |
| **A. SEASON ALTERNATIVE DESCRIPTIONS** | | |
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **U.S./Canada Border to Cape Falcon**<br>• May 1-15. See 2022 management measures, which are subject to inseason action and the 2023 season described below.<br>• May 16 through the earlier of June 29, or 28,300 Chinook. No more than 7,500 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 6,570 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8).<br>• May 16 – June 21; open seven days per week (C.1); then<br>• June 22 – June 29.<br>In the area between the U.S./Canada border and the Queets River the landing and possession limit is 70 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly, inseason (C.1, C.6).<br>In the area between the Queets River and Leadbetter Pt. the landing and possession limit is 200 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly, inseason (C.1, C.6). | **U.S./Canada Border to Cape Falcon**<br>• May 1-15. See 2022 management measures, which are subject to inseason action and the 2023 season described below.<br>• May 16 through the earlier of June 29, or 25,000 Chinook. No more than 6,630 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 5,810 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8).<br>Same as Alternative I.<br>In the area between the U.S./Canada border and the Queets River, the landing and possession limit is 60 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly, inseason (C.1, C.6).<br>In the area between the Queets River and Leadbetter Pt. the landing and possession limit is 100 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly, inseason (C.1, C.6). | **U.S./Canada Border to Cape Falcon**<br>• May 1-15. See 2022 management measures, which are subject to inseason action and the 2023 season described below.<br>• May 16 through the earlier of June 29, or 16,250 Chinook. No more than 4,310 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 3,770 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8).<br>Open five days per week (Fri.-Tues.) (C.1).<br>In the area between the U.S./Canada border and the Queets River, the landing and possession limit is 50 Chinook per vessel per open period (Fri.-Tues.). Landing limits will be evaluated weekly, inseason (C.1, C.6).<br>In the area between the Queets River and Leadbetter Pt. the landing and possession limit is 50 Chinook per vessel per open period (Fri.-Tues.). Landing limits will be evaluated weekly, inseason (C.1, C.6). |

TABLE 1. 2023 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 2 of 11)

| A. SEASON ALTERNATIVE DESCRIPTIONS | | |
|---|---|---|
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **North of Cape Falcon** | **North of Cape Falcon** | **North of Cape Falcon** |
| **U.S./Canada Border to Cape Falcon** *(continued)* | **U.S./Canada Border to Cape Falcon** *(continued)* | **U.S./Canada Border to Cape Falcon** *(continued)* |
| In the area between Leadbetter Pt. and Cape Falcon the landing and possession limit is 60 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly inseason (C.1, C.6). | In the area between Leadbetter Pt. and Cape Falcon landing and possession limit of 50 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly inseason (C.1, C.6). | In the area between Leadbetter Pt. and Cape Falcon the landing and possession limit is 40 Chinook per vessel per open period (Fri-Tues.). Landing limits will be evaluated weekly inseason (C.1, C.6). |
| All salmon, except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). | Same as Alternative I. | Same as Alternative I. |
| When it is estimated that approximately 50% of the overall Chinook quota or any Chinook subarea guideline has been landed, inseason action may be considered to ensure the quota and subarea guidelines are not exceeded. | Same as Alternative I. | Same as Alternative I. |
| If the Chinook quota is exceeded, the excess will be deducted from the all-salmon season (C.5). | Same as Alternative I. | Same as Alternative I. |
| In 2024, the season will open May 1 consistent with all preseason regulations in place in this area and subareas during May 16-June 30, 2023, including subarea salmon guidelines and quotas and weekly vessel limits except as described below for vessels fishing or in possession of salmon north of Leadbetter Point. This opening could be modified following Council review at its March and/or April 2024 meetings. | In 2024, same as Alternative I. | In 2024, same as Alternative I. |

TABLE 1. 2023 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 3 of 11)

**A. SEASON ALTERNATIVE DESCRIPTIONS**

| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
|---|---|---|
| **U.S./Canada Border to Cape Falcon**<br>• July 1 through the earlier of September 30, or 14,200 Chinook or 32,000 marked coho (C.8). | **U.S./Canada Border to Cape Falcon**<br>• July 1 through the earlier of September 30, or 12,500 Chinook or 29,600 marked coho (C.8). | **U.S./Canada Border to Cape Falcon**<br>• July 14 through the earlier of September 30, or 16,250 Chinook or 27,200 marked coho (C.8). |
| Open seven days per week. All salmon. Chinook minimum size limit of 27 inches total length. Coho minimum size limit of 16 inches total length (B, C.1). All coho must be marked with a healed adipose fin clip (C.8.d). No chum retention north of Cape Alava, Washington in August and September (C.4, C.7). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). | Same as Alternative I. | Same as Alternative I, except open five days per week (Fri.-Tues.) (C.1). |
| Landing and possession limit of 100 Chinook and 150 marked coho per vessel per landing week (Thurs.-Wed.). Landing limits will be evaluated weekly, inseason (C.1). | Landing and possession limit of 50 Chinook and 100 marked coho per vessel per landing week (Thurs.-Wed.). Landing limits will be evaluated weekly, inseason (C.1). | Landing and possession limit of 50 marked coho per vessel per open period (Fri.-Tues.). Landing limits will be evaluated weekly, inseason (C.1). |
| When it is estimated that approximately 50% of the overall Chinook quota has been landed, inseason action may be considered to ensure the quota is not exceeded. | Same as Alternative I. | Same as Alternative I. |
| An impact neutral, non-selective coho fishery may be considered through inseason management action later in the season. | Same as Alternative I. | Same as Alternative I. |

**For all commercial troll fisheries north of Cape Falcon**:

Mandatory closed areas include Salmon Troll Yelloweye Rockfish Conservation Area, Cape Flattery, and Columbia Control Zones.

Vessels must land and deliver their salmon within 24 hours of any closure of this fishery.

Vessels may not land fish east of the Sekiu River or east of Tongue Point, Oregon.

Vessels fishing or in possession of salmon north of Leadbetter Point must land and deliver all species of fish in a Washington port and must possess a Washington troll and/or salmon delivery license. For delivery to Washington ports south of Leadbetter Point, vessels must notify the Washington Department of Fish and Wildlife at 360-249-1215 prior to crossing the Leadbetter Point line with area fished, total Chinook, coho, and halibut catch aboard, and destination with approximate time of delivery. **During any single trip, only one side of the Leadbetter Point line may be fished** (C.11).

Vessels fishing or in possession of salmon while fishing south of Leadbetter Point must land and deliver all species of fish within the area and south of Leadbetter Point, except that Oregon permitted vessels may also land all species of fish in Garibaldi, Oregon. All Chinook caught north of Cape Falcon and being delivered by boat to Garibaldi must meet the minimum legal total length of 28 inches for Chinook for south of Cape Falcon seasons unless the season in waters off Garibaldi have been closed for Chinook retention for more than 48 hours (C.1.).

Under state law, vessels must report their catch on a state fish receiving ticket. Oregon State regulations require all fishers landing salmon into Oregon from any fishery between Leadbetter Point, Washington and Cape Falcon, Oregon to notify ODFW within one hour of delivery or prior to transport away from the port of landing by either calling 541-857-2546 or sending notification via e-mail to nfalcon.trollreport@odfw.oregon.gov. Notification shall include vessel name and number, number of salmon by species, port of landing and location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

Vessels in possession of salmon north of the Queets River may not cross the Queets River line without first notifying WDFW at 360-249-1215 with area fished, total Chinook, coho and halibut catch aboard, and destination. Vessels in possession of salmon south of the Queets River may not cross the Queets River line without first notifying WDFW at 360-249-1215 with area fished, total Chinook, coho and halibut catch aboard, and destination (C.11). Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

| TABLE 1. 2023 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 4 of 11) | | |
|---|---|---|
| **A. SEASON ALTERNATIVE DESCRIPTIONS** | | |
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **South of Cape Falcon** | **South of Cape Falcon** | **South of Cape Falcon** |
| **Supplemental Management Information** | **Supplemental Management Information** | **Supplemental Management Information** |
| 1. Sacramento River fall Chinook spawning escapement of 164,964 hatchery and natural area adults.<br>2. Sacramento Index exploitation rate of 2.8 %.<br>3. Klamath River recreational fishery allocation: 1,804 adult Klamath River fall Chinook.<br>4. Klamath tribal allocation: 1,872 adult Klamath River fall Chinook.<br>5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: NA.<br>6. Overall commercial troll coho TAC: 10,000.<br><br>Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the California Fish and Game Commission. | 1. Sacramento River fall Chinook spawning escapement of 164,964 hatchery and natural area adults.<br>2. Sacramento Index exploitation rate of 2.8%.<br>3. Klamath River recreational fishery allocation: 1,804 adult Klamath River fall Chinook.<br>4. Klamath tribal allocation: 1,872 adult Klamath River fall Chinook.<br>5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: NA.<br><br>Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the California Fish and Game Commission. | 1. Sacramento River fall Chinook spawning escapement of 164,990 hatchery and natural area adults.<br>2. Sacramento Index exploitation rate of 2.8%.<br>3. Klamath River recreational fishery allocation 0 adult Klamath River fall Chinook.<br>4. Klamath tribal allocation: 68 adult Klamath River fall Chinook.<br>5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: NA.<br><br>Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the California Fish and Game Commission. |

TABLE 1. 2023 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 5 of 11)

**A. SEASON ALTERNATIVE DESCRIPTIONS**

| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
|---|---|---|
| **Cape Falcon to Humbug Mt.**<br>• September 1-October 31 (C.9.a).<br><br>Open seven days per week. All salmon, through the earlier of September 30 or reaching the 10,000 non mark-selective coho quota; all salmon except coho thereafter. (C.4, C.7). Coho minimum size limit of 16 inches total length, and Chinook minimum size limit of 28 inches total length (B, C.1). All vessels fishing in the area must land their salmon in the State of Oregon. See gear restrictions and definitions (C.2, C.3).<br><br>No more than 100 Chinook allowed per vessel per landing week (Thurs.-Wed.). Vessel limits may be modified inseason (C.8.f).<br><br>Coho quota of 10,000 non-mark selective. No more than 50 coho allowed per vessel per landing week (Thurs.-Wed.). Vessel limits may be modified inseason (C.8.f).<br><br>Any remainder of the mark-selective coho quota from Cape Falcon to Humbug Mt. recreational fishery may be transferred inseason to the Cape Falcon to Humbug Mt. troll fishery on an impact neutral basis (C.8.h).<br><br>In 2024, the season will open March 15 for all salmon except coho. Chinook minimum size limit of 28 inches total length. Gear restrictions same as in 2023. This opening could be modified following Council review at its March 2024 meeting. | **Cape Falcon to Humbug Mt.**<br>• October 1-31 (C.9.a).<br><br>Open seven days per week. All salmon except coho. (C.4, C.7). Chinook minimum size limit of 28 inches total length (B, C.1). All vessels fishing in the area must land their salmon in the State of Oregon. See gear restrictions and definitions (C.2, C.3). Beginning October 1, open shoreward of the 40-fathom regulatory line (C.5.f).<br><br>No more than 75 Chinook allowed per vessel per landing week (Thurs.-Wed.). Vessel limits may be modified inseason.<br><br>In 2024, Same as Alternative I. | **Cape Falcon to Humbug Mt.**<br>• Closed.<br><br>In 2024, Same as Alternative I. |
| **Humbug Mt. to OR/CA Border (Oregon KMZ)**<br>• Closed.<br><br>In 2024, the season will open March 15 for all salmon except coho. Chinook minimum size limit of 28 inches total length. Gear restrictions same as in 2023. This opening could be modified following Council review at its March 2024 meeting. | **Humbug Mt. to OR/CA Border (Oregon KMZ)**<br>• Closed.<br><br>In 2024, same as Alternative I. | **Humbug Mt. to OR/CA Border (Oregon KMZ)**<br>• Closed.<br><br>In 2024, same as Alternative I. |

| TABLE 1. 2023 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 6 of 11) | | |
|---|---|---|
| **A. SEASON ALTERNATIVE DESCRIPTIONS** | | |
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **OR/CA Border to Humboldt South Jetty (California KMZ)**<br>• Closed.<br><br>In 2024, the season will open May 1 through the earlier of May 31, or a 3,000 Chinook quota. Chinook minimum size limit of 27 inches total length. Landing and possession limit of 20 Chinook per vessel per day (C.8.f). Open five days per week (Fri.-Tue.). All salmon except coho (C.4, C.7). Any remaining portion of Chinook quotas may be transferred inseason on an impact neutral basis to the next open quota period (C.8.b). All fish caught in this area must be landed within the area, within 24 hours of any closure of the fishery (C.6), and prior to fishing outside the area (C.10). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.e). See California State regulations for an additional closure adjacent to the Smith River. This opening could be modified following Council review at its March or April 2024 meetings. | **OR/CA Border to Humboldt South Jetty (California KMZ)**<br>• Closed.<br><br>In 2024, same as Alternative I. | **OR/CA Border to Humboldt South Jetty (California KMZ)**<br>• Closed.<br><br>In 2024, same as Alternative I. |
| **Humboldt South Jetty to Latitude 40°10' N.**<br>• Closed. | **Humboldt South Jetty to Latitude 40°10' N.**<br>• Closed. | **Humboldt South Jetty to Latitude 40°10' N.**<br>• Closed. |
| **Latitude 40°10' N. to Point Arena (Fort Bragg)**<br>• Closed.<br><br>In 2024, the season will open April 16 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B); **See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).** All salmon must be landed in California and north of Point Arena (C.6, C.11). Landing and possession limits may be considered inseason (C.8.g). This opening could be modified following Council review at its March 2024 meeting. | **Latitude 40°10' N. to Point Arena (Fort Bragg)**<br>• Closed.<br><br>In 2024, same as Alternative I. | **Latitude 40°10' N. to Point Arena (Fort Bragg)**<br>• Closed.<br><br>In 2024, same as Alternative I. |
| When the fishery is closed between the OR/CA border and Humbug Mountain and open to the south, vessels with fish on board caught in the open area off California may seek temporary mooring in Brookings, Oregon prior to landing in California only if such vessels first notify the Chetco River Coast Guard Station via VHF channel 22A between the hours of 0500 and 2200 and provide the vessel name, number of fish on board, and estimated time of arrival (C.6).. | | |

TABLE 1. 2023 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 7 of 11)

**A. SEASON ALTERNATIVE DESCRIPTIONS**

| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
|---|---|---|
| **Pt. Arena to Pigeon Pt. (San Francisco)**<br>• Closed.<br><br>In 2024, the season will open May 1 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B, C.1); **See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).** Landing and possession limits may be considered inseason (C.8.g). This opening could be modified following Council review at its March or April 2024 meeting.<br><br>**Point Reyes to Point San Pedro (Fall Area Target Zone)**<br>• Closed. | **Pt. Arena to Pigeon Pt. (San Francisco)**<br>• Closed.<br><br>In 2024, Same as Alternative I.<br><br>**Point Reyes to Point San Pedro (Fall Area Target Zone)**<br>• Closed | **Pt. Arena to Pigeon Pt. (San Francisco)**<br>• Closed.<br><br>In 2024, Same as Alternative I.<br><br>**Point Reyes to Point San Pedro (Fall Area Target Zone)**<br>• Closed |
| **Pigeon Point to U.S./Mexico Border (Monterey)**<br>• Closed.<br><br>In 2024, the season will open May 1 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B). **See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).** Landing and possession limits may be considered inseason (C.8.g). This opening could be modified following Council review at its March or April 2024 meeting. | **Pigeon Point to U.S./Mexico Border (Monterey)**<br>• Closed.<br><br>In 2024, same as Alternative I. | **Pigeon Point to U.S./Mexico Border (Monterey)**<br>• Closed.<br><br>In 2024, same as Alternative I. |

California State regulations require all salmon be made available to a CDFW representative for sampling immediately at port of landing. Any person in possession of a salmon with a missing adipose fin, upon request by an authorized agent or employee of the CDFW, shall immediately relinquish the head of the salmon to the State (California Fish and Game Code §8226).

**B. MINIMUM SIZE (Inches) (See C.1)**

| Area (when open) | Chinook | | Coho | | Pink |
|---|---|---|---|---|---|
| | Total Length | Head-off | Total Length | Head-off | |
| North of Cape Falcon | 27 | 20.5 | 16 | 12 | None |
| Cape Falcon to Humbug Mt. | 28 | 21.5 | 16 | 12 | None |
| Humbug Mt. to OR/CA Border | 28 | 21.5 | - | - | None |
| OR/CA Border to Humboldt South Jetty | - | - | - | - | - |
| Latitude 40°10' N. to Pt. Arena | - | - | - | - | - |
| Pt. Arena to Pigeon Pt. | - | - | - | - | - |
| Pigeon Pt. to U.S./Mexico Border (Alt. 3) | - | - | - | - | - |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Compliance with Minimum Size or Other Special Restrictions: All salmon on board a vessel must meet the minimum size, landing/possession limit, or other special requirements for the area being fished and the area in which they are landed if the area is open or has been closed less than 48 hours for that species of salmon. Salmon may be landed in an area that has been closed for a species of salmon more than 48 hours only if they meet the minimum size, landing/possession limit, or other special requirements for the area in which they were caught. Salmon may not be filleted prior to landing.

Any person who is required to report a salmon landing by applicable state law must include on the state landing receipt for that landing both the number and weight of salmon landed by species. States may require fish landing/receiving tickets be kept on board the vessel for 90 days or more after landing to account for all previous salmon landings.

C.2. Gear Restrictions:

a. Salmon may be taken only by hook and line using single point, single shank, barbless hooks.
b. Cape Falcon, Oregon, to the OR/CA border: No more than 4 spreads are allowed per line.
c. OR/CA border to U.S./Mexico border: No more than 6 lines are allowed per vessel, and barbless circle hooks are required when fishing with bait by any means other than trolling.

C.3. Gear Definitions:

*Trolling defined*: Fishing from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.
*Troll fishing gear defined*: One or more lines that drag hooks behind a moving fishing vessel engaged in trolling. In that portion of the fishery management area off Oregon and Washington, the line or lines must be affixed to the vessel and must not be intentionally disengaged from the vessel at any time during the fishing operation.
*Spread defined*: A single leader connected to an individual lure and/or bait.
*Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90º angle.

C.4. Vessel Operation in Closed Areas with Salmon on Board:

a. Except as provided under C.4.b below, it is unlawful for a vessel to have troll or recreational gear in the water while in any area closed to fishing for a certain species of salmon while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.
b. When Genetic Stock Identification (GSI) samples will be collected in an area closed to commercial salmon fishing, the scientific research permit holder shall notify NOAA OLE, USCG, CDFW, WDFW, ODFW, and OSP at least 24 hours prior to sampling and provide the following information: the vessel name, date, location, and time collection activities will be done. Any vessel collecting GSI samples in a closed area shall not possess any salmon other than those from which GSI samples are being collected. Salmon caught for collection of GSI samples must be immediately released in good condition after collection of samples.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS** (Continued)

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48º23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to Cape Alava (48º10'00" N. lat.) and east of 125º05'00" W. long.

b. *Salmon Troll Yelloweye Rockfish Conservation Area* – The area in Washington Marine Catch Area 3 from 48°00.00' N. lat.; 125°14.00' W. long. to 48°02.00' N. lat.; 125°14.00' W. long. to 48°02.00' N. lat.; 125°16.50' W. long. to 48°00.00' N. lat.; 125°16.50' W. long. and connecting back to 48°00.00' N. lat.; 125°14.00' W. long.

c. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 55'36" N. lat., 124°10'51" W. long.).

d. *Columbia Control Zone* - An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat.,124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°15'48" N. lat., 124°05'20" W. long.), and then along the north jetty to the point of intersection with the Buoy #10 line; and, on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

e. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately 6 nautical miles north of the Klamath River mouth); on the west by 124°23'00" W. long. (approximately 12 nautical miles off shore); and on the south by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

f. Waypoints for the 40 fathom regulatory line from Cape Falcon to Humbug Mt. (50 CFR 660.71 (k) (12)-(70), when in place.

45°46.00′ N. lat., 124°04.49′ W. long.;
45°44.34′ N. lat., 124°05.09′ W. long.;
45°40.64′ N. lat., 124°04.90′ W. long.;
45°33.00′ N. lat., 124°04.46′ W. long.;
45°32.27′ N. lat., 124°04.74′ W. long.;
45°29.26′ N. lat., 124°04.22′ W. long.;
45°20.25′ N. lat., 124°04.67′ W. long.;
45°19.99′ N. lat., 124°04.62′ W. long.;
45°17.50′ N. lat., 124°04.91′ W. long.;
45°11.29′ N. lat., 124°05.20′ W. long.;
45°05.80′ N. lat., 124°05.40′ W. long.;
45°05.08′ N. lat., 124°05.93′ W. long.;
45°03.83′ N. lat., 124°06.47′ W. long.;
45°01.70′ N. lat., 124°06.53′ W. long.;
44°58.75′ N. lat., 124°07.14′ W. long.;
44°51.28′ N. lat., 124°10.21′ W. long.;
44°49.49′ N. lat., 124°10.90′ W. long.;
44°44.96′ N. lat., 124°14.39′ W. long.;
44°43.44′ N. lat., 124°14.78′ W. long.;
44°42.26′ N. lat., 124°13.81′ W. long.;
44°41.68′ N. lat., 124°15.38′ W. long.;
44°34.87′ N. lat., 124°15.80′ W. long.;
44°33.74′ N. lat., 124°14.44′ W. long.;
44°27.66′ N. lat., 124°16.99′ W. long.;
44°19.13′ N. lat., 124°19.22′ W. long.;
44°15.35′ N. lat., 124°17.38′ W. long.;
44°14.38′ N. lat., 124°17.78′ W. long.;
44°12.80′ N. lat., 124°17.18′ W. long.;
44°09.23′ N. lat., 124°15.96′ W. long.;
44°08.38′ N. lat., 124°16.79′ W. long.;
44°08.30′ N. lat., 124°16.75′ W. long.;
44°01.18′ N. lat., 124°15.42′ W. long.;
43°51.61′ N. lat., 124°14.68′ W. long.;
43°42.66′ N. lat., 124°15.46′ W. long.;
43°40.49′ N. lat., 124°15.74′ W. long.;
43°38.77′ N. lat., 124°15.64′ W. long.;
43°34.52′ N. lat., 124°16.73′ W. long.;
43°28.82′ N. lat., 124°19.52′ W. long.;
43°23.91′ N. lat., 124°24.28′ W. long.;
43°20.83′ N. lat., 124°26.63′ W. long.;
43°17.96′ N. lat., 124°28.81′ W. long.;
43°16.75′ N. lat., 124°28.42′ W. long.;
43°13.97′ N. lat., 124°31.99′ W. long.;
43°13.72′ N. lat., 124°33.25′ W. long.;
43°12.26′ N. lat., 124°34.16′ W. long.;
43°10.96′ N. lat., 124°32.33′ W. long.;
43°05.65′ N. lat., 124°31.52′ W. long.;
42°59.66′ N. lat., 124°32.58′ W. long.;
42°54.97′ N. lat., 124°36.99′ W. long.;
42°53.81′ N. lat., 124°38.57′ W. long.;
42°50.00′ N. lat., 124°39.68′ W. long.;
42°49.13′ N. lat., 124°39.70′ W. long.;
42°46.47′ N. lat., 124°38.89′ W. long.;
42°45.74′ N. lat., 124°38.86′ W. long.;
42°44.79′ N. lat., 124°37.96′ W. long.;
42°45.01′ N. lat., 124°36.39′ W. long.;
42°44.14′ N. lat., 124°35.17′ W. long.;
42°42.14′ N. lat., 124°32.82′ W. long.;
42°40.50′ N. lat., 124°31.98′ W. long

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

C.6. Notification When Unsafe Conditions Prevent Compliance with Regulations: If prevented by unsafe weather conditions or mechanical problems from meeting special management area landing restrictions, vessels must notify the U.S. Coast Guard and receive acknowledgment of such notification prior to leaving the area. This notification shall include the name of the vessel, port where delivery will be made, approximate number of salmon (by species) on board, the estimated time of arrival, and the specific reason the vessel is not able to meet special management area landing restrictions.

In addition to contacting the U.S. Coast Guard, vessels fishing south of the Oregon/California border must notify CDFW within one hour of leaving the management area by calling 800-889-8346 and providing the same information as reported to the U.S. Coast Guard. All salmon must be offloaded within 24 hours of reaching port.

C.7. Incidental Pacific Halibut Harvest: License applications for incidental harvest for Pacific halibut during commercial salmon fishing must be obtained from NMFS.

a. Pacific halibut retained must be no less than 32 inches in total length (with head on).

b. During the salmon troll season, incidental harvest is authorized only during April, May, and June, and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825 or 206-526-6667). WDFW, ODFW, and CDFW will monitor landings. If the landings are projected to exceed the preseason allocation for this fishery or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to prohibit retention of halibut in the non-Indian salmon troll fishery. See the most current Pacific Halibut Catch Sharing Plan for more details.

c. Incidental Pacific halibut catch regulations in the commercial salmon troll fishery adopted for 2023, prior to any 2023 inseason action, will be in effect when incidental Pacific halibut retention opens on April 1, 2023 unless otherwise modified by inseason action at the March 2023 Council meeting.

d. At the 2023 March meeting, the Council adopted the following options for public review:

Beginning May 16, 2023, through the end of the 2023 salmon troll fishery, and beginning April 1, 2024, until modified through inseason action or superseded by the 2024 management measures license holders may land or possess no more than one Pacific halibut per two Chinook, except one Pacific halibut may be possessed or landed without meeting the ratio requirement, and:

Option I - no more than 35 halibut may be possessed or landed per trip.

Option II - no more than 30 halibut may be possessed or landed per trip.

Option III - no more than 25 halibut may be possessed or landed per trip.

e. "C-shaped" yelloweye rockfish conservation area is an area to be voluntarily avoided for salmon trolling.
NMFS and the Council request salmon trollers voluntarily avoid this area in order to protect yelloweye rockfish. The area is defined in the Pacific Council Halibut Catch Sharing Plan in the North Coast subarea (Washington marine area 3), with the following coordinates in the order listed:

48°18' N. lat.; 125°18' W. long.;
48°18' N. lat.; 124°59' W. long.;
48°11' N. lat.; 124°59' W. long.;
48°11' N. lat.; 125°11' W. long.;
48°04' N. lat.; 125°11' W. long.;
48°04' N. lat.; 124°59' W. long.;
48°00' N. lat.; 124°59' W. long.;
48°00' N. lat.; 125°18' W. long.;
and connecting back to 48°18' N. lat.; 125°18' W. long.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

C.8. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June non-Indian commercial troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline if the transfer would not result in exceeding preseason impact expectations on any stocks.
b. Chinook remaining from May, June, and/or July non-Indian commercial troll quotas in the Oregon or California KMZ may be transferred to the Chinook quota for the next open period if the transfer would not result in exceeding preseason impact expectations on any stocks.
c. NMFS may transfer salmon between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the areas' representatives on the Salmon Advisory Subpanel (SAS), and if the transfer would not result in exceeding preseason impact expectations on any stocks.
d. The Council will consider inseason recommendations for special regulations for any experimental fisheries annually in March; proposals must meet Council protocol and be received in November the year prior.
e. If retention of unmarked coho (adipose fin intact) is permitted by inseason action, the allowable coho quota will be adjusted to ensure preseason projected impacts on all stocks is not exceeded.
f. Landing limits may be modified inseason to sustain season length and keep harvest within overall quotas.
g. Landing limits in California may be implemented and/or modified inseason to sustain season length and keep harvest within preseason expectations.
h. Deviations from the allocation of allowable ocean harvest of coho salmon in the area south of Cape Falcon may be allowed to meet consultation standards for ESA-listed stocks (FMP 5.3.2). Therefore, should any rollovers result in a deviation from the south of Cape Falcon coho allocation schedule between sectors would still fall underneath this exemption.

C.9. State Waters Fisheries: Consistent with Council management objectives:
a. The State of Oregon may establish additional late-season fisheries in state waters.
b. The State of California may establish limited fisheries in selected state waters.
c. Check state regulations for details.

C.10. For the purposes of California Fish and Game Code, Section 8232.5, the definition of the Klamath Management Zone (KMZ) for the ocean salmon season shall be that area from Humbug Mountain, Oregon, to Latitude 40°10' N.

C.11. Latitudes for geographical reference of major landmarks along the west coast. Majority of information from source: 2022 West Coast federal salmon regulations, Chapter 5. https://www.federalregister.gov/documents/2022/05/16/2022-10430/fisheries-off-west-coast-states-west-coast-salmon-fisheries-2022-specifications-and-management

| | | | |
|---|---|---|---|
| Cape Flattery, WA | 48°23′00″ N lat. | Humboldt South Jetty, CA | 40°45′53″ N lat. |
| Cape Alava, WA | 48°10′00″ N lat. | 40°10′ line (near Cape Mendocino, CA) | 40°10′00″ N lat. |
| Queets River, WA | 47°31′42″ N lat. | Horse Mountain, CA | 40°05′00″ N lat. |
| Leadbetter Point, WA | 46°38′10″ N lat. | Point Arena, CA | 38°57′30″ N lat. |
| Cape Falcon, OR | 45°46′00″ N lat. | Point Reyes, CA | 37°59′44″ N lat. |
| South end Heceta Bank line, OR | 43°58′00″ N lat. | Point San Pedro, CA | 37°35′40″ N lat. |
| Humbug Mountain, OR | 42°40′30″ N lat. | Pigeon Point, CA | 37°11′00″ N lat. |
| Oregon-California border | 42°00′00″ N lat. | Point Sur, CA | 36°18′00″ N lat. |
| | | Point Conception, CA | 34°27′00″ N lat. |

TABLE 2. 2023 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council adopted. (Page 1 of 8)

| A. SEASON ALTERNATIVE DESCRIPTIONS | | |
|---|---|---|
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **North of Cape Falcon** | **North of Cape Falcon** | **North of Cape Falcon** |
| **Supplemental Management Information** | **Supplemental Management Information** | **Supplemental Management Information** |
| 1. Overall non-Indian TAC: 85,000 Chinook and 200,000 coho marked with a healed adipose fin clip (marked).<br>2. Recreational TAC: 42,500 Chinook and 168,000 marked coho; all retained coho must be marked.<br>3. Various daily limits and species combinations of one and two salmon will be considered. Including one fish, two fish only one of which may be a Chinook, and two fish only one of which may be a coho.<br>4. Trade:<br>5. No Area 4B add-on fishery.<br>6. Buoy 10 fishery opens August 1 with an expected landed catch of 40,000 marked coho in August and September.<br>7. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries. | 1. Overall non-Indian TAC: 75,000 Chinook and 185,000 coho marked with a healed adipose fin clip (marked).<br>2. Recreational TAC: 37,500 Chinook and 155,400 marked coho; all retained coho must be marked.<br>3.Same as Alternative I.<br>4. Trade:<br>5. Same as Alternative I.<br>6. Buoy 10 fishery opens August 1 with an expected landed catch of 50,000 marked coho in August and September.<br>7. Same as Alternative I. | 1. Overall non-Indian TAC: 65,000 Chinook and 170,000 coho marked with a healed adipose fin clip (marked).<br>2. Recreational TAC: 32,500 Chinook and 142,800 marked coho; all retained coho must be marked.<br>3. Same as Alternative I.<br>4. Trade:<br>5. Same as Alternative I.<br>6. Buoy 10 fishery opens August 1 with an expected landed catch of 60,000 marked coho in August and September.<br>7. Same as Alternative I. |
| **U.S./Canada Border to Cape Alava (Neah Bay Subarea**)<br>• June 17 through earlier of September 30, or 17,470 marked coho subarea quota, with a subarea guideline of 9,490 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day, of which only one may be a Chinook, plus one additional pink salmon. All coho must be marked with a healed adipose fin clip. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).<br><br>An impact neutral non-selective coho fishery may be considered through inseason management action later in the season.<br><br>Beginning August 1, no Chinook retention east of the Bonilla-Tatoosh line (C.4.a) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5). | **U.S./Canada Border to Cape Alava (Neah Bay Subarea)**<br>• June 24 through earlier of September 30, or 16,160 marked coho subarea quota, with a subarea guideline of 8,370 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day, only one of which may be a Chinook. All coho must be marked with a healed adipose fin clip (C.1). See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).<br><br>Same as Alternative I. | **U.S./Canada Border to Cape Alava (Neah Bay Subarea**)<br>• July 1 through earlier of September 24, or 14,850 marked coho subarea quota, with a subarea guideline of 7,260 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day. All coho must be marked with a healed adipose fin clip (C.1). See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).<br><br>Same as Alternative I. |

TABLE 2. 2023 Recreational management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 2 of 8)

**A. SEASON ALTERNATIVE DESCRIPTIONS**

| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
|---|---|---|
| **Cape Alava to Queets River (La Push Subarea)**<br>• June 17 through earlier of September 30, or 4,370 marked coho subarea quota, with a subarea guideline of 1,590 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day, of which only one may be a Chinook, plus one additional pink salmon. All coho must be marked with a healed adipose fin clip. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).<br><br>Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5).<br><br>An impact neutral non-selective coho fishery may be considered through inseason management action later in the season.<br><br>• October 3 through earlier of October 7, or 150 Chinook quota (C.5) in the area north of 47°50'00 N. lat. and south of 48°00'00" N. lat.<br><br>Fishery may be closed if extreme freshwater temperature and/or flow events occur in the Quillayute basin in September. Chinook only, one Chinook per day. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3). | **Cape Alava to Queets River (La Push Subarea)**<br>• June 24 through earlier of September 30, or 4,040 marked coho subarea quota, with a subarea guideline of 1,530 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day, of which only one may be a Chinook. All coho must be marked with a healed adipose fin clip. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).<br><br>Same as Alternative I. | **Cape Alava to Queets River (La Push Subarea)**<br>• July 1 through earlier of September 24, or 3,710 marked coho subarea quota, with a subarea guideline of 1,330 Chinook (C.5).<br><br>Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day. All coho must be marked with a healed adipose fin clip. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).<br><br>Same as Alternative I. |
| **Queets River to Leadbetter Point (Westport Subarea)**<br>• June 24 through earlier of September 30, or 62,160 marked coho subarea quota, with a subarea guideline of 18,750 Chinook (C.5).<br><br>Open seven days per week. All salmon, two salmon per day, no more than one of which may be a Chinook. All coho must be marked with a healed adipose fin clip. See gear restrictions and definitions (C.1, C.2, C.3). Chinook minimum size limit of 22 inches total length (B).<br><br>An impact neutral non-selective coho fishery may be considered through inseason management action later in the season.<br><br>Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5). | **Queets River to Leadbetter Point (Westport Subarea)**<br>• July 1 through earlier of September 30, or 57,500 marked coho subarea quota, with a subarea guideline of 16,550 Chinook (C.5).<br><br>Same as Alternative I.<br><br>Same as Alternative I. | **Queets River to Leadbetter Point (Westport Subarea)**<br>• July 2 through earlier of September 30, or 52,840 marked coho subarea quota, with a subarea guideline of 14,330 Chinook (C.5).<br><br>Open five days per week (Sun.–Thurs.). All salmon; two salmon per day, no more than one of which may be a Chinook. All coho must be marked with a healed adipose fin clip. See gear restrictions and definitions (C.1, C.2, C.3). Chinook minimum size limit of 22 inches total length (B).<br><br>Same as Alternative I. |

TABLE 2. 2023 Recreational management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 3 of 8)

**A. SEASON ALTERNATIVE DESCRIPTIONS**

| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
|---|---|---|
| **Leadbetter Point to Cape Falcon (Columbia River Subarea)**<br>• June 24 through earlier of September 30, or 84,000 marked coho subarea quota, with a subarea guideline of 12,520 Chinook (C.5). | **Leadbetter Point to Cape Falcon (Columbia River Subarea)**<br>• June 24 through earlier of September 30, or 77,700 marked coho subarea quota, with a subarea guideline of 11,050 Chinook (C.5). | **Leadbetter Point to Cape Falcon (Columbia River Subarea)**<br>• June 26 through earlier of September 24, or 71,400 marked coho subarea quota, with a subarea guideline of 9,580 Chinook (C.5). |
| Open seven days per week. All salmon; two salmon per day, no more than one of which may be a Chinook. All coho must be marked with a healed adipose fin clip. See gear restrictions and definitions (C.1, C.2, C.3). Chinook minimum size limit of 22 inches total length (B).<br><br>An impact neutral non-selective coho fishery may be considered through inseason management action later in the season. | Same as Alternative I. | Same as Alternative I. |
| Columbia Control Zone closed (C.4.c). Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5). | Same as Alternative I. | Same as Alternative I. |

TABLE 2. 2023 Recreational management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 4 of 8)

**A. SEASON ALTERNATIVE DESCRIPTIONS**

| **South of Cape Falcon** | **South of Cape Falcon** | **South of Cape Falcon** |
|---|---|---|
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **Supplemental Management Information** | **Supplemental Management Information** | **Supplemental Management Information** |
| 1. Sacramento River fall Chinook spawning escapement of 164,964 hatchery and natural area adults.<br>2. Sacramento Index exploitation rate of 2.8 %.<br>3. Klamath River recreational fishery allocation: 1,804 adult Klamath River fall Chinook.<br>4. Klamath tribal allocation: 1,872 adult Klamath River fall Chinook.<br>5. Overall recreational coho TAC: 110,000 coho marked with a healed adipose fin clip (marked), and 25,000 coho in the non-mark-selective coho fishery.<br>6. Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the CFGC. | 1. Sacramento River fall Chinook spawning escapement of 164,964 hatchery and natural area adults.<br>2. Sacramento Index exploitation rate of 2.8%.<br>3. Klamath River recreational fishery allocation: 1,804 adult Klamath River fall Chinook.<br>4. Klamath tribal allocation: 1,872 adult Klamath River fall Chinook.<br>5. Overall recreational coho TAC: 100,000 coho marked with a healed adipose fin clip (marked), and 20,000 coho in the non-mark-selective coho fishery.<br>6. Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the CFGC. | 1. Sacramento River fall Chinook spawning escapement of 164,990 hatchery and natural area adults.<br>2. Sacramento Index exploitation rate of 2.8%.<br>3. Klamath River recreational fishery allocation 0 adult Klamath River fall Chinook.<br>4. Klamath tribal allocation: 68 adult Klamath River fall Chinook.<br>5. Overall recreational coho TAC: 90,000 coho marked with a healed adipose fin clip (marked), and 15,000 coho in the non-mark-selective coho fishery.<br>6. Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the CFGC. |
| **Cape Falcon to OR/CA Border.**<br>Mark-selective coho fishery:<br>• June 17 through the earlier of August 31, or 110,000 marked coho quota (C.6).<br><br>Open seven days per week. All salmon except Chinook, two salmon per day. All retained coho must be marked with a healed adipose fin clip (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3).<br><br>Any remainder of the mark-selective coho quota may be transferred inseason on an impact neutral basis to the troll quota for the non-selective coho fishery from Cape Falcon to Humbug Mountain (C.5). | **Cape Falcon to OR/CA Border.**<br>Mark-selective coho fishery:<br>• June 17 through the earlier of August 31, or 100,000 marked coho quota (C.6).<br><br>Same as Alternative I.<br><br>Any remainder of the mark-selective coho quota may be transferred inseason on an impact neutral basis to the recreational non-selective coho fishery from Cape Falcon to Humbug Mountain (C.5). | **Cape Falcon to Humbug Mt.**<br>Mark-selective coho fishery:<br>• June 17 through the earlier of August 31, or 90,000 marked coho quota (C.6).<br><br>Same as Alternative I.<br><br>Any remainder of the mark-selective coho quota may be transferred inseason on an impact neutral basis to the recreational non-selective coho fishery from Cape Falcon to Humbug Mountain (C.5). |

| TABLE 2. 2023 Recreational management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 5 of 8) | | All data preliminary, March 10, 2023 |
|---|---|---|
| **A. SEASON ALTERNATIVE DESCRIPTIONS** | | |
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **Cape Falcon to Humbug Mt.**<br>• September 1-October 31 (C.6).<br><br>Open seven days per week. All salmon except coho, except as described in the non-mark-selective coho fishery (C.5), two fish per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3).<br><br>In 2024, the season will open March 15 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); and the same gear restrictions as in 2023 (C.2, C.3). This opening could be modified following Council review at its March 2024 meeting. | **Cape Falcon to Humbug Mt.**<br>• September 1-October 31 (C.6).<br><br>Open seven days per week. All salmon except coho, except as described in the non-mark-selective coho fishery (C.5), one fish per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3).<br><br>In 2024, same as Alternative | |
| **Cape Falcon to Humbug Mt.**<br>Non-mark-selective coho fishery:<br>• September 1 through the earlier of September 30, or 25,000 non-mark-selective coho quota (C.6). Open days may be modified inseason.<br><br>Open seven days per week. All salmon, two salmon per day (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3). | **Cape Falcon to Humbug Mt.**<br>Non-mark-selective coho fishery:<br>• September 1 through the earlier of September 30, or 20,000 non-mark-selective coho quota (C.6). Open days may be modified inseason.<br><br>Open seven days per week. All salmon, two salmon per day, only one of which may be a Chinook (C.1.). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3). | **Cape Falcon to Humbug Mt.**<br>Non-mark-selective coho fishery:<br>• September 1 through the earlier of September 30, or 15,000 non-mark-selective coho quota (C.6). Open days may be modified inseason.<br><br>Open seven days per week. All salmon except Chinook, two salmon per day (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3). |
| **Humbug Mt. to OR/CA Border (Oregon KMZ)**<br>Mark-selective coho fishery:<br>• June 17 through the earlier of August 31, or the Cape Falcon to OR/CA border 110,000 marked coho quota (C.6).<br><br>Open seven days per week. All salmon except Chinook, two salmon per day. All retained coho must be marked with a healed adipose fin clip (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3).<br><br>See minimum size limits (B). See gear restrictions and definitions (C.2, C.3). | **Humbug Mt. to OR/CA Border (Oregon KMZ)**<br>Mark-selective coho fishery:<br>• June 17 through the earlier of August 31, or the Cape Falcon to OR/CA border 100,000 marked coho quota (C.6).<br><br>Same as Alternative I. | **Humbug Mt. to OR/CA Border (Oregon KMZ)**<br>Mark-selective coho fishery:<br>• Closed. |
| Fishing in the Stonewall Bank yelloweye rockfish conservation area restricted to trolling only on days the all-depth recreational halibut fishery is open (call the halibut fishing hotline 1-800-662-9825 for specific dates) (C.3.b, C.4.d) | | |

| TABLE 2. 2023 Recreational management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 6 of 8) | | |
|---|---|---|
| **A. SEASON ALTERNATIVE DESCRIPTIONS** | | |
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **OR/CA Border to latitude 40°10' N. (California KMZ)**<br>• Closed.<br><br>In 2024, season opens May 1 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March or April 2024 meeting. | **OR/CA Border to latitude 40°10' N. (California KMZ)**<br>• Closed.<br><br>In 2024, same as Alternative I. | **OR/CA Border to latitude 40°10' N. (California KMZ)**<br>• Closed.<br><br>In 2024, same as Alternative I. |
| **Latitude 40°10' N. to Point Arena (Fort Bragg)**<br>• Closed.<br><br>In 2024, season opens May 1 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March or April 2024 meeting. | **Latitude 40°10' N. to Point Arena (Fort Bragg)**<br>• Closed.<br><br>In 2024, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March or April 2024 meeting. | **Latitude 40°10' N. to Point Arena (Fort Bragg)**<br>• Closed.<br><br>In 2024, same as Alternative I. |
| **Point Arena to Pigeon Point (San Francisco)**<br>• Closed.<br><br>In 2024, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March 2024 meeting. | **Point Arena to Pigeon Point (San Francisco)**<br>• Closed.<br><br>In 2024, same as Alternative I. | **Point Arena to Pigeon Point (San Francisco)**<br>• Closed.<br><br>In 2024, same as Alternative I. |
| **Pigeon Point to U.S./Mexico Border (Monterey)**<br>• Closed.<br><br>In 2024, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March 2024 meeting. | **Pigeon Point to U.S./Mexico Border (Monterey)**<br>• Closed.<br><br>In 2024, same as Alternative I. | **Pigeon Point to U.S./Mexico Border (Monterey)**<br>• Closed.<br><br>In 2024, same as Alternative I.. |
| California State regulations require all salmon be made available to a CDFW representative for sampling immediately at port of landing. Any person in possession of a salmon with a missing adipose fin, upon request by an authorized agent or employee of the CDFW, shall immediately relinquish the head of the salmon to the State (California Code of Regulations Title 14 Section 1.73). | | |

TABLE 2. 2023 Recreational management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 7 of 8)

**B. MINIMUM SIZE (Inches) (See C.1)**

| Area (when open) | Chinook | Coho | Pink |
|---|---|---|---|
| North of Cape Falcon (Westport and Col R) | 22 | 16 | None |
| North of Cape Falcon (Neah Bay and La Push) | 24 | 16 | None |
| Cape Falcon to Humbug Mt. | 24 | 16 | None |
| Humbug Mt. to OR/CA Border | 24 | 16 | None |
| OR/CA Border to Pt. Arena | - - | - - | - |
| Pt. Arena to Pigeon Pt. | - - | - - | - |
| Pigeon Pt. to U.S./Mexico Border | - - | - - | - |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Compliance with Minimum Size and Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught. Salmon may not be filleted, or salmon heads removed prior to landing.
*Ocean Boat Limits*: Off the coast of Washington, Oregon, and California, each fisher aboard a vessel may continue to use angling gear until the combined daily limits of Chinook and coho salmon for all licensed and juvenile anglers aboard have been attained (additional state restrictions may apply).

C.2. Gear Restrictions: Salmon may be taken only by hook and line using barbless hooks. All persons fishing for salmon, and all persons fishing from a boat with salmon on board must meet the gear restrictions listed below for specific areas or seasons.

a. *U.S./Canada Border to Pt. Conception, California*: No more than one rod may be used per angler; and no more than two single point, single shank, barbless hooks are required for all fishing gear.

b. *Latitude 40°10' N. to Pt. Conception, California:* Single point, single shank, barbless circle hooks (see gear definitions below) are required when fishing with bait by any means other than trolling, and no more than two such hooks shall be used. When angling with two hooks, the distance between the hooks must not exceed five inches when measured from the top of the eye of the top hook to the inner base of the curve of the lower hook, and both hooks must be permanently tied in place (hard tied). Circle hooks are not required when artificial lures are used without bait.

C.3. Gear Definitions:

a. *Recreational fishing gear defined*: Off Oregon and Washington, angling tackle consists of a single line that must be attached to a rod and reel held by hand or closely attended; the rod and reel must be held by hand while playing a hooked fish. No person may use more than one rod and line while fishing off Oregon or Washington. Off California, the line must be attached to a rod and reel held by hand or closely attended; weights directly attached to a line may not exceed four pounds (1.8 kg). While fishing off California north of Pt. Conception, no person fishing for salmon, and no person fishing from a boat with salmon on board, may use more than one rod and line. Fishing includes any activity which can reasonably be expected to result in the catching, taking, or harvesting of fish.

b. *Trolling defined*: Angling from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

c. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

C.4. Control Zone Definitions:

a. *The Bonilla-Tatoosh Line*: A line running from the western end of Cape Flattery to Tatoosh Island Lighthouse (48°23'30" N. lat., 124°44'12" W. long.) to the buoy adjacent to Duntze Rock (48°24'37" N. lat., 124°44'37" W. long.), then in a straight line to Bonilla Pt. (48°35'39" N. lat., 124°42'58" W. long.) on Vancouver Island, British Columbia.

b. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 55'36" N. lat., 124°10'51" W. long.).

c. *Columbia Control Zone*: An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat., 124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°15'48" N. lat., 124°05'20" W. long. and then along the north jetty to the point of intersection with the Buoy #10 line; and on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

d. *Stonewall Bank Yelloweye Rockfish Conservation Area*: The area defined by the following coordinates in the order listed:
44°37.46' N. lat.; 124°24.92' W. long.
44°37.46' N. lat.; 124°23.63' W. long.
44°28.71' N. lat.; 124°21.80' W. long.
44°28.71' N. lat.; 124°24.10' W. long.
44°31.42' N. lat.; 124°25.47' W. long.
and connecting back to 44°37.46' N. lat.; 124°24.92' W. long.

e. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately 6 nautical miles north of the Klamath River mouth); on the west by 124°23'00" W. long. (approximately 12 nautical miles offshore); and, on the south by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

C.5. Inseason Management: Regulatory modifications may become necessary inseason to meet preseason management objectives such as quotas, harvest guidelines, and season duration. In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Actions could include modifications to bag limits, or days open to fishing, and extensions or reductions in areas open to fishing.

b. Coho may be transferred inseason among recreational subareas north of Cape Falcon to help meet the recreational season duration objectives (for each subarea) after conferring with representatives of the affected ports and the Council's SAS recreational representatives north of Cape Falcon, and if the transfer would not result in exceeding preseason impact expectations on any stocks.

c. Chinook and coho may be transferred between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS, and if the transfer would not result in exceeding preseason impact expectations on any stocks.

d. Fishery managers may consider inseason action modifying regulations restricting retention of unmarked (adipose fin intact) coho. To remain consistent with preseason expectations, any inseason action shall consider, if significant, the difference between observed and preseason forecasted (adipose-clipped) mark rates. Such a consideration may also include a change in bag limit of two salmon, no more than one of which may be a coho.

e. Marked coho remaining from the Cape Falcon to OR/CA Border recreational mark-selective coho quota may be transferred inseason to the Cape Falcon to Humbug Mt. non-mark-selective recreational fishery or the Cape Falcon to Humbug Mt. commercial troll fishery if the transfer would not result in exceeding preseason impact expectations on any stocks.

f. Deviations from the allocation of allowable ocean harvest of coho salmon in the area south of Cape Falcon may be allowed to meet consultation standards for ESA-listed stocks (FMP 5.3.2). Therefore, should any rollovers result in a deviation from the south of Cape Falcon coho allocation schedule between sectors would still fall underneath this exemption.

C.6. Additional Seasons in State Territorial Waters: Consistent with Council management objectives, the States of Washington, Oregon, and California may establish limited seasons in state waters. Check state regulations for details.

TABLE 3. 2023 Treaty Indian troll management Alternatives for ocean salmon fisheries – Tribal adopted. (Page 1 of 2)

| A. SEASON ALTERNATIVE DESCRIPTIONS | | |
|---|---|---|
| ALTERNATIVE I | ALTERNATIVE II | ALTERNATIVE III |
| **Supplemental Management Information** | **Supplemental Management Information** | **Supplemental Management Information** |
| **1. Overall Treaty-Indian TAC: 50,000 Chinook and 62,000 coho.**<br>2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.<br>3. In 2024, the season will open May 1, consistent with all preseason regulations in place for Treaty Indian Troll fisheries during May 16-June 30, 2023. All catch in May 2024 applies against the 2024 Treaty Indian Troll fisheries quota. This opening could be modified following Council review at its March and/or April 2024 meetings. | **1. Overall Treaty-Indian TAC: 40,000 Chinook and 52,000 coho.**<br>2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.<br>3.Same as Alternative 1 | **1. Overall Treaty-Indian TAC: 30,000 Chinook and 42,000 coho.**<br>2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.<br>3. Same as Alternative 1 |
| • May 1 through the earlier of June 30 or **25,000 Chinook quota**.<br>All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C).<br>• **July 1 through the earlier of September 15, or 25,000 Chinook quota, or 62,000 coho quota.**<br>All Salmon. See size limit (B) and other restrictions (C). | • May 1 through the earlier of June 30 or **20,000 Chinook quota**.<br>All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C).<br>• **July 1 through the earlier of September 15, or 20,000 Chinook quota or 52,000 coho quota**<br>All salmon. See size limit (B) and other restrictions (C). | • May 1 through the earlier of June 30 or **15,000 Chinook quota**.<br>All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C).<br>• **July 1 through the earlier of September 15, or 15,000 Chinook quota or 42,000 coho quota**<br>All salmon. See size limit (B) and other restrictions (C). |

**B. MINIMUM LENGTH (TOTAL INCHES)**

| | Chinook | | Coho | | |
|---|---|---|---|---|---|
| Area (when open) | Total Length | Head-off | Total Length | Head-off | Pink |
| North of Cape Falcon | 24.0 (61.0 cm) | 18.0 (45.7 cm) | 16.0 (40.6 cm) | 12.0 (30.5 cm) | None |

TABLE 3. 2023 Treaty Indian troll management Alternatives for ocean salmon fisheries – Council adopted. (Page 2 of 2)

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Tribe and Area Boundaries. All boundaries may be changed to include such other areas as may hereafter be authorized by a Federal court for that tribe's treaty fishery.

S'KLALLAM - Washington State Statistical Area 4B (defined to include those waters of Puget Sound easterly of a line projected from the Bonilla Point light on Vancouver Island to the Tatoosh Island light, thence to the most westerly point on Cape Flattery and westerly of a line projected true north from the fishing boundary marker at the mouth of the Sekiu River [WAC 220-301-030]).

MAKAH - Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.

QUILEUTE - A polygon commencing at Cape Alava, located at latitude 48°10'00" north, longitude 124°43'56.9" west; then proceeding west approximately forty nautical miles at that latitude to a northwestern point located at latitude 48°10'00" north, longitude 125°44'00" west; then proceeding in a southeasterly direction mirroring the coastline at a distance no farther than forty nautical miles from the mainland Pacific coast shoreline at any line of latitude, to a southwestern point at latitude 47°31'42" north, longitude 125°20'26" west; then proceeding east along that line of latitude to the Pacific coast shoreline at latitude 47°31'42" north, longitude 124°21'9.0" west.

HOH - That portion of the FMA between 47°54'18" N. lat. (Quillayute River) and 47°21'00" N. lat. (Quinault River) and east of 125°44'00" W. long.

QUINAULT - A polygon commencing at the Pacific coast shoreline near Destruction Island, located at latitude 47°40'06" north, longitude 124°23'51.362" west; then proceeding west approximately thirty nautical miles at that latitude to a northwestern point located at latitude 47°40'06" north, longitude 125°08'30" west; then proceeding in a southeasterly direction mirroring the coastline no farther than thirty nautical miles from the mainland Pacific coast shoreline at any line of latitude, to a southwestern point at latitude 46°53'18" north, longitude 124°53'53" west; then proceeding east along that line of latitude to the pacific coast shoreline at latitude 46°53'18" north, longitude 124°7'36.6" west.

C.2. Gear restrictions

a. Single point, single shank, barbless hooks are required in all fisheries.
b. No more than eight fixed lines per boat.
c. No more than four hand-held lines per person in the Makah area fishery (Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.)

C.3. Quotas

a. The quotas include troll catches by the S'Klallam and Makah Tribes in Washington State Statistical Area 4B from May 1 through September 15.
b. The **Quileute Tribe may continue a ceremonial and subsistence fishery** during the time frame of October 1 through October 15 in the same manner as in 2004-2015. Fish taken during this fishery are to be counted against treaty troll quotas established for the 2024 season (estimated harvest during the October ceremonial and subsistence fishery: 20 Chinook; 40 coho).

C.4. Area Closures

a. The area within a six nautical mile radius of the mouths of the Queets River (47°31'42" N. lat.) and the Hoh River (47°45'12" N. lat.) will be closed to commercial fishing.
b. A closure within two nautical miles of the mouth of the Quinault River (47°21'00" N. lat.) may be enacted by the Quinault Nation and/or the State of Washington and will not adversely affect the Secretary of Commerce's management regime.

C.5. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June treaty-Indian ocean troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline on a fishery impact equivalent basis.

TABLE 4. 2023 Chinook and coho harvest quotas and guidelines (*) for ocean salmon fishery management Alternatives - Council adopted.

| Fishery or Quota Designation | Chinook for Alternative I | Chinook for Alternative II | Chinook for Alternative III | Coho for Alternative I | Coho for Alternative II | Coho for Alternative III |
|---|---|---|---|---|---|---|
| **NORTH OF CAPE FALCON** | | | | | | |
| TREATY INDIAN OCEAN TROLL[a/] | | | | | | |
| U.S./Canada Border to Cape Falcon (All Except Coho) | 25,000 | 20,000 | 15,000 | - | - | - |
| U.S./Canada Border to Cape Falcon (All Species) | 25,000 | 20,000 | 15,000 | 62,000 | 52,000 | 42,000 |
| Subtotal Treaty Indian Ocean Troll | 50,000 | 40,000 | 30,000 | 62,000 | 52,000 | 42,000 |
| NON-INDIAN COMMERCIAL TROLL[b/] | | | | | | |
| U.S./Canada Border to Cape Falcon (All Except Coho) | 28,300 | 25,000 | 16,250 | - | - | - |
| U.S./Canada Border to Cape Falcon (All Species) | 14,200 | 12,500 | 16,250 | 32,000 | 29,600 | 27,200 |
| Subtotal Non-Indian Commercial Troll | 42,500 | 37,500 | 32,500 | 32,000 | 29,600 | 27,200 |
| RECREATIONAL | | | | | | |
| U.S./Canada Border to Cape Alava[b/] | 9,490 * | 8,370 * | 7,260 * | 17,470 | 16,160 | 14,850 |
| Cape Alava to Queets River[b/] | 1,740 * | 1,530 * | 1,330 * | 4,370 | 4,040 | 3,710 |
| Queets River to Leadbetter Pt.[b/] | 18,750 * | 16,550 * | 14,330 * | 62,160 | 57,500 | 52,840 |
| Leadbetter Pt. to Cape Falcon[b/c/] | 12,520 * | 11,050 * | 9,580 * | 84,000 | 77,700 | 71,400 |
| Subtotal Recreational | 42,500 | 37,500 | 32,500 | 168,000 | 155,400 | 142,800 |
| TOTAL NORTH OF CAPE FALCON | 135,000 | 115,000 | 95,000 | 262,000 | 237,000 | 212,000 |
| **SOUTH OF CAPE FALCON** | | | | | | |
| COMMERCIAL TROLL[a/] | | | | | | |
| Cape Falcon to Humbug Mt. | - | - | - | 10,000 | | - |
| Humbug Mt. to OR/CA Border | | | | - | - | - |
| OR/CA Border to Humboldt South Jetty | - | - | - | - | - | - |
| Subtotal Commercial Troll | - | - | - | 10,000 | - | - |
| RECREATIONAL | | | | | | |
| Cape Falcon to OR/CA Border | - | - | - | 135,000 [d/] | 120,000 [e/] | 105,000 [f/] |
| TOTAL SOUTH OF CAPE FALCON | - | - | - | 145,000 | 120,000 | 105,000 |

a/ Quotas are non-mark selective for both Chinook and coho.

b/ Quotas are non-mark-selective for Chinook and mark-selective for coho.

c/ Does not include Buoy 10 fishery. Expected catch in August and September: Alternative I - 40,000 marked coho; Alternative II - 50,000 marked coho; Alternative III - 60,000 marked coho.

d/ The quota consists of both mark-selective and non-mark-selective coho quotas: 110,000 and 25,000 respectively.

e/ The quota consists of both mark-selective and non-mark-selective coho quotas: 100,000 and 20,000 respectively.

f/ The quota consists of both mark-selective and non-mark-selective coho quotas: 90,000 and 15,000 respectively. Area includes Cape Falcon to Humbug Mt.

TABLE 5. 2023 Projected key stock escapements (thousands of fish) or management criteria for ocean fishery Alternatives - Council adopted [a/] (Page 1 of 3)

| Key Stock/Criteria | PROJECTED Alt I | Alt II | Alt III | 2023 Criteria | Spawner Objective or Other Comparative Standard as Noted [b/] |
|---|---|---|---|---|---|
| **CHINOOK** | | | | | **CHINOOK** |
| Columbia Upriver Brights | 271.1 | 273.4 | 275.1 | 74.0 | Minimum ocean escapement to attain 40.0 adults over McNary Dam, with normal distribution and no mainstem harvest. The management goal has been increased to 60.0 by Columbia River managers. |
| Mid-Columbia Brights | 52.4 | 52.8 | 53.1 | 14.9 | Minimum ocean escapement to attain 7.9 for Little White Salmon egg-take, assuming average conversion and no mainstem harvest. |
| Columbia Lower River Hatchery Tules | 76.4 | 77.5 | 78.6 | 25.0 | Minimum ocean escapement to attain 14.8 adults for hatchery egg-take, with average conversion and no lower river mainstem or tributary harvest. |
| Columbia Lower River Natural Tules[c/] (threatened) | **39.1%** | 37.7% | 36.4% | ≤ 38.0% | Total adult equivalent fishery exploitation rate (2023 NMFS ESA guidance). |
| Columbia Lower River Wild[e/] (threatened) | 8.6 | 8.6 | 8.7 | 6.9 | Minimum ocean escapement to attain MSY spawner goal of 5.7 for N. Lewis River fall Chinook (NMFS ESA consultation standard). |
| Spring Creek Hatchery Tules | 134.5 | 137.2 | 140.1 | 8.2 | Minimum ocean escapement to attain 6.0 adults for Spring Creek Hatchery egg-take, assuming average conversion and no mainstem harvest. |
| Upper Columbia River Summer | 84.3 | 85.0 | 85.8 | 29.0 | Aggregate escapement to mouth of Columbia River. |
| Snake River Fall (threatened) SRFI | 51.3% | 46.2% | 41.7% | ≤ 70.0% | Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard). |
| Klamath River Fall | 23.614 | 23.614 | 26.133 | ≥ 23.614 | 2023 minimum natural area adult escapement (FMP control rule). |
| Federally recognized tribal harvest | 50.0% | 50.0% | 50.0% | 50.0% | Equals 1.872, 1.872, and 68 adult fish for Yurok and Hoopa Valley tribal fisheries. |
| Exploitation (spawner reduction) rate | 10.0% | 10.0% | 0.4% | ≤ 10.0% | FMP control rule. |
| Adult river mouth return | 39.9 | 39.9 | 39.9 | NA | Total adults in thousands. |
| Age-4 ocean harvest rate | 0.3% | 0.3% | 0.3% | ≤ 10.0% | NMFS guidance. |
| KMZ sport fishery share | 37.7% | 37.7% | 37.7% | | |
| River recreational fishery share | 96.3% | 96.3% | 0.0% | NA | Equals 1.804, 1.804, and 0 adult fish for recreational inriver fisheries. |
| Sacramento River Winter (endangered) | 0.0% | 0.0% | 0.0% | ≤ 20.0% | Age-3 ocean impact rate in fisheries south of Pt. Arena. In addition, the following season restrictions apply: Recreational- Pt. Arena to Pigeon Pt. between the first Saturday in April and the second Sunday in November; Pigeon Pt. to the U.S./Mexico border between the first Saturday in April and the first Sunday in October. Minimum size limit ≥ 20 inches total length. Commercial- Pt. Arena to the U.S./Mexico border between May 1 and September 30, except Pt. Reyes to Pt. San Pedro between October 1 and 15 (Monday-Friday). Minimum size limit ≥ 26 inches total length (NMFS 2023 ESA Guidance). |
| Sacramento River Fall | 165.0 | 165.0 | 165.1 | ≥ 122.000 | 2023 minimum hatchery and natural area adult escapement (FMP). |
| Sacramento Index Exploitation Rate | 2.8% | 2.8% | 2.8% | ≤ 28.1% | FMP control rule. |
| Ocean commercial impacts | 3.0 | 3.0 | 3.0 | | Includes fall (Sept-Dec) 2022 impacts (3.0 thousand SRFC). |
| Ocean recreational impacts | 1.8 | 1.8 | 1.8 | | Includes fall (Sept-Dec) 2022 impacts (1.7 thousand SRFC). |
| River recreational impacts | 0.0 | 0.0 | 0.0 | | |
| SRKW Prey Abundance[g/] | | | | | |
| North of Falcon | 888.3 | 888.3 | 888.3 | ≥ 623.0 | Oct 1 starting abundance of age 3+ Chinook from U.S./Canada Border to Cape Falcon |
| Oregon Coast | 450.3 | 450.3 | 450.3 | NA | Oct 1 starting abundance of age 3+ Chinook from Cape Falcon to Horse Mt. |
| California Coast | 248.6 | 248.6 | 248.6 | NA | Oct 1 starting abundance of age 3+ Chinook south of Horse Mt. |
| Southwest WCVI | 663.8 | 663.8 | 663.8 | NA | Oct 1 starting abundance of age 3+ Chinook off Southwest Vancouver Island |
| Salish Sea | 1,054.7 | 1,054.7 | 1,054.7 | NA | Oct 1 starting abundance of age 3+ Chinook in the Salish Sea |

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2023 ocean fishery Alternatives - Council Adopted[a/] (Page 2 of 3).

| Key Stock/Criteria | PROJECTED Alt I | Alt II | Alt III | 2023 Criteria | Spawner Objective or Other Comparative Standard as Noted [b/] |
|---|---|---|---|---|---|
| **COHO** | **COHO** | | | | **COHO** |
| Interior Fraser (Thompson River) | **10.3%(5.7%)** | 9.5%(4.9%) | 8.6%(4.0%) | ≤ 10.0% | 2023 Southern U.S. exploitation rate ceiling; PSC coho agreement. |
| Skagit | **48.0%(5.2%)** | **47.4%(4.4%)** | **46.9%(3.6%)** | ≤ 35.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Stillaguamish | 24.2%(3.6%) | 23.7%(3.0%) | 23.2%(2.4%) | ≤ 50.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Snohomish | 21.0%(3.6%) | 20.5%(3.0%) | 19.9%(2.4%) | ≤ 40.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Hood Canal | 40.4%(5.6%) | 39.7%(4.8%) | 39.1%(4.0%) | ≤ 45.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Strait of Juan de Fuca | 10.9%(4.7%) | 10.1%(3.9%) | 9.4%(3.2%) | ≤ 40.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Quillayute Fall | 12.6 | 12.7 | 12.8 | 6.3 | FMP MSY adult spawner estimate. Value depicted is ocean escapement. |
| | 37.2% | 36.6% | 36.2% | ≤ 53% | PST total exploitation rate constraint for 2023.[d/f/] |
| Hoh | 5.5 | 5.6 | 5.7 | 2.0 | FMP MSY adult spawner estimate. Value depicted is ocean escapement. |
| | 53.6% | 52.5% | 51.6% | ≤ 65% | PST total exploitation rate constraint for 2023.[d/f/] |
| Queets Wild | 10.3 | 10.5 | 10.7 | 5.8 | FMP MSY natural area adult spawner estimate. Value depicted is ocean escapement. |
| | 36.8% | 35.4% | 34.2% | ≤ 53% | PST total exploitation rate constraint for 2023.[d/f/] |
| Grays Harbor | 102.8 | 104.0 | 104.9 | 35.4 | FMP MSP natural area adult spawner estimate. Value depicted is ocean escapement. |
| | 49.9% | 49.3% | 48.8% | ≤ 65% | FMP total exploitation rate constraint (MFMT).[d/f/] |
| Willapa Bay | 49.6 | 50.6 | 51.5 | 17.2 | FMP MSY natural area adult spawner estimate. Value depicted is ocean escapement. |
| Lower Columbia River Natural (threatened) | 14.9% | 12.5% | 10.9% | ≤23.0% | Total marine and mainstem Columbia R. fishery exploitation rate (2023 NMFS ESA guidance). Value depicted is marine ER before Buoy 10. |
| Upper Columbia[c/] | 61% | 63% | 65% | ≥ 50% | Minimum percentage of the run to Bonneville Dam. |
| Columbia River Hatchery Early | 314.7 | 322.3 | 326.0 | 77.2 | Minimum ocean escapement to attain hatchery egg-take goal of 21.7 early adult coho, with average conversion and no mainstem or tributary fisheries. |
| Columbia River Hatchery Late | 224.0 | 236.2 | 247.2 | 9.7 | Minimum ocean escapement to attain hatchery egg-take goal of 6.4 late adult coho, with average conversion and no mainstem or tributary fisheries. |
| Oregon Coastal Natural | 20.0% | 18.1% | 17.4% | ≤ 20.0% | Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard). |
| Southern Oregon/Northern California Coast (threatened) | | | | | |
| Trinity Natural | 1.7% | 1.3% | 1.2% | ≤ 16.0% | Total exploitation rate ceiling. Value depicted is ocean exploitation rate only. |
| Klamath Natural | 1.7% | 1.3% | 1.2% | ≤ 15.0% | Total exploitation rate ceiling. Value depicted is ocean exploitation rate only. |
| Rogue Natural | 1.7% | 1.3% | 1.2% | ≤ 15.0% | Total exploitation rate ceiling. Value depicted is ocean exploitation rate only. |
| Other Natural | 1.7% | 1.3% | 1.2% | ≤ 15.0% | Total exploitation rate ceiling. Value depicted is ocean exploitation rate only. |

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2023 ocean fishery Alternatives - Council Adopted[a/] (Page 3 of 3).

a/ Coho projections in the table are based on 2022 pre-season stock and fishery inputs for Canadian fisheries. Model results for Chinook in this table used 2022 preseason effort scalars for SEAK, NBC, WCVI AABM fisheries, recent 2-yr average catches for BC ISBM fisheries, and 2022 preseason catches for Puget Sound fisheries. Assumptions for these fisheries will be changed prior to the April meeti new information becomes available.

b/ Ocean escapement is the number of salmon escaping ocean fisheries and entering freshwater with the following clarifications. Ocean escapement for Puget Sound stocks is the estimated number of salmon entering Area 4B that are available to U.S. net fisheries in Puget Sound and spawner escapement after impacts from the Canadian, U.S. ocean, and Puget Sound troll and recreational fisheries ha been deducted. Numbers in parentheses represent Council area ERs for Puget Sound coho stocks. For Columbia River early and late coho stocks, ocean escapement represents the number of coho afte Buoy 10 fishery. Values reported for Klamath River fall Chinook are natural area adult spawners. Values reported for Sacramento River fall Chinook are hatchery and natural area adult spawners.

c/ Includes projected impacts of inriver fisheries that have not yet been shaped.

d/ Annual management objectives may be different than FMP goals, and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders. It is anticipated that fishery management will be adjusted by state and tribal comanagers during the preseason planning process to comply with stock management objectives.

e/ Includes minor contributions from East Fork Lewis River and Sandy River.

f/ Management criteria depicted represent the lower of the FMP and PST Southern Coho Management Plan ER constraints in a given year (see Table III-5 in most recent Preseason Report I). PST ER constraints represent an approximation of the maximum ER associated with achieving the escapement goal. Per the provisions of the PST Southern Coho Management Plan, Parties may request increas management unit specific ER caps, so long as it occurs prior to March 31 in a given year.

g/ The modeled preseason, pre-fishing estimates of abundance for areas other than North of Falcon (NOF) are derived using the Council adopted methodology from the Ad Hoc SRKW Workgroup ar provided for information purposes only. These non-NOF area abundances are not considered in the development of annual Council fishery management measures. Therefore, the “criteria” for these area designated as “N/A”. The Southwest WCVI and Salish Sea areas are outside Council managed waters although impacts to FMP salmon stocks are taken into account when assessing fishing-related mor

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2023 ocean salmon fishery management Alternatives - Council adopted. (Page 1 of 2)

| Area and Fishery | 2023 Catch Projection | | | 2023 Bycatch Mortality[a/] Projection | | | 2023 Bycatch Projection[b/] | | | Observed in 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | II | III | I | II | III | I | II | III | Catch | Bycatch Mortality |
| OCEAN FISHERIES: | **CHINOOK (thousands of fish)** | | | | | | | | | | |
| NORTH OF CAPE FALCON | | | | | | | | | | | |
| Treaty Indian Ocean Troll | 50.0 | 40.0 | 30.0 | 5.1 | 4.1 | 3.1 | 12.8 | 10.2 | 7.7 | 34.7 | 3.5 |
| Non-Indian Commercial Troll | 42.5 | 37.5 | 32.5 | 17.2 | 15.2 | 12.3 | 61.3 | 54.1 | 43.6 | 26.0 | 11.1 |
| Recreational | 42.5 | 37.5 | 32.5 | 5.1 | 4.6 | 4.0 | 23.4 | 20.9 | 18.0 | 24.8 | 3.4 |
| CAPE FALCON TO HUMBUG MT.[c/] | | | | | | | | | | | |
| Commercial Troll | 1.3 | 0.9 | 0.0 | 0.3 | 0.2 | 0.0 | 0.7 | 0.5 | 0.0 | 29.7 | 6.9 |
| Recreational | 0.9 | 0.9 | 0.0 | 0.1 | 0.2 | 0.0 | 0.4 | 0.6 | 0.3 | 4.6 | 0.5 |
| HUMBUG MT. TO OR/CA BORDER | | | | | | | | | | | |
| Commercial Troll | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.2 |
| Recreational | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.4 | 0.0 [d/] |
| OR/CA BORDER TO to LAT 40°10' N. | | | | | | | | | | | |
| Commercial Troll | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - |
| Recreational | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.4 | 0.5 [d/] |
| LAT 40°10' N. TO PT. ARENA | | | | | | | | | | | |
| Commercial Troll | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.7 | 6.3 [d/] |
| Recreational | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 0.3 [d/] |
| PT. ARENA TO PIGEON PT. | | | | | | | | | | | |
| Commercial Troll | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 97.6 | 24.4 [d/] |
| Recreational | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 66.1 | 7.6 [d/] |
| SOUTH OF PIGEON PT. | | | | | | | | | | | |
| Commercial Troll | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 92.0 | 11.2 [d/] |
| Recreational | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15.9 | 1.4 [d/] |
| TOTAL OCEAN FISHERIES | | | | | | | | | | | |
| Commercial Troll | 93.8 | 78.4 | 62.5 | 22.6 | 19.5 | 15.4 | 74.8 | 64.9 | 51.3 | 302.3 | 63.7 |
| Recreational | 43.4 | 38.4 | 32.5 | 5.3 | 4.7 | 4.0 | 23.9 | 21.6 | 18.3 | 118.8 | 13.8 |
| INSIDE FISHERIES: | | | | | | | | | | | |
| Area 4B | - | - | - | - | - | - | - | - | - | - | - |
| Buoy 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 28.4 | 5.6 [d/] |

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2023 ocean salmon fishery management Alternatives - Council adopted. (Page 2 of 2).

| Area and Fishery | 2023 Catch Projection | | | 2023 Bycatch Mortality[a/] Projection | | | 2023 Bycatch Projection[b/] | | | Observed in 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | II | III | I | II | III | I | II | III | Catch | Bycatch Mortality |
| OCEAN FISHERIES: | | | | | **COHO (thousands of fish)** | | | | | | |
| NORTH OF CAPE FALCON | | | | | | | | | | | |
| Treaty Indian Ocean Troll[e/] | 62.0 | 52.0 | 42.0 | 4.1 | 3.4 | 2.6 | 6.9 | 5.6 | 4.2 | 36.2 | 2.3 |
| Non-Indian Commercial Troll | 32.0 | 29.6 | 27.2 | 14.1 | 12.7 | 10.6 | 45.8 | 41.3 | 33.8 | 12.9 | 4.2 |
| Recreational | 168.0 | 155.4 | 142.8 | 29.3 | 26.8 | 24.4 | 123.9 | 113.2 | 102.4 | 81.4 | 15.9 |
| SOUTH OF CAPE FALCON | | | | | | | | | | | |
| Commercial Troll | 10.0 | 0.0 | - | 0.5 | 0.0 | - | 0.6 | 0.1 | - | 2.2 | 2.9 |
| Recreational[e/] | 135.0 | 120.0 | 105.0 | 29.5 | 26.5 | 23.4 | 132.9 | 119.4 | 105.5 | 58.3 | 14.3 |
| TOTAL OCEAN FISHERIES | | | | | | | | | | | |
| Commercial Troll | 104.0 | 81.6 | 69.2 | 18.7 | 16.1 | 13.2 | 53.2 | 47.0 | 38.0 | 51.2 | 9.4 |
| Recreational | 303.0 | 275.4 | 247.8 | 58.8 | 53.3 | 47.8 | 256.8 | 232.6 | 207.9 | 139.6 | 30.2 |
| INSIDE FISHERIES: | | | | | | | | | | | |
| Area 4B | - | - | - | - | - | - | - | - | - | - | - |
| Buoy 10 | 40.0 | 50.0 | 60.0 | 8.6 | 10.6 | 12.5 | 38.3 | 47.0 | 55.4 | 8.8 | 1.4 [d/] |

a/ The bycatch mortality reported in this table consists of drop-off mortality (includes predation on hooked fish) plus hook-and-release mortality of Chinook and coho salmon in Council-area fisheries. Drop-off mortality for both Chinook and coho is assumed to be equal to 5% of total encounters. The hook-and-release mortality (HRM) rates used for both Chinook and coho are:

Commercial: 26%.

Recreational, north of Pt. Arena: 14%.

Recreational, south of Pt. Arena: 16% (based on the expected proportion of fish that will be caught using mooching versus trolling gear, and the HRMs of 42.2% and 14% for these two respective gear types).

b/ Bycatch calculated as dropoff mortality plus fish released.

c/ Includes Oregon territorial water, late season Chinook fisheries.

d/ Based on reported released Chinook or coho. Reported releases in California fisheries are used as a surrogate in Oregon fisheries.

e/ Includes fisheries that allow retention of all legal sized coho.

TABLE 7. Expected coastwide exploitation rates by fishery for 2023 ocean fisheries management Alternatives for lower Columbia Natural (LCN), Oregon coastal natural (OCN), Lower Columbia River (LCR) tule Chinook, and Southern Oregon Northern California Coastal (SONCC) coho salmon by natural-origin subcomponent - Council Adopted (Page 1 of 2)

| | Exploitation Rate (Percent) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LCN Coho | | | OCN Coho | | | LCR Tule Chinook | | |
| Fishery | I | II | III | I | II | III | I | II | III |
| SOUTHEAST ALASKA | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 2.9% | 3.0% | 3.0% |
| BRITISH COLUMBIA | 0.1% | 0.1% | 0.1% | 0.3% | 0.3% | 0.3% | 13.0% | 13.1% | 13.4% |
| PUGET SOUND/STRAIT | 0.2% | 0.2% | 0.2% | 0.0% | 0.0% | 0.0% | 0.3% | 0.3% | 0.3% |
| NORTH OF CAPE FALCON | | | | | | | | | |
| Treaty Indian Ocean Troll | 2.3% | 1.9% | 1.5% | 0.5% | 0.4% | 0.3% | 2.5% | 2.0% | 1.5% |
| Recreational | 4.9% | 4.5% | 4.1% | 0.9% | 0.8% | 0.8% | 4.4% | 3.9% | 3.4% |
| Non-Indian Troll | 1.6% | 1.5% | 1.3% | 0.3% | 0.3% | 0.3% | 5.9% | 5.2% | 4.5% |
| SOUTH OF CAPE FALCON | | | | | | | | | |
| Recreational: | | | | | | | 0.2% | 0.2% | 0.1% |
| Cape Falcon to Humbug Mt. | 4.9% | 4.3% | 3.7% | 10.4% | 8.7% | 7.0% | - | - | - |
| Humbug Mt. to OR/CA border (KMZ) | 0.1% | 0.1% | 0.1% | 0.4% | 0.3% | 0.3% | - | - | - |
| OR/CA border to Latitude 40°10' N. (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - |
| Fort Bragg | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - |
| South of Pt. Arena | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - |
| Troll: | | | | | | | 0.2% | 0.0% | 0.0% |
| Cape Falcon to Humbug Mt. | 0.8% | 0.0% | 0.0% | 1.4% | 0.0% | 0.0% | - | - | - |
| Humbug Mt. to OR/CA border (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - |
| OR/CA border to Horse Mt. (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - |
| Fort Bragg | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - |
| South of Pt. Arena | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - |
| BUOY 10 | 2.0% | 2.5% | 2.9% | 0.1% | 0.1% | 0.2% | 9.7% | 9.9% | 10.1% |
| ESTUARY/FRESHWATER | NA | NA | NA | 5.6% | 7.1% | 8.3% | | | |
| TOTAL[a/] | 14.9% | 12.5% | 10.9% | 20.0% | 18.1% | 17.4% | **39.1%** | 37.7% | 36.4% |

TABLE 7. Expected coastwide exploitation rates by fishery for 2023 ocean fisheries management Alternatives for lower Columbia Natural (LCN), Oregon coastal natural (OCN), Lower Columbia River (LCR) tule Chinook, and Southern Oregon Northern California Coastal (SONCC) coho salmon by natural-origin subcomponent - Council Adopted (Page 2 of 2).

| | Exploitation Rate (Percent) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trinity Natural | | | Klamath Natural | | | Rogue Natural | | | Other SONCC | | |
| Fishery | I | II | III | I | II | III | I | II | III | I | II | III |
| SOUTHEAST ALASKA | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| BRITISH COLUMBIA | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% |
| PUGET SOUND/STRAIT | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| NORTH OF CAPE FALCON | | | | | | | | | | | | |
| Treaty Indian Ocean Troll | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Recreational | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Non-Indian Troll | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| SOUTH OF CAPE FALCON | | | | | | | | | | | | |
| Recreational: | | | | | | | | | | | | |
| Cape Falcon to Humbug Mt. | 0.7% | 0.6% | 0.5% | 0.7% | 0.6% | 0.5% | 0.7% | 0.6% | 0.5% | 0.7% | 0.6% | 0.5% |
| Humbug Mt. to OR/CA border (KMZ) | 0.7% | 0.6% | 0.6% | 0.7% | 0.6% | 0.6% | 0.7% | 0.6% | 0.6% | 0.7% | 0.6% | 0.6% |
| OR/CA border to Latitude 40°10' N. (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Fort Bragg | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| South of Pt. Arena | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Troll: | | | | | | | | | | | | |
| Cape Falcon to Humbug Mt. | 0.2% | 0.0% | 0.0% | 0.2% | 0.0% | 0.0% | 0.2% | 0.0% | 0.0% | 0.2% | 0.0% | 0.0% |
| Humbug Mt. to OR/CA border (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| OR/CA border to Horse Mt. (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Fort Bragg | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| South of Pt. Arena | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| BUOY 10 | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| ESTUARY/FRESHWATER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| TOTAL | 1.7% | 1.3% | 1.2% | 1.7% | 1.3% | 1.2% | 1.7% | 1.3% | 1.2% | 1.7% | 1.3% | 1.2% |

a/ Totals do not include Buoy 10 and estuary/freshwater for LCN or SONCC. For OCN and LCR Tule Chinook, includes projected impacts of inriver fisheries that have not yet been shaped. Bolded values identify ocean exploitation rates that, when combined with freshwater harvest rates, would exceed the total allowable exploitation rate.

TABLE 8. Projected coho mark rates for 2023 fisheries under base period fishing patterns (percent marked).

| Area | Fishery | June | July | August | Sept |
|---|---|---|---|---|---|
| Canada | | | | | |
| Johnstone Strait | Recreational | -- | 26% | 23% | -- |
| West Coast Vancouver Island | Recreational | 45% | 35% | 30% | 29% |
| North Georgia Strait | Recreational | 38% | 39% | 38% | 33% |
| South Georgia Strait | Recreational | 40% | 45% | 42% | 41% |
| Juan de Fuca Strait | Recreational | 44% | 43% | 45% | 40% |
| Johnstone Strait | Troll | 46% | 35% | 28% | 31% |
| NW Vancouver Island | Troll | 43% | 38% | 40% | 40% |
| SW Vancouver Island | Troll | 54% | 46% | 48% | 48% |
| Georgia Strait | Troll | 47% | 43% | 44% | 38% |
| Puget Sound | | | | | |
| Strait of Juan de Fuca (Area 5) | Recreational | 61% | 48% | 48% | 46% |
| Strait of Juan de Fuca (Area 6) | Recreational | 53% | 46% | 48% | 43% |
| San Juan Island (Area 7) | Recreational | 47% | 52% | 43% | 31% |
| North Puget Sound (Areas 6 & 7A) | Net | -- | 51% | 49% | 32% |
| Council Area | | | | | |
| Neah Bay (Area 4/4B) | Recreational | 45% | 57% | 51% | 60% |
| LaPush (Area 3) | Recreational | 58% | 60% | 67% | 49% |
| Westport (Area 2) | Recreational | 74% | 71% | 68% | 63% |
| Columbia River (Area 1) | Recreational | 77% | 79% | 70% | 73% |
| Tillamook | Recreational | 68% | 62% | 55% | 46% |
| Newport | Recreational | 61% | 55% | 53% | 40% |
| Coos Bay | Recreational | 50% | 45% | 35% | 22% |
| Brookings | Recreational | 44% | 30% | 26% | 6% |
| Neah Bay (Area 4/4B) | Troll | 54% | 52% | 54% | 58% |
| LaPush (Area 3) | Troll | 53% | 55% | 53% | 53% |
| Westport (Area 2) | Troll | 59% | 64% | 66% | 64% |
| Columbia River (Area 1) | Troll | 75% | 75% | 71% | 57% |
| Tillamook | Troll | 63% | 61% | 59% | 57% |
| Newport | Troll | 59% | 56% | 51% | 50% |
| Coos Bay | Troll | 49% | 45% | 40% | 25% |
| Brookings | Troll | 37% | 36% | 41% | 60% |
| Columbia River | | | | | |
| Buoy 10 | Recreational | -- | -- | -- | 65% |

TABLE 9. Preliminary projected exvessel value under Council-adopted 2023 non-Indian commercial troll regulatory Alternatives compared to 2022 and the 2018-2022 average (in inflation-adjusted dollars).

| | | Exvessel Value (thousands of dollars)[a/] | | | | |
|---|---|---|---|---|---|---|
| Management Area | Alternative | 2023 Projected[b/] | 2022 Actual | Percent Change from 2022 | 2018-2022 Average | Percent Change From 2018-2022 Average |
| North of Cape Falcon | I | 3,469 | 1,975 | +76% | 2,048 | +69% |
| | II | 3,082 | | +56% | | +50% |
| | III | 2,695 | | +36% | | +32% |
| Cape Falcon to Humbug Mt. | I | 290 | 2,830 | -90% | 2,178 | -87% |
| | II | 87 | | -97% | | -96% |
| | III | 0 | | -100% | | -100% |
| Humbug Mt. to OR/CA Border | I | 0 | 86 | -100% | 187 | -100% |
| | II | 0 | | -100% | | -100% |
| | III | 0 | | -100% | | -100% |
| OR/CA Border to 40º10' N. Lat. | I | 0 | 0 | - | 235 | -100% |
| | II | 0 | | - | | -100% |
| | III | 0 | | - | | -100% |
| 40º10' N. Lat. to Pt. Arena | I | 0 | 1,466 | -100% | 1,378 | -100% |
| | II | 0 | | -100% | | -100% |
| | III | 0 | | -100% | | -100% |
| Pt. Arena to Pigeon Pt. | I | 0 | 7,748 | -100% | 9,435 | -100% |
| | II | 0 | | -100% | | -100% |
| | III | 0 | | -100% | | -100% |
| South of Pigeon Pt. | I | 0 | 8,076 | -100% | 5,468 | -100% |
| | II | 0 | | -100% | | -100% |
| | III | 0 | | -100% | | -100% |
| Total South of Cape Falcon | I | 290 | 20,207 | -99% | 18,883 | -98% |
| | II | 87 | | -100% | | -100% |
| | III | 0 | | -100% | | -100% |
| West Coast Total | I | 3,758 | 22,181 | -83% | 20,932 | -82% |
| | II | 3,169 | | -86% | | -85% |
| | III | 2,695 | | -88% | | -87% |

a/ Values are inflation-adjusted to 2022 dollars. Exvessel values are not comparable to the income impacts shown in Table 10.

b/ Projections are based on expected catches in the Council management area and estimated 2022 average weights and exvessel prices.

TABLE 10. Preliminary projected angler trips and coastal community income impacts generated under Council-adopted 2023 recreational ocean salmon fishery regulatory Alternatives compared to 2022 and the 2018-2022 average (in inflation-adjusted dollars).

| | | Angler Trips (thousands) | | | Community Income Impacts (thousands of dollars)[a/] | | | Percent Change in Income Impacts | |
|---|---|---|---|---|---|---|---|---|---|
| Management Area | Alternative | Estimates Based on the Options | 2022 Actual | 2018-2022 Avg. | Estimates Based on the Options | 2022 Actual | 2018-2022 Avg. | Compared to 2022 | Compared to 2018-2022 Avg. |
| North of Cape Falcon[b/] | I | 96.4 | 86.5 | 63.1 | 13,581 | 12,184 | 9,339 | +11% | +45% |
| | II | 87.0 | | | 12,258 | | | +1% | +31% |
| | III | 77.6 | | | 10,934 | | | -10% | +17% |
| Cape Falcon to Humbug Mt. | I | 57.7 | 76.3 | 65.6 | 4,306 | 5,699 | 5,088 | -24% | -15% |
| | II | 52.8 | | | 3,945 | | | -31% | -22% |
| | III | 47.5 | | | 3,549 | | | -38% | -30% |
| Humbug Mt. to OR/CA Border | I | 0.0 | 3.2 | 5.3 | 0 | 181 | 293 | -100% | -100% |
| | II | 0.0 | | | 0 | | | -100% | -100% |
| | III | 0.0 | | | 0 | | | -100% | -100% |
| OR/CA Border to 40º10' N. Lat. | I | 0.0 | 5.3 | 5.5 | 0 | 636 | 688 | -100% | -100% |
| | II | 0.0 | | | 0 | | | -100% | -100% |
| | III | 0.0 | | | 0 | | | -100% | -100% |
| 40º10' N. Lat. to Pt. Arena | I | 0.0 | 6.8 | 7.6 | 0 | 1,110 | 1,280 | -100% | -100% |
| | II | 0.0 | | | 0 | | | -100% | -100% |
| | III | 0.0 | | | 0 | | | -100% | -100% |
| Pt. Arena to Pigeon Pt. | I | 0.0 | 62.1 | 55.4 | 0 | 14,900 | 13,911 | -100% | -100% |
| | II | 0.0 | | | 0 | | | -100% | -100% |
| | III | 0.0 | | | 0 | | | -100% | -100% |
| South of Pigeon Pt. | I | 0.0 | 24.3 | 20.9 | 0 | 3,547 | 3,055 | -100% | -100% |
| | II | 0.0 | | | 0 | | | -100% | -100% |
| | III | 0.0 | | | 0 | | | -100% | -100% |
| Total South of Cape Falcon | I | 57.7 | 178.0 | 160.4 | 4,306 | 26,073 | 24,314 | -83% | -82% |
| | II | 52.8 | | | 3,945 | | | -85% | -84% |
| | III | 47.5 | | | 3,549 | | | -86% | -85% |
| West Coast Total | I | 154.0 | 264.4 | 223.5 | 17,888 | 38,257 | 33,653 | -53% | -47% |
| | II | 139.8 | | | 16,203 | | | -58% | -52% |
| | III | 125.1 | | | 14,483 | | | -62% | -57% |

a/ Income impacts are not comparable to the exvessel values shown in Table 9. All dollar values are expressed in inflation-adjusted 2022 dollars.
b/ Does not include Buoy 10 fishery.

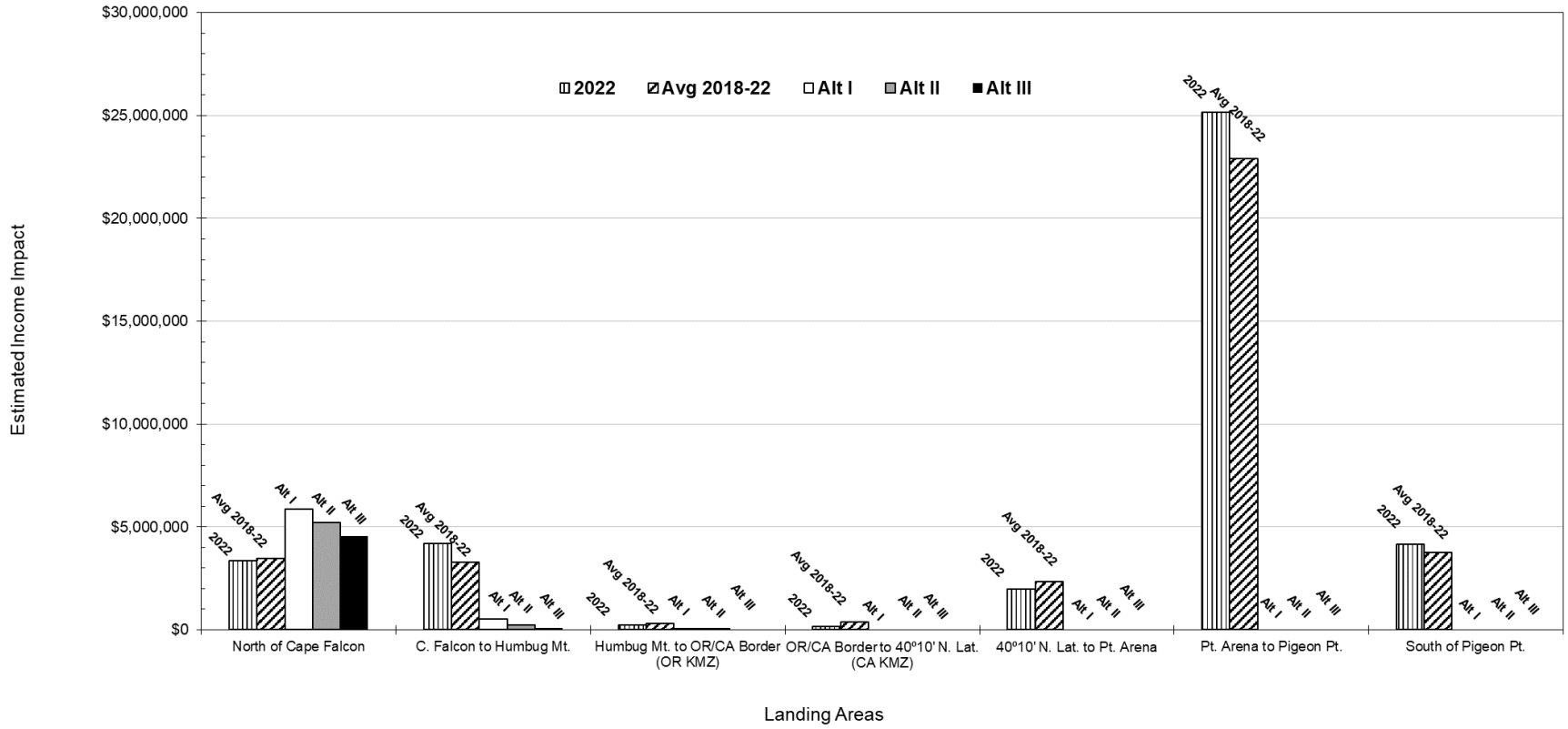



FIGURE 1. Projected community income impacts associated with landings projected under the Council adopted 2023 commercial fishery Alternatives compared to 2022 and the 2018-2022 average (in inflation-adjusted dollars).

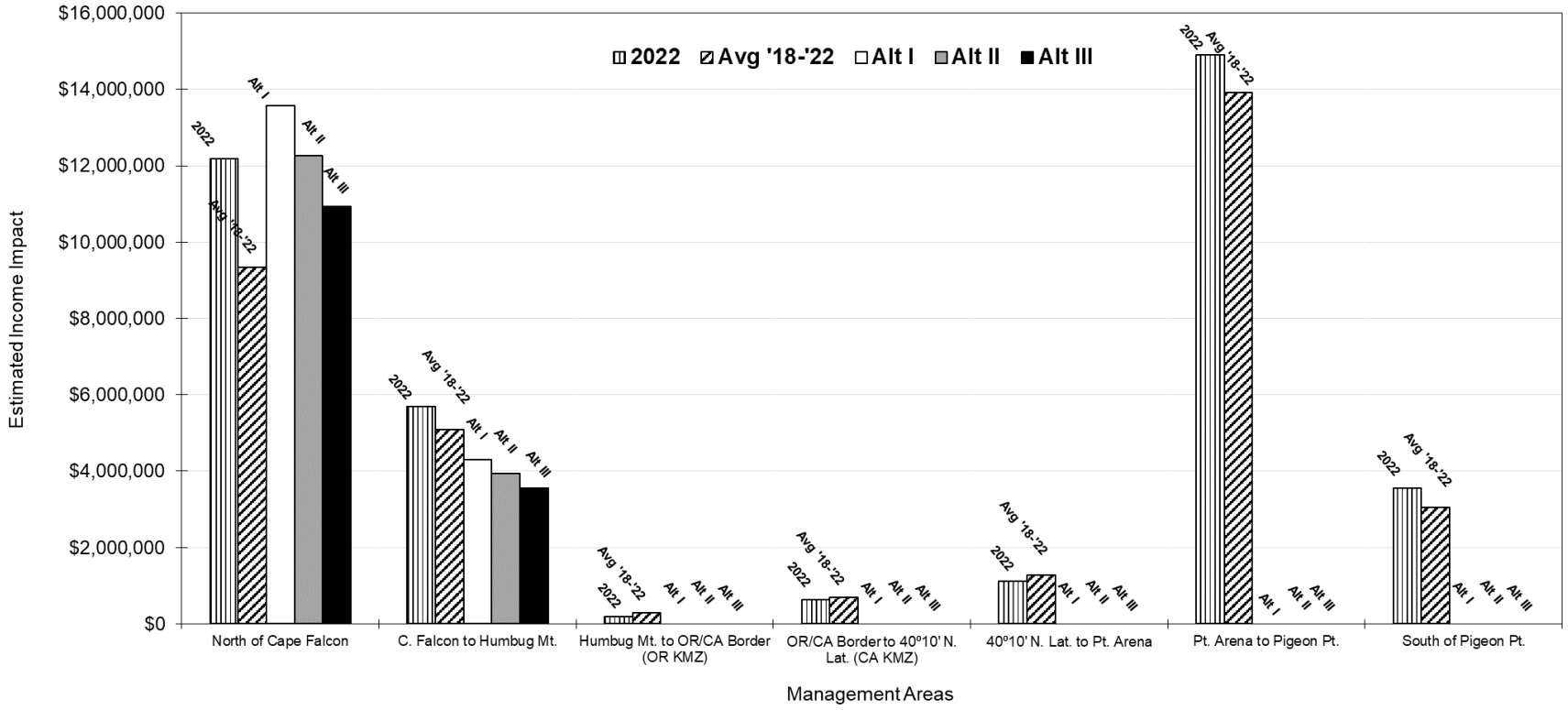



FIGURE 2. Projected community income impacts associated with angler effort projected under the Council adopted 2023 recreational fishery Alternatives compared to 2022 and the 2018-2022 average (in inflation-adjusted dollars).

# APPENDIX A: PROJECTED IMPACTS FOR AGE-3 SACRAMENTO RIVER WINTER CHINOOK, ADULT KLAMATH RIVER FALL CHINOOK, AGE-4 KLAMATH RIVER FALL CHINOOK AND ADULT SACRAMENTO RIVER FALL CHINOOK.

Table A-1. Sacramento River winter Chinook age-3 ocean impact rate south of Point Arena by fishery and Alternative. The impacts are displayed as a percent for each Alternative by fishery, port area, and month. Max rate: 20%.

**Commercial**

**Alternative I**

| Port Area | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|
| SF | | | | | | | | | 0.00 |
| MO | | | | | | | | | 0.00 |
| Total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Alternative II**

| Port Area | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|
| SF | | | | | | | | | 0.00 |
| MO | | | | | | | | | 0.00 |
| Total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Alternative III**

| Port Area | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|
| SF | | | | | | | | | 0.00 |
| MO | | | | | | | | | 0.00 |
| Total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**No Action**

| Port Area | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|
| SF | | | 0.18 | 0.12 | 0.18 | 0.07 | | | 0.55 |
| MO | 0.33 | 1.21 | 0.26 | 0.25 | | | | | 2.05 |
| Total | 0.33 | 1.21 | 0.44 | 0.36 | 0.18 | 0.07 | 0.00 | 0.00 | 2.59 |

**Recreational**

**Alternative I**

| Port Area | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|---|
| SF | | | | | | | | | | 0.00 |
| MO | | | | | | | | | | 0.00 |
| Total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Alternative II**

| Port Area | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|---|
| SF | | | | | | | | | | 0.00 |
| MO | | | | | | | | | | 0.00 |
| Total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Alternative III**

| Port Area | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|---|
| SF | | | | | | | | | | 0.00 |
| MO | | | | | | | | | | 0.00 |
| Total | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**No Action**

| Port Area | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year Total |
|---|---|---|---|---|---|---|---|---|---|---|
| SF | 0.27 | 0.83 | 0.39 | 2.21 | 0.79 | 0.11 | 0.18 | | | 4.77 |
| MO | 1.20 | 1.58 | 1.66 | 2.80 | 1.20 | 0.06 | 0 | | | 8.51 |
| Total | 1.47 | 2.41 | 2.05 | 5.02 | 1.98 | 0.17 | 0.18 | 0.00 | 0.00 | 13.28 |

SF Pt. Arena to Pigeon Pt. (San Francisco)
MO Pigeon Pt. to the U.S./Mexico Border (Monterey)

Table A-2. Klamath River fall Chinook ocean impacts in numbers of fish by fishery and Alternative.

## Commercial

### Alternative I

***23,614 natural area spawners, 10.0% spawner reduction rate, 0.3% age-4 ocean harvest rate***

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | |
| CO | 0 | 0 | | | | | | | | |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 0 | 0 | | | | | | | | |
| MO | | | | | | | | | | |
| Total | 0 | 0 | | | | | | | | |

### Alternative II

***23,614 natural area spawners, 10.0% spawner reduction rate, 0.3% age-4 ocean harvest rate***

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | |
| CO | 0 | 0 | | | | | | | | |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 0 | 0 | | | | | | | | |
| MO | | | | | | | | | | |
| Total | 0 | 0 | | | | | | | | |

### Alternative III

***26,133 natural area spawners, 0.4% spawner reduction rate, 0.3% age-4 ocean harvest rate***

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | |
| CO | 0 | 0 | | | | | | | | |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 0 | 0 | | | | | | | | |
| MO | | | | | | | | | | |
| Total | 0 | 0 | | | | | | | | |

### No Action

***17,792 natural area spawners, 32% spawner reduction rate, 12% age-4 ocean harvest rate***

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | 2 | 12 | 5 | 88 | 419 | 311 | 837 | 837 |
| CO | 0 | 0 | | | 11 | | | 18 | 29 | 29 |
| KO | | | 0 | 0 | | 93 | 68 | 53 | 214 | 214 |
| KC | | | | | | | | | | |
| FB | | | | | | | 477 | 927 | 1,404 | 1,404 |
| SF | 0 | 0 | | | | | 948 | 243 | 1,191 | 1,191 |
| MO | | | | | 293 | 236 | 61 | 40 | 630 | 630 |
| Total | | | 2 | 12 | 309 | 416 | 1,973 | 1,593 | 4,305 | 4,305 |

## Recreational

### Alternative I

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | 0 | 3 | 17 | 20 | 20 |
| CO | 0 | 0 | | | | | 0 | 1 | 28 | 29 | 29 |
| KO | | | | | | | 6 | 1 | 9 | 16 | 16 |
| KC | 27 | | | | | | | | | | 27 |
| FB | 20 | | | | | | | | | | 20 |
| SF | 25 | 0 | | | | | | | | | 25 |
| MO | 0 | 0 | | | | | | | | | 0 |
| Total | 72 | 0 | | | | | 6 | 5 | 54 | 65 | 137 |

### Alternative II

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | 0 | 3 | 17 | 20 | 20 |
| CO | 0 | 0 | | | | | 0 | 1 | 28 | 29 | 29 |
| KO | | | | | | | 6 | 1 | 9 | 16 | 16 |
| KC | 27 | | | | | | | | | | 27 |
| FB | 20 | | | | | | | | | | 20 |
| SF | 25 | 0 | | | | | | | | | 25 |
| MO | 0 | 0 | | | | | | | | | 0 |
| Total | 72 | 0 | | | | | 6 | 5 | 54 | 65 | 137 |

### Alternative III

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | 0 | 3 | 17 | 20 | 20 |
| CO | 0 | 0 | | | | | 0 | 1 | 28 | 29 | 29 |
| KO | | | | | | | | | | | |
| KC | 27 | | | | | | | | | | 27 |
| FB | 20 | | | | | | | | | | 20 |
| SF | 25 | 0 | | | | | | | | | 25 |
| MO | 0 | 0 | | | | | | | | | 0 |
| Total | 72 | 0 | | | | | 0 | 4 | 45 | 49 | 121 |

### No Action

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | 0 | 7 | 0 | 0 | 16 | 65 | 88 | 88 |
| CO | 0 | 0 | | 0 | 0 | 0 | 2 | 4 | 123 | 129 | 129 |
| KO | | | | | | | 15 | 6 | 30 | 51 | 51 |
| KC | 27 | | | | | 204 | | | 29 | 233 | 260 |
| FB | 20 | | | | | 9 | 32 | 35 | 16 | 92 | 112 |
| SF | 25 | 0 | | | 21 | 42 | 55 | 318 | 82 | 518 | 543 |
| MO | 0 | 0 | | | 14 | 0 | 0 | 0 | 0 | 14 | 14 |
| Total | 72 | | | | 41 | 255 | 103 | 379 | 346 | 1,124 | 1,196 |

NO Cape Falcon to S. End of Heceta Bank
CO S. End of Heceta Bank to Humbug Mt.
KO Humbug Mt. to OR/CA Border (Oregon KMZ)
KC OR/CA Border to latitude 40°10′ N. (California KMZ)
FB Southern KMZ Boundary to Pt. Arena (Fort Bragg)
SF Pt. Arena to Pigeon Pt. (San Francisco)
MO Pigeon Pt. to U.S./Mexico Border (Monterey)

Table A-3. Klamath River fall Chinook age-4 ocean harvest by fishery and Alternative. In 2023, a harvest of 2720 age-4 KRFC results in a 16% ocean harvest rate.

## Commercial

### Alternative I

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | |
| CO | 0 | 0 | | | | | | | | |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 0 | 0 | | | | | | | | |
| MO | | | | | | | | | | |
| Total | | | | | | | | | | |

### Alternative II

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | |
| CO | 0 | 0 | | | | | | | | |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 0 | 0 | | | | | | | | |
| MO | | | | | | | | | | |
| Total | | | | | | | | | | |

### Alternative III

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | |
| CO | 0 | 0 | | | | | | | | |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 0 | 0 | | | | | | | | |
| MO | | | | | | | | | | |
| Total | | | | | | | | | | |

### No Action

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | 2 | 10 | 4 | 34 | 304 | 170 | 524 | 524 |
| CO | 0 | 0 | | | 10 | | | 14 | 24 | 24 |
| KO | | | 0 | 0 | | 80 | 57 | 46 | 183 | 183 |
| KC | | | | | | | | | | |
| FB | | | | | | | 327 | 495 | 822 | 822 |
| SF | 0 | 0 | | | | | 732 | 122 | 854 | 854 |
| MO | | | | | 250 | 181 | 55 | 36 | 522 | 522 |
| Total | | | 2 | 10 | 264 | 294 | 1,475 | 882 | 2,927 | 2,927 |

## Recreational

### Alternative I

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | | 0 |
| CO | 0 | 0 | | | | | | | | | 0 |
| KO | | | | | | | | | | | |
| KC | 26 | | | | | | | | | | 26 |
| FB | 19 | | | | | | | | | | 19 |
| SF | 24 | | | | | | | | | | 24 |
| MO | 0 | 0 | | | | | | | | | 0 |
| Total | 68 | | | | | | | | | | 68 |
| | | | | | | | | | | | 0.3% |

### Alternative II

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | | 0 |
| CO | 0 | 0 | | | | | | | | | 0 |
| KO | | | | | | | | | | | |
| KC | 26 | | | | | | | | | | 26 |
| FB | 19 | | | | | | | | | | 19 |
| SF | 24 | 0 | | | | | | | | | 24 |
| MO | 0 | 0 | | | | | | | | | 0 |
| Total | 68 | | | | | | | | | | 68 |
| | | | | | | | | | | | 0.3% |

### Alternative III

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | | | | | 0 |
| CO | 0 | 0 | | | | | | | | | 0 |
| KO | | | | | | | | | | | |
| KC | 26 | | | | | | | | | | 26 |
| FB | 19 | | | | | | | | | | 19 |
| SF | 24 | 0 | | | | | | | | | 24 |
| MO | 0 | 0 | | | | | | | | | 0 |
| Total | 68 | | | | | | | | | | 68 |
| | | | | | | | | | | | 0.3% |

### No Action

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | 0 | 2 | 0 | 0 | 5 | 19 | 26 | 0 |
| CO | 0 | 0 | | 0 | 0 | 0 | 1 | 1 | 37 | 39 | 0 |
| KO | | | | | | | 4 | 2 | 10 | 16 | 16 |
| KC | 26 | | | | | 63 | | | 14 | 77 | 103 |
| FB | 19 | | | | | 3 | 10 | 11 | 5 | 29 | 48 |
| SF | 24 | 0 | | | 7 | 13 | 17 | 97 | 24 | 158 | 182 |
| MO | 0 | 0 | | | 5 | 0 | 0 | 0 | 0 | 5 | 0 |
| Total | 68 | | | | 14 | 79 | 31 | 115 | 109 | 348 | 416 |

NO Cape Falcon to S. End of Heceta Bank
CO S. End of Heceta Bank to Humbug Mt.
KO Humbug Mt. to OR/CA Border (Oregon KMZ)
KC OR/CA Border to Southern KMZ Boundary (California KMZ)
FB Southern KMZ Boundary to Pt. Arena (Fort Bragg)
SF Pt. Arena to Pigeon Pt. (San Francisco)
MO Pigeon Pt. to U.S./Mexico Border (Monterey)

Table A-4. Sacramento River fall Chinook ocean impacts in numbers of fish by fishery and Alternative.

## Commercial

### Alternative I

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 5 | | | | | | | | 5 |
| CO | 9 | 0 | | | | | | | | 9 |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 2,904 | 76 | | | | | | | | 2,980 |
| MO | | | | | | | | | | |
| Total | 2,913 | 81 | | | | | | | | 2,994 |

### Alternative II

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 5 | | | | | | | | 5 |
| CO | 9 | 0 | | | | | | | | 9 |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 2,904 | 76 | | | | | | | | 2,980 |
| MO | | | | | | | | | | |
| Total | 2,913 | 81 | | | | | | | | 2,994 |

### Alternative III

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 5 | | | | | | | | 5 |
| CO | 9 | 0 | | | | | | | | 9 |
| KO | | | | | | | | | | |
| KC | | | | | | | | | | |
| FB | | | | | | | | | | |
| SF | 2,904 | 76 | | | | | | | | 2,980 |
| MO | | | | | | | | | | |
| Total | 2,913 | 81 | | | | | | | | 2,994 |

### No Action

| Port | Fall 2022 | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 5 | 227 | 1,243 | 546 | 1,527 | 2,096 | 481 | 6,120 | 6,125 |
| CO | 9 | 0 | | | 526 | | | 40 | 566 | 575 |
| KO | | | 0 | 0 | | 228 | 162 | 52 | 442 | 442 |
| KC | | | | | | | | | | |
| FB | | | | | | | 2,682 | 3,099 | 5,781 | 5,781 |
| SF | 2,904 | 76 | | | | | 5,010 | 2,241 | 7,251 | 10,231 |
| MO | | | | | 10,954 | 5,836 | 915 | 211 | 17,916 | 17,916 |
| Total | 2,913 | 81 | 227 | 1,243 | 12,026 | 7,591 | 10,865 | 6,125 | 38,077 | 41,071 |

## Recreational

### Alternative I

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | 7 | 25 | 13 | 45 | 45 |
| CO | 22 | 0 | | | | | 3 | 14 | 5 | 22 | 44 |
| KO | | | | | | | 5 | 15 | 7 | 27 | 27 |
| KC | 123 | | | | | | | | | | 123 |
| FB | 48 | | | | | | | | | | 48 |
| SF | 1,228 | 275 | | | | | | | | | 1,503 |
| MO | 10 | 10 | | | | | | | | | 20 |
| Total | 1,431 | 285 | | | | | 14 | 54 | 25 | 93 | 1,809 |

### Alternative II

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | 7 | 25 | 13 | 45 | 45 |
| CO | 22 | 0 | | | | | 3 | 14 | 5 | 22 | 44 |
| KO | | | | | | | 5 | 15 | 7 | 27 | 27 |
| KC | 123 | | | | | | | | | | 123 |
| FB | 48 | | | | | | | | | | 48 |
| SF | 1,228 | 275 | | | | | | | | | 1,503 |
| MO | 10 | 10 | | | | | | | | | 20 |
| Total | 1,431 | 285 | | | | | 14 | 54 | 25 | 93 | 1,809 |

### Alternative III

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | | | | 7 | 25 | 13 | 45 | 45 |
| CO | 22 | 0 | | | | | 3 | 14 | 5 | 22 | 44 |
| KO | | | | | | | | | | | |
| KC | 123 | | | | | | | | | | 123 |
| FB | 48 | | | | | | | | | | 48 |
| SF | 1,228 | 275 | | | | | | | | | 1,503 |
| MO | 10 | 10 | | | | | | | | | 20 |
| Total | 1,431 | 285 | | | | | 10 | 38 | 18 | 66 | 1,782 |

### No Action

| Port | Fall 2022 | | | Summer 2023 | | | | | | Summer | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Sep | Oct | Nov-Dec | Mar | Apr | May | Jun | Jul | Aug | Total | Total |
| NO | 0 | 0 | | 2 | 0 | 3 | 47 | 175 | 68 | 227 | 295 |
| CO | 22 | 0 | | 0 | 6 | 2 | 25 | 99 | 32 | 154 | 186 |
| KO | | | | | | | 16 | 108 | 33 | 124 | 157 |
| KC | 123 | | | | | 782 | | | 273 | 905 | 1,178 |
| FB | 48 | | | | | 150 | 158 | 429 | 430 | 785 | 1,215 |
| SF | 1,228 | 275 | | | 1,634 | 2,803 | 1,211 | 7,775 | 3,904 | 14,926 | 18,830 |
| MO | 10 | 10 | | | 4,234 | 1,152 | 1,177 | 1,406 | 299 | 7,989 | 8,288 |
| Total | 1,431 | 285 | | 2 | 5,875 | 4,892 | 2,633 | 9,992 | 5,039 | 28,433 | 30,149 |

NO Cape Falcon to S. End of Heceta Bank
CO S. End of Heceta Bank to Humbug Mt.
KO Humbug Mt. to OR/CA Border (Oregon KMZ)
KC OR/CA Border to latitude 40°10' N. (California KMZ)
FB Southern KMZ Boundary to Pt. Arena (Fort Bragg)
SF Pt. Arena to Pigeon Pt. (San Francisco)
MO Pigeon Pt. to U.S./Mexico Border (Monterey)

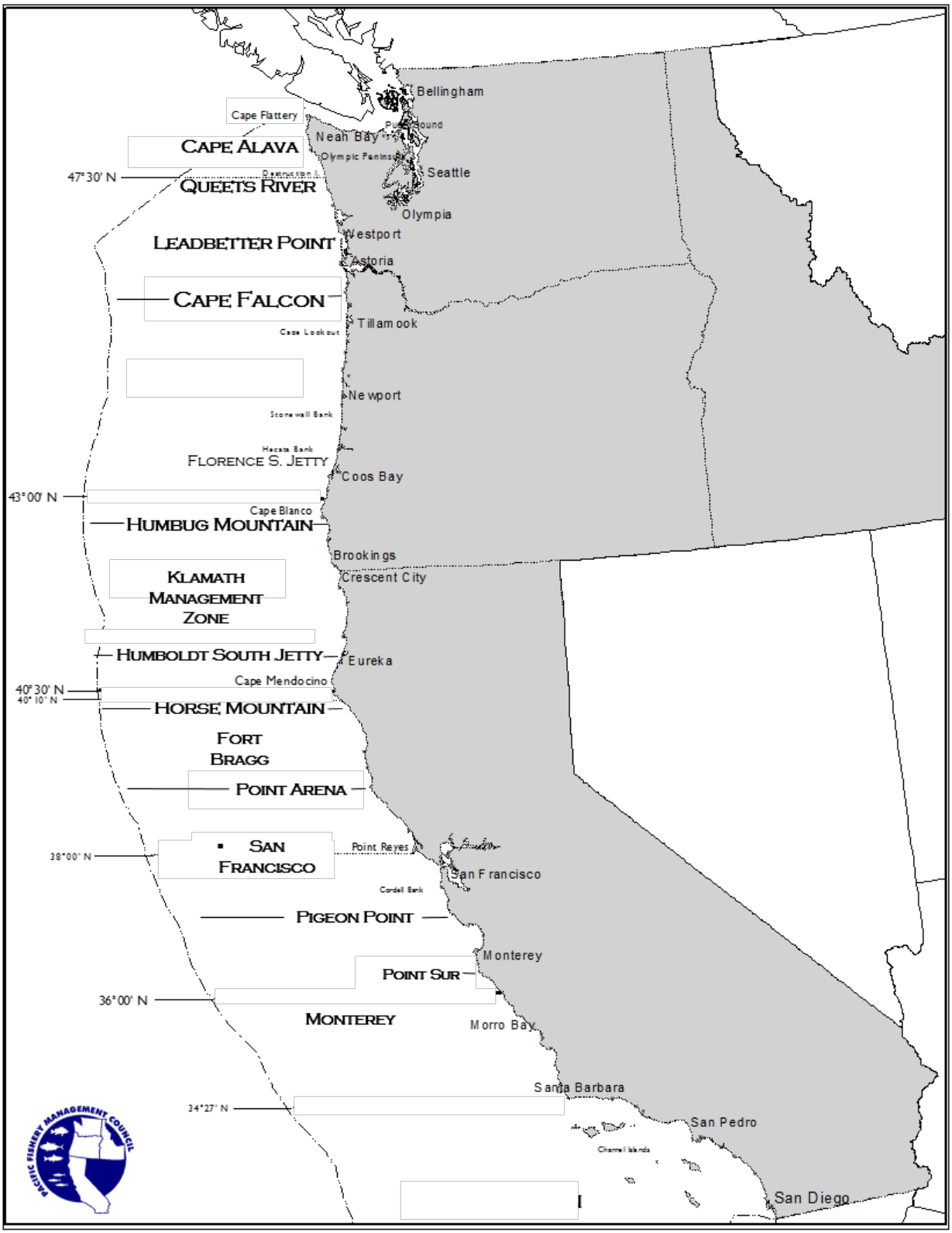
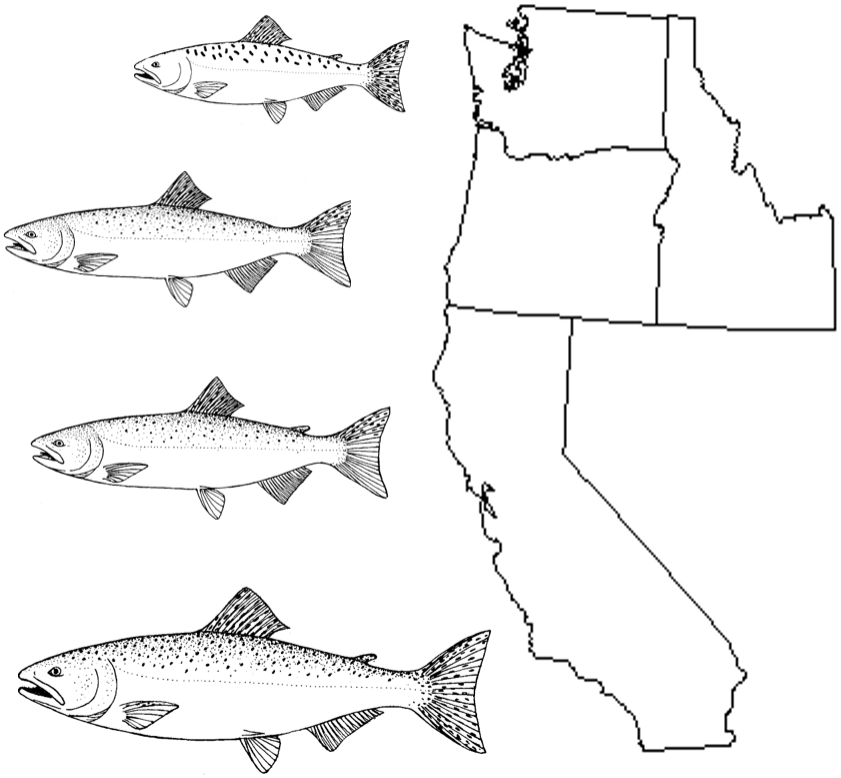



FIGURE 3. Map of Pacific West Coast with major salmon ports and management boundaries. This map is for reference only and is not intended for use in navigation or fishery regulation.

# PRESEASON REPORT III

## COUNCIL ADOPTED MANAGEMENT MEASURES
## AND
## ENVIRONMENTAL ASSESSMENT PART 3
## FOR
## 2023 OCEAN SALMON FISHERY REGULATIONS

**REGULATION IDENTIFIER NUMBER 0648-BL66**



Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384
(503) 820-2280
www.pcouncil.org

APRIL 2023

# ACKNOWLEDGMENTS

## SALMON TECHNICAL TEAM

**DR. MICHAEL O'FARRELL, CHAIR**
National Marine Fisheries Service, Santa Cruz, California

**MR. JON CAREY, VICE CHAIR**
National Marine Fisheries Service, Lacey, Washington

**MS. GRACE EASTERBROOK** (*alternate for Ms. Kandice Morgenstern*)
California Department of Fish and Wildlife, Eureka, California

**DR. STEVE HAESEKER**
U.S. Fish and Wildlife Service, Vancouver, Washington

**MS. CASSANDRA LEEMAN**
Oregon Department of Fish and Wildlife, Salem, Oregon

**DR. ALEXANDREA SAFIQ**
Washington Department of Fish and Wildlife, Olympia, Washington

**MS. STEPHANIE THURNER** *(alternate for Ms. Ashton Harp)*
Northwest Indian Fisheries Commission, Olympia, Washington

**DR. RICH ZABEL**
National Marine Fisheries Service, Seattle, Washington

## PACIFIC FISHERY MANAGEMENT COUNCIL STAFF

**MS. ROBIN EHLKE**
**DR. JIM SEGER**

The Salmon Technical Team and the Council staff express their thanks for the expert assistance provided by Mr. Kyle Van de Graaf, Washington Department of Fish and Wildlife; Mr. Ian Pritchard and Mr. Lane Jackson, California Department of Fish and Wildlife; Mr. Eric Schindler, Oregon Department of Fish and Wildlife, and numerous other tribal and agency personnel in completing this report.

This document may be cited in the following manner:
Pacific Fishery Management Council. 2023. *Preseason Report III: Council Adopted Management Measures and Environmental Assessment Part 3 for 2023 Ocean Salmon Fishery Regulations: BL66.* (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.

A report of the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number FNA20NMF4410011.

# TABLE OF CONTENTS

## LIST OF TABLES

Page



## LIST OF FIGURES

## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AABM | Aggregate Abundance Based Management |
| ABC | Acceptable Biological Catch |
| ACL | Annual Catch Limit(s) |
| AI | Abundance Index |
| BiOp | biological opinion |
| CDFW | California Department of Fish and Wildlife |
| Council | Pacific Fishery Management Council |
| CPUE | catch per unit effort |
| CYER | Calendar year exploitation rate |
| EA | Environmental Assessment |
| EEZ | Economic Exclusive Zone |
| EIS | Environmental Impact Statement |
| ESA | Endangered Species Act |
| ESU | Evolutionarily Significant Unit |
| FMP | fishery management plan |
| FONSI | finding of no significant impact |
| FRAM | Fishery Regulation Assessment Model |
| GSI | genetic stock identification |
| IPHC | International Pacific Halibut Commission |
| ISBM | Individual Stock Based Management |
| KMZ | Klamath Management Zone (Humbug Mountain to Horse Mountain) |
| KRFC | Klamath River fall Chinook |
| LCN | Lower Columbia Natural (wild Columbia River coho below Bonneville Dam) |
| LCR | Lower Columbia River (wild Col. River tule fall Chinook below Bonneville Dam) |
| LRH | Lower River Hatchery (hatchery Col. River tule fall Chinook below Bonneville Dam) |
| LRW | Lower River Wild (Columbia River bright fall wild Chinook below Bonneville Dam) |
| MSST | minimum stock size threshold |
| MSY | maximum sustainable yield |
| NBC | Northern British Columbia |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fisheries Service |
| ODFW | Oregon Department of Fish and Wildlife |
| OCN | Oregon coastal natural (coho) |
| OFL | Overfishing Limit |
| OPI | Oregon Production Index |
| PSC | Pacific Salmon Commission |
| PST | Pacific Salmon Treaty |
| SAS | Salmon Advisory Subpanel |
| SCH | Spring Creek Hatchery (Col. R. tule fall Chinook returning to Spring Creek Hatchery [above Bonneville Dam]) |
| SEAK | Southeast Alaska |
| $S_{MSY}$ | Spawning escapement associated with maximum sustainable yield |
| SONCC | Southern Oregon/Northern California Coast (coho ESU) |
| SRFC | Sacramento River fall Chinook |
| SRW | Snake River wild fall Chinook |
| SRWC | Sacramento River winter Chinook |
| STT | Salmon Technical Team |
| SWO | State Waters Only (fisheries off Oregon south of Cape Falcon) |
| TAC | Total Allowable Catch |
| WCVI | West Coast Vancouver Island |
| WDFW | Washington Department of Fish and Wildlife |

## 1.0 INTRODUCTION

This report, referred to as Preseason III, is the last in an annual series of four reports prepared by the Salmon Technical Team (STT) of the Pacific Fishery Management Council (Council) to document and help guide development of ocean salmon fishery management measures for fisheries off the coasts of Washington, Oregon, and California. This report describes the Council's 2023[1] ocean salmon management measures adopted for submission to the U.S. Secretary of Commerce and characterizes the expected impacts on ocean salmon fisheries and the stocks which support them.

This report also constitutes the third and final part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2023 ocean salmon regulations and includes a description and analysis of the Proposed Action. An EA is used to determine whether an action being considered by a Federal agency has significant environmental impacts. The first part of this EA (Preseason Report I; PFMC 2023b, incorporated herein by reference), includes a statement of the purpose and need for the proposed action, a description of the affected environment, a description of the No-Action Alternative, and an evaluation of the No-Action Alternative's effects on the salmon stocks included in the Council's Fishery Management Plan (FMP). The second part of the EA (Preseason Report II; PFMC 2023c, incorporated herein by reference), includes an additional description of the affected environment relevant to the Council's proposed Alternatives, a description of the Alternatives, and an analysis of the environmental consequences of the Alternatives, including short term and long-term impacts of the Alternatives. Along with the description and analysis of the Proposed Action in this report (Preseason Report III), these three parts of the EA will provide the necessary components to determine if a finding of no significant impact (FONSI) or Environmental Impact Statement (EIS) is warranted.

The Council's Proposed Action for the 2023 ocean salmon fishery regulations meet all objectives of the FMP (Section 3), including Annual Catch Limits (ACLs) set according to the FMP and described in Preseason Report I; the level of protection required by all consultation standards for salmon species listed under the Endangered Species Act (ESA) (Section 4); and the obligations under the Pacific Salmon Treaty (PST) (Section 5).

Under the Council's recommended management measures, salmon stocks originating from Washington, Oregon, and California meet all the applicable conservation objectives in the FMP where possible. The spawning escapement for Klamath River fall Chinook (KRFC) is projected to be 23,614 natural area adults (40,700 is the conservation objective for this stock), despite the recommended closure of ocean salmon fisheries off the coast of California and most of Oregon.

The STT evaluated salmon stock status based on spawning escapement data published in the *Review of 2022 Ocean Salmon Fisheries* (2022 Review, PFMC 2023a) and provided the following information on Chinook and coho stocks:

Sacramento River fall Chinook (SRFC) and KRFC were found to meet the criteria for being classified as overfished in the PFMC *Review of 2017 Ocean Salmon Fisheries*, released in February 2018. NMFS subsequently published an overfished designation for both stocks in June 2018, and rebuilding plans were developed for both and adopted by the Council in 2019. Sacramento River fall Chinook was determined to be rebuilt in 2021 (*Review of 2021 Ocean Salmon Fisheries)*. Klamath River fall Chinook continue to meet the criteria for overfished status based on the most recent three-year geometric mean of spawning escapement (2020-2022).

[1] The fishery management measures under consideration would cover the period May 16, 2023, through May 15, 2024 (86 FR 26426). For ease of reference, we refer to this time period as 2023.

Queets River spring/summer Chinook were found to meet the criteria for being classified as overfished based on the most recent three-year geometric mean of spawning escapement (2019-2021) published in the PFMC *Review of 2022 Ocean Salmon Fisheries*, released in February 2023.

Queets River natural coho, Strait of Juan de Fuca natural coho, and Snohomish River natural coho were found to meet the criteria for being classified as overfished in the PFMC *Review of 2017 Ocean Salmon Fisheries,* released in February 2018. Queets River natural coho continue to meet the criteria for overfished status, Strait of Juan de Fuca natural coho have met the criteria for not overfished/rebuilding status, and Snohomish natural coho now meet the criteria for rebuilt status based on the most recent three-year geometric mean of escapement estimates (2019-2021).

## 2.0 SELECTION OF FINAL MANAGEMENT MEASURES

The following figures and tables describe the Council-adopted management measures covering the period from May 16, 2023, through May 15, 2024 unless modified inseason:

Table 1 - Non-Indian commercial ocean salmon management measures;

Figure 1 - Geographic outline of commercial troll (non-Indian) ocean salmon seasons;

Table 2 - Recreational ocean salmon management measures;

Figure 2 - Geographic outline of recreational ocean salmon seasons;

Table 3 - Treaty Indian commercial ocean management measures; and

Table 4 - Allowable catch quotas for Chinook and coho.

In addition, Tables 5, 6, and 7 provide information on the biological impacts and landing estimates for the Council's management recommendations. Table 8 displays the expected mark (healed adipose fin-clip) rate for coho encountered in Council adopted mark-selective fisheries. Tables 9 and 10, and Figures 3 and 4 provide information on the economic impacts of the proposed fisheries. Table 11 summarizes environmental effects of the Proposed Action and Alternatives. The assessment of stock status with regard to overfished, overfishing, and approaching an overfished condition is described in Table 12.

The 2023 seasons are constrained primarily by: (1) Klamath River fall Chinook and Sacramento River fall Chinook south of Cape Falcon, and (2) lower Columbia River natural tule Chinook and Puget Sound Chinook north of Cape Falcon.

Regulations and expected fishing patterns for the Treaty Indian ocean fisheries were developed by the Hoh, S'Klallam, Makah, Quileute, and Quinault tribes for their respective fisheries.

### *2.1 Inseason Management*

Inseason changes are made to meet the preseason intent of the management measures described in this document, but must also meet the Council's FMP goals, especially in regard to conservation and allocation goals, Federally-recognized Indian fishing rights, consultation standards for ESA-listed salmon stocks, and obligations under the PST.

Inseason actions that are anticipated for the 2023-2024 management season include, but are not limited to, the following possibilities:

1. Adjustments in landing limits and days open for non-Indian commercial fisheries.
2. Changing the days or number of days of fishing allowed per calendar week for recreational fisheries.
3. Transfer of coho quotas among recreational port areas north of Cape Falcon.

4. Trading portions of Chinook and coho quotas between recreational and non-Indian commercial sectors north of Cape Falcon.
5. Routine openings and closings, and other management measures associated with quota management, including modifying open areas, bag and size limits, species retention limits, and mark-selective retention restrictions.
6. Transferring unused or exceeded quota to subsequent fisheries on an impact neutral, fishery equivalent basis.
7. Closing or postponing Oregon recreational and commercial fisheries scheduled to open March 15, 2024, if necessary to meet 2024 management objectives.
8. Closing or postponing California recreational fisheries scheduled to open April 6 or May 1, 2024, or commercial fisheries scheduled to open April 16 or May 1, 2024, if necessary to meet 2024 management objectives.
9. Implementing and/or modifying landing limits for the California commercial fishery scheduled to open April 16 or May 1, 2024.
10. Closing or postponing commercial fisheries north of Cape Falcon scheduled to open May 1, 2024, if necessary to meet 2024 management objectives.
11. Adjustments to incidental Pacific halibut catch regulations in commercial fisheries, including landing and possession ratios and landing and possession limits per trip.

Inseason action will generally be accomplished through National Marine Fisheries Service (NMFS) sponsored conference calls attended by representatives of affected Tribal and state management agencies, the Council, the Salmon Advisory Subpanel (SAS), and the STT. The Council may also make recommendations for inseason actions at any of its regularly scheduled meetings.

### *2.2 State Waters Fisheries*

In addition to the seasons shown in Tables 1 and 2, the Oregon Department of Fish and Wildlife (ODFW) may permit fall fisheries for salmon in certain areas within state marine waters. Potential seasons off the Oregon coast typically include commercial and recreational fisheries at the mouths of the Chetco, Elk, and other rivers. Washington may also establish limited recreational salmon fisheries in state marine waters if additional impacts on coho and/or Chinook stocks can be accommodated within management constraints. California will not establish any additional state marine water salmon fisheries in 2023.

## 3.0 SALMON FISHERY MANAGEMENT PLAN REQUIREMENTS

The Council's Salmon FMP includes objectives for setting annual management measures to regulate ocean salmon fisheries between the U.S./Canada border and the U.S./Mexico border. The objectives include biological, administrative, and allocation requirements. In recommending final management measures, the Council attempts to meet all objectives in a fair and balanced manner, while maintaining established priorities.

Biological objectives for stocks originating in the Council area and impacted by Council area ocean fisheries are listed in Table 3-1 of the Salmon FMP. The objectives generally consist of meeting spawning escapement numbers associated with maximum sustainable yield ($S_{MSY}$), overfishing limits (OFL), acceptable biological catch (ABC), and annual catch limits (ACL), or exploitation rate limits designed to support recovery of depressed stocks or to rebuild overfished stocks, while encompassing a long-term average harvest approximating maximum sustainable yield (MSY).

Administrative objectives are requirements for meeting other applicable law outside of the Salmon FMP. These requirements include the Endangered Species Act (ESA), international treaties, and tribal trust responsibilities. The Salmon FMP defers to measures needed to protect ESA-listed species analyzed in or

required by biological opinions (BiOps) issued by NMFS under ESA section 7(a)(2) or developed through other ESA processes (referred to in the Salmon FMP as "consultation standards"). Section 5.0 of this document provides greater detail on ESA listed species, while impacts of the proposed Alternatives on ESA listed species are described in Table 5.

The Salmon FMP requires compliance with relevant terms of the PST. Section 6.0 of this document provides greater detail on PST provisions and stocks, while impacts of the Council adopted proposed Alternatives on those stocks are described in Table 5.

Treaty trust responsibilities of the Salmon FMP require the Council to abide by Court orders in the *U.S. v. Washington* (Puget Sound), *Hoh v. Baldrige* (Washington coast), and *U.S. v. Oregon* (Columbia River) cases, and the Solicitor General opinion (Klamath River) governing allocation and management of shared salmon resources. Much of the North of Falcon forum is dedicated to annual negotiations establishing allocation among the tribes, non-Indian fishing sectors, and ocean and inside interests. The results of these negotiations allow the Council to complete final management measure recommendations while meeting its biological, administrative, and allocation objectives.

The Columbia River Treaty Tribes establish periodic management agreements with the state co-managers and Federal agencies. These agreements are approved pursuant to provisions of *U.S. v. Oregon* procedures. Recent agreements have included an entitlement for the treaty tribes of 50 percent of the coho return destined for areas upstream from Bonneville Dam. Council area fisheries are shaped in order to meet this requirement as needed.

The Yurok and Hoopa Valley Tribes are entitled to 50 percent of the total Klamath River fall Chinook (KRFC) harvest, which is calculated as a harvest of KRFC equal to that taken in all non-Indian fisheries. The Council must account for all harvest impacts when assessing the achievement of KRFC conservation objectives.

In addition to the allocation objectives associated with sharing between treaty Indian and non-Indian sectors, the Salmon FMP includes formulas for sharing Chinook and coho quotas. North of Cape Falcon, there are sharing formulas between commercial and recreational sectors, and among recreational port subareas; the recreational subarea sharing formula may be modified with the support of recreational port representatives. North of Falcon recreational subarea sharing was developed with the support of port area representatives, and all other sharing of Chinook and coho quotas adhered to FMP sharing formulas or other provisions of the FMP. Therefore, 2023 salmon management measures adopted by the Council meet all allocation requirements.

## 4.0 SPECIES LISTED UNDER THE ENDANGERED SPECIES ACT

Since 1989, NMFS has listed 17 Evolutionarily Significant Units (ESUs) of salmon under the ESA. As the listings have occurred, NMFS has initiated formal ESA § 7 consultations and issued BiOps that consider the impacts resulting from implementation of the Salmon FMP and annual management measures to listed salmonid species. NMFS has also reinitiated consultation on certain ESUs when required due to pertinent new information becoming available on the status of the stocks or on the impacts of the Salmon FMP on the stocks. The consultation standards referred to in this document are derived from those consultations and include: (1) reasonable and prudent alternatives and/or reasonable and prudent measures, (2) conservation objectives that were included as part of the proposed action subject to Section 7 consultations, and (3) NMFS requirements under ESA Section 4(d) determinations.

Amendment 12 to the Salmon FMP added the generic category "species listed under the ESA" to the list of stocks in the salmon management unit and modified respective escapement goals to include "manage consistent with NMFS jeopardy standards or recovery plans to meet immediate conservation needs and

long-term recovery of the species." Amendment 14 specified those listed ESUs and clarified which stocks in the FMP management unit were representative of the ESUs.

Some ESA-listed salmonid species are either rarely caught in Council fisheries (e.g., spring Chinook from the upper Columbia River) or already receive sufficient protection from measures implemented to limit impacts to other stocks (e.g., Central Valley spring Chinook). NMFS has determined that management actions designed to limit catch from these ESUs, beyond what will be provided by harvest constraints for other stocks, are not necessary.

Evolutionarily Significant Units (ESUs) of salmon under the ESA:

| Species | ESU | Status | Federal Register Notice | | | | |
|---|---|---|---|---|---|---|---|
| | | | Most Recent | | | Original Listing | |
| | **Chinook** | | | | | | |
| Chinook Salmon | Sacramento River Winter | Endangered | 81 FR 33468 | 5/26/2016 | | 54 FR 32085 | 8/1/1989 |
| (*O. tshawytscha*) | Snake River Fall | Threatened | 81 FR 33468 | 5/26/2016 | | 57 FR 14653 | 4/22/1992 |
| | Snake River Spring/Summer | Threatened | 81 FR 33468 | 5/26/2016 | | 57 FR 14653 | 4/22/1992 |
| | Puget Sound | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 14308 | 3/24/1999 |
| | Lower Columbia River | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 14308 | 3/24/1999 |
| | Upper Willamette River | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 14308 | 3/24/1999 |
| | Upper Columbia River Spring | Endangered | 81 FR 33468 | 5/26/2016 | | 64 FR 14308 | 3/24/1999 |
| | Central Valley Spring | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 50394 | 9/16/1999 |
| | California Coastal | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 50394 | 9/16/1999 |
| | **Chum** | | | | | | |
| Chum Salmon | Hood Canal Summer-Run | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 14508 | 3/25/1999 |
| (*O. keta*) | Columbia River | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 14508 | 3/25/1999 |
| | **Coho** | | | | | | |
| Coho Salmon | Central California Coastal | Endangered | 81 FR 33468 | 5/26/2016 | | 61 FR 56138 | 10/31/1996 |
| (*O. kisutch*) | S. Oregon/ N. California Coastal | Threatened | 81 FR 33468 | 5/26/2016 | | 62 FR 24588 | 2019 |
| | Oregon Coastal | Threatened | 81 FR 33468 | 5/26/2016 | | 63 FR 42587 | 8/10/1998 |
| | Lower Columbia River | Threatened | 81 FR 33468 | 5/26/2016 | | 70 FR 37160 | 6/28/2005 |
| | **Sockeye** | | | | | | |
| Sockeye Salmon | Snake River | Endangered | 81 FR 33468 | 5/26/2016 | | 56 FR 58619 | 11/20/1991 |
| (*O. nerka*) | Ozette Lake | Threatened | 81 FR 33468 | 5/26/2016 | | 64 FR 14528 | 3/25/1999 |

A list of current BOs in effect, the species they apply to, and their duration:

| Date | Evolutionarily Significant Unit covered and effective period |
|---|---|
| 3/8/1996 | Snake River spring/summer and fall Chinook and sockeye (until reinitiated) |
| 4/28/1999 | Oregon Coastal natural coho, Southern Oregon/ Northern California coastal coho, Central California coastal coho (until reinitiated) |
| 4/28/2000 | Central Valley spring Chinook (until reinitiated) |
| 4/27/2001 | Hood Canal summer chum 4(d) limit (until reinitiated) |
| 4/30/2001 | Upper Willamette Chinook, Upper Columbia spring Chinook, Lake Ozette sockeye, Columbia River chum, and 10 steelhead ESUs (until reinitiated) |
| 4/30/2004 | Puget Sound Chinook (until reinitiated) |
| 2/28/2023 | California coastal Chinook (until reinitiated) |
| 4/26/2012 | Lower Columbia River Chinook (until reinitiated) |
| 4/9/2015 | Lower Columbia River natural coho (until reinitiated) |
| 4/26/2018 | Sacramento River winter Chinook (until reinitiated) |

Additional listed salmonid ESUs found within the Council area, but not substantively impacted by Council managed fisheries, include:

| **Chinook** | **Steelhead** |
|---|---|
| Snake River spring/summer (threatened) | Southern California (endangered) |
| Upper Willamette (threatened) | South-central California coast (threatened) |
| Puget Sound (threatened) | Upper Columbia River (endangered) |
| Upper Columbia River spring (endangered) | Middle Columbia River (threatened) |
| | Snake River Basin (threatened) |
| **Sockeye** | Puget Sound (threatened) |
| Snake River (endangered) | Central Valley, California (threatened) |
| Ozette Lake Sockeye (threatened) | Central California coast (threatened) |
| | Upper Willamette River (threatened) |
| **Chum** | Lower Columbia River (threatened) |
| Columbia River (threatened) | Northern California (threatened) |
| Hood Canal summer (threatened) | |

Of the ESA-listed Chinook and coho ESUs, Council-managed fisheries can have substantive impacts on Sacramento River winter Chinook (SRWC), Central Valley spring Chinook, California coastal Chinook (CCC), Snake River fall Chinook (natural component, referred to as Snake River Wild (SRW) in this document), lower Columbia River (LCR) fall Chinook, and all coho species (also referred to as 'stocks' in this document).

In a letter received by the Council (dated March 3, 2023), NMFS summarized existing consultation standards and provided guidance on measures needed to protect species listed under the ESA during the 2023 fishing season. The letter summarized the measures analyzed and/or recommended in the relevant NMFSs BiOps on the effects of fisheries managed under the salmon FMP on listed salmon and specified limits applicable for the 2023 fishing season given abundance forecasts and other season-specific information. The letter also provides NMFS' recommendations for certain non-ESA listed stocks in the fishery. The ESA consultation standards, exploitation rates, and other criteria in place for the 2023 management season are presented in Table 5

## 5.0 OBLIGATIONS UNDER THE PACIFIC SALMON TREATY

In 1985 the PST was signed, setting long-term goals for the benefit of the shared salmon resources of the United States and Canada. The Pacific Salmon Commission (PSC) is the body formed by the governments of Canada and the United States to implement the PST.

### *5.1 Chinook Salmon Management*

A new ten-year agreement under the PST was adopted by both the U.S. and Canada and implemented beginning with the 2019 fishing year. The new agreement includes reductions to catch ceilings for the Southeast Alaska (SEAK) and West Coast Vancouver Island (WCVI) Aggregate Abundance Based Management (AABM) fisheries relative to the prior 2009 Agreement. For SEAK, the reductions range from 1.5 percent in years of high abundance to 7.5 percent in years of low abundance. For WCVI, the reductions range from 2.4 percent in years of high abundance to 12.5 percent in years of low abundance. Additionally, beginning with the 2019 Agreement, while annual catch limits continue to be determined using the abundance indices (AIs) from the PSC Chinook Model for the Northern British Columbia (NBC) and WCVI AABM fisheries, the annual catch limits for SEAK fisheries have been set using a catch-per-unit-effort (CPUE) estimate from the early winter power troll fishery (see Tables 1 and 2 in Chapter 3 of the 2019 Agreement for specifics). For 2023, the PSC approved the use of a new method for setting the

annual catch limit in the SEAK AABM fishery, which incorporates both the empirical CPUE information in addition to PSC Chinook Model-based abundance projections in a multivariate approach.

For the 2023 fishing season, the predicted abundance index produced using the multivariate model was 1.42, which corresponds to an all gear catch limit of 206,027 Chinook. The annual calibration of the PSC Chinook Model produced AIs of 1.16 for the NBC AABM fishery and 1.02 for the WCVI AABM fishery. These AIs correspond to catch limits of 141,700 and 115,500 for the NBC and WCVI AABM fisheries, respectively.

Fisheries not subject to AABM regimes, including Council area fisheries, are subject to a new set of Individual Stock Based Management (ISBM) obligations under the 2019 agreement. These provisions require the calendar year exploitation rate (CYER) by all U.S. fisheries south of the U.S./Canada border on specific indicator stocks to be below some level of the average 2009 – 2015 CYER if they do not achieve their management objectives (see Attachment I in Chapter 3 of the 2019 Agreement for specifics). Similar to previous ISBM obligations, these limits are taken into account during preseason planning processes, however, relative to meeting the provisions of the PST, the CYER limits are evaluated on a postseason basis only. Canadian fisheries that are not included in AABM complexes are managed under ISBM constraints, which, similar to U.S. ISBM fisheries, require the CYER by Canadian ISBM fisheries on specific indicator stocks to be below some level of the average 2009 – 2015 CYER if they do not achieve their management objectives. Expectations for Canadian and Alaskan fisheries harvest and stock abundance forecasts are incorporated into the Chinook Fishery Regulation Assessment Model (FRAM) to estimate total exploitation rate impacts from all marine fisheries (Table 5).

Key considerations for Canadian domestic fishery management for Chinook in 2023 include: (1) meeting domestic conservation obligations for WCVI, Lower Strait of Georgia, Fraser River Spring 4.2 and 5.2, Fraser Summer 5.2, Fraser Summer 4.1 and Fraser Fall 4.1 (Harrison River) stocks; (2) meeting First Nations Food, Social and Ceremonial and treaty obligations for Chinook harvests in native fisheries; and (3) monitoring of incidental impacts during commercial and native fisheries directed at sockeye, and chum salmon. It is anticipated that the details of the fishery regulatory package off WCVI and in the Juan de Fuca-Strait of Georgia areas will be driven by levels of allowable impact on WCVI, Lower Strait of Georgia and Fraser River Chinook stocks, in addition to Interior Fraser (Thompson River) coho, and potentially Thompson and/or Chilcotin River Steelhead. Increasing the availability of Chinook salmon in key foraging areas of Southern Resident Killer Whales in the southern British Columbia (BC) region is an additional consideration which will be supported through conservation actions implemented for Fraser River and other Chinook salmon.

## *5.2 Coho Salmon Management*

In 2002, the PSC adopted a management plan for coho salmon originating in Washington and Southern British Columbia River systems. The plan is directed at the conservation of key management units, four from Southern British Columbia (Interior Fraser, Lower Fraser, Strait of Georgia Mainland, and Strait of Georgia Vancouver Island) and nine from Washington (Skagit, Stillaguamish, Snohomish, Hood Canal, Strait of Juan de Fuca, Quillayute, Hoh, Queets, and Grays Harbor). Exploitation rate limits for intercepting fisheries are established for individual management units through formulas specified in the 2019 PST Southern Coho Management Plan and are based on total allowable fishery exploitation rates.

The categorical status of U.S. coho management units are reported to comply with obligations pursuant to the 2019 PST Southern Coho Management Plan. Categorical status is employed by the PSC under the 2019 PST Southern Coho Management Plan to indicate general ranges of allowable total exploitation rates for U.S. and Canadian coho management units. Three categories are employed: low (total exploitation rate less than 20 percent), moderate (total exploitation rate 20 percent to 40 percent), and abundant (total

exploitation rate greater than 40 percent). For the Puget Sound management units, the 2019 PST Southern Coho Management Plan uses the thresholds and stepped harvest rate goals from the Comprehensive Coho Agreement, developed by Washington and the Puget Sound tribes, and adopted by the Council as FMP conservation objectives in November 2009. Actual exploitation rate constraints for Canadian fisheries on U.S. coho management units are determined by formulas that specify sharing of allowable exploitation rates and a "composite rule." The composite rule adjusts constraints for Canadian fishery exploitation rates based on the number of U.S. management units which fall in a given category. For example, if only one Washington coastal or Puget Sound coho management unit is in low status, Canadian fisheries are constrained to a total exploitation rate on that unit of 12 percent; if two or more Washington coastal management units are in low status, the constraint becomes 10 percent. The most restrictive exploitation rate limit for Canadian fishery impacts on U.S. coho management units is 10 percent.

For several Washington coastal coho management units, management objectives are expressed as a range of spawning escapements expected to produce MSY. Allowable exploitation rates are calculated from the forecast abundance and the lower end of the escapement range and used to classify the categorical status of the management units. This rate is the maximum allowed under the PST when the management unit is in the moderate or abundant status, but exploitation rates up to 20 percent are allowed if the management unit is in the low abundance status.

For 2023, Puget Sound and Washington coast coho constraints are as follows:

**FMP**

| FMP Stock | Total Exploitation Rate Constraint[a/] | Categorical Status[a/] |
|---|---|---|
| Skagit | 35% | Low |
| Stillaguamish | 50% | Normal |
| Snohomish | 40% | Low |
| Hood Canal | 45% | Low |
| Strait of Juan de Fuca | 40% | Low |
| Quillayute Fall | 59% | |
| Hoh | 65% | |
| Queets | 65% | |
| Grays Harbor | 65% | |

**PST Southern Coho Management Plan**

| U.S. Management Unit | Total Exploitation Rate Constraint[b/] | Categorical Status[c/] |
|---|---|---|
| Skagit | 35% | Moderate |
| Stillaguamish | 50% | Abundant |
| Snohomish | 40% | Moderate |
| Hood Canal | 45% | Moderate |
| Strait of Juan de Fuca | 40% | Moderate |
| Quillayute Fall[c/] | 53% | Abundant |
| Hoh[c/] | 69% | Abundant |
| Queets[c/] | 53% | Abundant |
| Grays Harbor[c/d/] | 69% | Abundant |

a/ Preliminary. For Puget Sound stocks, the exploitation rate constraints and categorical status (Normal, Low, Critical) reflect application of Comprehensive Coho Agreement rules, as adopted in the FMP. For Washington Coast stocks, exploitation rate constraints represent MFMT. Note that under *U.S. v. Washington* and *Hoh v. Baldrige* case law, the management objectives can differ from FMP objectives provided there is an annual agreement among the state and tribal comanagers; therefore, the exploitation rates used to report categorical status do not necessarily represent maximum allowable rates for these stocks.

b/ Preliminary. For Puget Sound and Washington Coast management units, the exploitation rate constraints reflect application of the 2019 PST Southern Coho Management Plan.

c/ Categories (Abundant, Moderate, Low) correspond to the general exploitation rate ranges depicted in paragraph 8(b)(iii) of the 2019 PST Southern Coho Management Plan. For Washington Coast stocks, categorical status is determined by the exploitation rate associated with meeting the escapement goal (or the lower end of the escapement goal range). As Washington Coast stocks are managed to achieve agreed escapement goals, this exploitation rate also becomes an approximation of the maximum allowable rate unless the stock is in the "Low" status. In that case, an ER of up to 20% is allowed.

d/ Based on projected natural area spawners (wild plus hatchery strays) and MSP escapement goal of 35,400. Exploitation rate constraint subject to change should comanagers agree to a modified escapement goal under *U.S. v. Washington* and *Hoh v. Baldrige* case law.

Key considerations for Canadian fishery management for coho in 2023 are expected to include: (1) meeting domestic conservation obligations for Interior Fraser (including Thompson River) coho; (2) coho harvests by First Nations fisheries; (3) incidental impacts during commercial and First Nations fisheries directed at Chinook, chum, and especially Fraser sockeye salmon which will see a dominant late run return in 2023. The Canadian fishery regimes affecting coho are expected to be driven by Canadian domestic allowable impacts on the Thompson River component of the Interior Fraser management unit, Fraser Chinook concerns and Fraser sockeye stocks of concern co-migrating with the late run.

In years prior to 2014, Canadian fisheries were managed so as not to exceed a three percent maximum exploitation rate. In May 2014, Canada decided to permit up to a 16 percent exploitation rate on upper Fraser coho in Canadian fisheries to allow for impacts in fisheries directed at a record Fraser sockeye forecast. Since 2015, upper Fraser coho in Canadian fisheries have been managed per low status limitations. The projected status of Canadian coho management units in 2023 indicates continuing concerns for the condition of Interior Fraser coho. The Interior Fraser coho management unit is anticipated to remain in low abundance status, resulting in a requirement to constrain the total mortality fishery exploitation rate for 2023 Southern U.S. fisheries to a maximum of 10.0 percent.

# 6.0 CHINOOK SALMON MANAGEMENT

## *6.1 North of Cape Falcon*

Abundance projections important to Chinook harvest management north of Cape Falcon in 2023 are:

- *Columbia River hatchery tules*. Combined production of Lower River Hatchery (LRH) and Spring Creek Hatchery (SCH) stocks returning to the Columbia River is forecasted to be 213,200, which is higher than the 2022 preseason expectation of 164,200. The LRH forecast is 77,100, which is greater than the forecast of 73,000 in 2022. The SCH forecast is 136,100, which is greater than the 2022 forecast of 91,200.

### 6.1.1 Objectives

Key Chinook salmon management objectives shaping management measures north of Cape Falcon are:

- NMFS consultation standards and annual guidance for ESA listed species as provided in Section 4.0 above. Relevant ESUs (may be referred to as stocks in this document) for the area north of Cape Falcon include LCR Chinook (natural tule component and referred to as LCR natural tule fall Chinook in this document), Lower Columbia River wild fall Chinook (natural component and referred to as LRW fall Chinook in this document), and SRW fall Chinook.
- Fisheries north of Cape Falcon were shaped to minimize impacts on the LCR natural tule fall Chinook ESU.

### 6.1.2 Achievement of Objectives

Fishery quotas under the adopted management measures are presented in Table 4. Stock-specific management criteria and their forecast values are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality estimates are summarized in Table 6. Table 7 provides a breakdown of impacts by fishery and area for LCR tule Chinook. Descriptions pertaining to the achievement of key objectives for Chinook salmon management north of Cape Falcon are as follows:

- *LCR natural tule fall Chinook*. The Council adopted management measures have a projected total exploitation rate of 38.0 percent, which is within the 38.0 percent maximum for 2023.

- *LRW fall Chinook*. The Council adopted management measures have a projected ocean escapement of 8,700, which is projected to be sufficient to meet the ESA consultation standard of an adult spawning escapement of at least 5,700 in the North Fork Lewis River.

- *SRW fall Chinook*. The Council adopted management measures have an ocean exploitation rate that is 49.0 percent of the base period exploitation rate, which is less than the ESA consultation standard of no more than 70 percent of the 1988 – 1993 base period exploitation rate for all ocean fisheries.

The adopted management measures for Council-area Chinook fisheries north of Cape Falcon satisfy NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for relevant Chinook stocks (Table 5).

## *6.2 South of Cape Falcon*

Status of Chinook stocks important to 2023 Chinook harvest management south of Cape Falcon are:

- *SRFC*. The Sacramento Index forecast is 169,767, which is lower than the 2022 forecast of 396,458.
- *KRFC*. The ocean abundance forecast for this stock is 75,256 age-3, 27,198 age-4, and 1,339 age-5 fish. These compare to the 2022 forecasts of 154,998 age-3, 43,211 age-4, and 1,908 age-5 fish.
- *SRWC*. The forecast of age-3 escapement absent fishing is 4,540, which is less than the 2022 forecast of 5,971.

### 6.2.1 Objectives

Key Chinook salmon management objectives shaping management measures south of Cape Falcon are:

- A KRFC natural area spawner escapement of at least 23,614 adults, which is produced, in expectation, by a maximum exploitation rate of 10.0 percent (FMP control rule).
- A SRFC hatchery and natural area spawner escapement of at least 122,000 adults (FMP control rule).
- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant ESA-listed stocks (species or components thereof) for the area south of Cape Falcon include SRWC, California coastal Chinook, SRW fall Chinook, and LCR natural tule Chinook.

The maximum allowable exploitation rate for KRFC in 2023 is 10 percent, which is a de minimis exploitation rate. In such cases, the FMP stipulates:

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

The Salmon Technical Team has assessed these circumstances, with the exception of minimal needs for Tribal fisheries.

**Potential for low spawner abundance**
The potential for critically low natural spawner abundance is considered high. The 2023 minimum natural-area spawner escapement of 23,614 adults is below the minimum stock size threshold (MSST; 30,525). A natural-area escapement of 23,614 adults would represent the 12th lowest value over the past 45 years of data.

**Substocks**
To assess the potential for critically low abundance of substocks, a statistical model (PFMC 2007, Appendix D) was applied to historical run size data to assess the probability that escapement to either the Salmon, Scott, or Shasta rivers would fall below 720 adults, given a total, basin-wide natural area escapement of 23,614 adults in 2023. The 720 escapement threshold for these substocks was based on effective population size (genetic) considerations. Application of the model suggested that at least one of the substocks would fall below the 720 adult threshold with a probability of 0.39.

**Recent spawner abundance**
The natural-area adult spawner escapement has been lower than MSST in seven of the last ten years and four of the last five years. The 2023 forecast of natural-area spawners in the absence of fishing is 26,238 adults, which is below the maximum sustainable yield spawner escapement ($S_{MSY}$; 40,700) and the MSST. If fishing seasons are structured such that the maximum allowable exploitation rate of 10 percent is met, the natural-area adult spawner expectation is 23,614, which is lower than the MSST and $S_{MSY}$.

**Comingled stocks**
With regard to co-mingled stocks, Sacramento River fall Chinook have a low abundance forecast and are a constraint to fisheries in 2023.

**Indicators of marine and freshwater environmental conditions**
Indicators of marine and freshwater conditions encountered by KRFC broods in the 2023 fisheries [primarily brood years 2019 (age-4 in 2023) and 2020 (age-3 in 2023)] were provided in the Habitat Committee report at the March 2023 PFMC meeting.

Brood year 2019 KRFC were the progeny of a low abundance of spawners. Egg to fry productivity was above average, but outmigrants encountered low flows. The number of hatchery fish released was well below average, but the release timing relative to the spring transition in the ocean was favorable for survival. Early marine survival indicators were mixed. The mean status score for freshwater life stages of the 2019 brood was below average while the mean status score for the marine component of the lifecycle was above average.

Brood year 2020 KRFC were the progeny of a spawner abundance near the mean value, and incubation indicators were also close to the mean. Outmigrants encountered low flows and high temperatures. Hatchery production was below average, but hatchery-origin outmigrants encountered favorable river and ocean conditions. Early marine survival indicators were generally near mean values, the exception being a favorable North Pacific Index. The mean status score for freshwater life stages of the 2020 brood was below average while the mean status score for the marine component of the lifecycle was above average.

**Approaching an overfished condition**
The KRFC stock currently meets the criteria for approaching an overfished condition.

**Overfished status**
KRFC was declared overfished following the 2017 escapement and continues to meet the criteria for overfished status in 2023.

### 6.2.2 Achievement of Objectives

Fishery quotas under the adopted management measures are presented in Table 4. Stock-specific management criteria and their forecast values under the adopted management measures are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality estimates are summarized in Table 6. Table 7 provides a breakdown of impacts by fishery and area for LCR tule Chinook. Table 12 provides an assessment of stock status. Descriptions pertaining to the achievement of key objectives for Chinook salmon management south of Cape Falcon are found below.

- *KRFC*. The projected natural-area adult escapement is 23,614, which is equivalent to the FMP control rule-defined minimum for 2023.
- *SRFC*. The adopted management measures result in a projected escapement of 164,964, which exceeds the FMP control rule-defined minimum of 122,000 hatchery and natural area adult spawners.
- *SRWC*. The adopted management measures result in a projected age-3 impact rate of zero percent, which is consistent with the ESA consultation standard that (1) limits the age-3 impact rate in 2023 fisheries south of Point Arena to a maximum of 20.0 percent and (2) specifies time/area closures and minimum size limit constraints south of Point Arena.
- *California coastal Chinook*. The adopted management measures result in a projected KRFC age-4 ocean harvest rate of 0.3 percent, which is consistent with the 2023 NMFS guidance to limit the forecast KRFC age-4 ocean harvest rate to a maximum of 10.0 percent.
- *SRW fall Chinook*. The adopted management measures have an ocean exploitation rate of 49.0 percent of the base period exploitation rate, which is less than the ESA consultation standard of no more than 70 percent of the 1988-1993 base period exploitation rate for all ocean fisheries.
- *LCR natural tule fall Chinook.* The projected exploitation rate in the adopted management measures is 38.0 percent and meets the 38.0 percent maximum for 2023.

The adopted management measures for Chinook fisheries south of Cape Falcon satisfy NMFS ESA consultation standards and guidance. However, KRFC does not meet its conservation objective of 40,700 natural area adult spawners (Table 5).

## 7.0 COHO SALMON MANAGEMENT

Abundance projections important to coho harvest management in Council area fisheries in 2023 are:

- *Oregon Production Index (OPI) Hatchery coho.* The forecast for hatchery coho from the Columbia River and the coast south of Cape Falcon of 896,900 is lower than the 2022 forecast of 1,003,500. The Columbia River early coho forecast is 481,800 compared to the 2022 forecast of 592,500, and the Columbia River late coho forecast is 404,300 compared to the 2022 forecast of 404,700.
- *Oregon coastal natural (OCN) coho.* The OCN forecast is 238,800 compared to the 2022 forecast of 222,400.
- *Lower Columbia natural (LCN) coho.* The LCN forecast is 45,500 compared to the 2022 forecast of 65,700.
- *Puget Sound coho.* Among Puget Sound natural stocks, Skagit, Snohomish, Hood Canal, and Strait of Juan de Fuca coho are in the low category. Stillaguamish coho are in the normal category.
- *Interior Fraser (Thompson River) coho.* This Canadian stock continues to be depressed and continues to constrain ocean coho fisheries north of Cape Falcon.

- *Washington coastal coho.* Forecasts for Washington coastal coho stocks as an aggregate are similar for natural stocks and increased for hatchery stocks compared to 2022. Among Washington coastal natural stocks, Quillayute fall, Queets, Hoh, and Grays Harbor coho are all in the abundant category under the PST Southern Coho Management Plan.

## 7.1 Objectives

Key coho management objectives shaping management measures in 2023 Council area fisheries are:

- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant stocks include Central California Coast coho (south of the Oregon/California border), Southern Oregon/Northern California Coastal (SONCC) coho, OCN coho, and LCN coho. The maximum allowable exploitation rates for 2023 are: (1) a combined marine/freshwater exploitation rate not to exceed 20.0 percent for OCN coho, (2) a combined exploitation rate in marine-area and mainstem Columbia River fisheries not to exceed 23.0 percent for LCN coho, and (3) a total exploitation rate not to exceed 16.0 percent for the Trinity River component of SONCC coho and a total exploitation rate not to exceed 15.0 percent for all other components of the SONCC coho ESU. Furthermore, coho retention is prohibited in all California ocean fisheries.
- Salmon FMP conservation objectives and obligations under the PST Southern Coho Management Plan for stocks originating along the Washington coast, Puget Sound, and British Columbia as provided in Section 6.2 above. The forecasts for Washington coastal coho stocks are abundant in 2023; these stocks contribute to fisheries off Washington. Forecasts for some Puget Sound coho stocks in 2023 are low; however, the majority of the exploitation on these stocks occurs in Puget Sound and has been addressed in development of fishing seasons for inside waters during the North of Falcon co-management process by the state and tribes of Washington prior to the April Council meeting. The forecast for Interior Fraser coho in 2023 is low; because of their abundance status, Interior Fraser coho are subject to an exploitation rate ceiling of 10.0 percent in southern U.S. fisheries under the PST Southern Coho Management Plan.
- Queets natural coho, Strait of Juan de Fuca natural coho, and Snohomish natural coho salmon stocks were classified as overfished in 2018, and the Council adopted rebuilding plans for these stocks in 2019. In 2020, Snohomish natural coho was reported to have met the criteria for not overfished-rebuilding. In 2023, Snohomish natural coho was reported to have met the criteria for rebuilt and Strait of Juan de Fuca natural coho was reported to have met the criteria for not overfished-rebuilding. Queets natural coho continue to meet the criteria for overfished. Coho fisheries, particularly north of Cape Falcon, were shaped to minimize impacts on these stocks and meet the objectives of the rebuilding plans. Objectives of the rebuilding plans for Queets natural coho and Strait of Juan de Fuca natural coho are to manage the stock under status quo $S_{msy}$.

## 7.2 Achievement of Objectives

Fishery quotas under the adopted management measures are presented in Table 4. Stock-specific management criteria and their forecast values are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality are summarized in Table 6. Table 7 provides a breakdown of impacts by fishery and area for LCN, OCN, and SONCC coho populations. Table 8 provides expected coho mark rates for west coast fisheries by month. Table 12 provides an assessment of stock status, including expected spawning escapement and exploitation rates under the adopted management measures.

- *SONCC coho.* The adopted management measures satisfy the maximum 16 percent exploitation rate for the Trinity River component of the SONCC coho ESU and 15 percent for all other components when projected marine impacts are combined with projected freshwater impacts. The marine exploitation rate is 1.8 percent for all SONCC coho components. The freshwater

exploitation rates are 13.2 percent, 5.9 percent, 4.9 percent, and 0.0 percent for Trinity, Klamath, Rouge, and other SONCC coho ESU components, respectively.

- *OCN coho*. The adopted management measures satisfy the maximum 20.0 percent exploitation rate for combined marine and freshwater fisheries, with a marine exploitation rate of 14.1 percent and a freshwater exploitation rate of 5.8 percent.
- *LCN coho.* The adopted management measures satisfy the maximum 23.0 percent exploitation rate for combined marine and mainstem Columbia River fisheries, with a marine exploitation rate of 14.3 percent and a mainstem Columbia River exploitation rate of 4.6 percent.
- *Washington coastal natural coho*. The adopted management measures provide ocean escapement numbers of 12,521, 5,448, 10,251, and 102,101 for Quillayute fall, Hoh, Queets, and Grays Harbor natural coho, respectively. These ocean escapement levels, when combined with scheduled in-river fisheries, meet FMP management objectives or objectives agreed to by the treaty tribes and Washington Department of Fish and Wildlife (WDFW) for those coho stocks. Expected exploitation rates are 42.6 percent, 51.0 percent, 40.9 percent, and 55.6 percent for Quillayute fall, Hoh, Queets, and Grays Harbor natural coho, respectively, which comply with both the FMP and the PST Southern Coho Management Plan (Section 5.2 and Table 12).
- *Queets natural coho.* Currently meets the stock status criteria for overfished. The adopted management measures comply with the objective in the Rebuilding Plan.
- *Strait of Juan de Fuca natural coho.* Currently meets the stock status criteria for not overfished-rebuilding. The adopted management measures comply with the objective in the Rebuilding Plan.
- *Interior Fraser coho*. The Southern U.S. exploitation rates in the adopted management measures total 9.7 percent, which complies with the 10.0 percent maximum required by the PST Southern Coho Management Plan

The adopted management measures for coho fisheries satisfy NMFS ESA consultation standards and guidance, FMP objectives, and all other objectives for relevant coho stocks including those listed in Table 5.

## 8.0 PINK SALMON MANAGEMENT

Pink salmon merit management consideration in 2023. Impacts on Chinook and coho in pink-directed fisheries may be part of negotiations to reach a final agreement in North of Cape Falcon ocean and Puget Sound fisheries

## 9.0 IMPORTANT FEATURES OF THE ADOPTED MANAGEMENT MEASURES

Significant changes from recent seasons are highlighted below, but this section is not intended to be a comprehensive description of the adopted management measures. For detailed information on the adopted ocean salmon seasons see Table 1 (non-Indian commercial), Table 2 (recreational), and Table 3 (Treaty Indian).

Adopted management measures in the area north of Cape Falcon were shaped to meet NMFS consultation standards, comply with Council-adopted rebuilding plans, and follow annual guidance for Chinook and coho stocks of concern. The 2023 Chinook total allowable catch (TAC) is increased from the 2022 TAC due to greater abundances of Columbia River Chinook. The 2023 coho TAC is slightly decreased but similar compared to last year's TAC due to similar abundance forecasts for Columbia River hatchery and coastal Washington coho stocks and constrained by low forecasts for Interior Fraser (Thompson River) natural coho.

Fisheries south of Cape Falcon are constrained by KRFC and SRFC. KRFC are being managed under the *de minimis* portion of its harvest control rule, which in 2023 specifies a maximum allowable exploitation rate of 10.0 percent and a minimum escapement of 23,614 natural area adult spawners.

## 9.1 Commercial

North of Cape Falcon, the non-Indian troll Chinook quota is split two thirds in the spring (May-June) fishery and one third the summer fishery (July-September). The non-Indian commercial Chinook quota of 39,000 is increased compared to the 27,000 Chinook quota in 2022. The non-Indian commercial coho quota of 30,400 is slightly reduced relative to the 2022 quota of 32,000 coho.

The spring fishery in the area north of Cape Falcon will be open for all salmon except coho seven days per week May 1 through June 29. Chinook subarea guidelines and weekly (defined as Thursday through Wednesday) and per open period (June 22-29) landing and possession limits in effect are: 70 Chinook in the area between the U.S./Canada border and the Queets River, 150 Chinook in the area between the Queets River and Leadbetter Point, and 60 Chinook in the area between Leadbetter Point and Cape Falcon. In 2024, the season is scheduled to open May 1 for all salmon except coho consistent with preseason regulations as described for this area and subareas for May 16-June 29, 2023.

The summer fishery in the area north of Cape Falcon will be open for all salmon seven days per week July 1 through September 30. A landing and possession limit of 150 marked coho per vessel per landing week is in effect coastwide, and all landed coho must be marked with a healed adipose fin clip.

Commercial fisheries south of Cape Falcon are substantially reduced relative to the 2022 management measures. In the area between Cape Falcon and Humbug Mountain the commercial fishery will be open for all salmon for the month of September with a non-mark selective coho quota of 10,000. For the month of October, the fishery is open shoreward of the 40-fathom regulatory line and all salmon except coho may be retained. A landing and possession limit of 75 Chinook and coho per vessel per landing week are in place.

For the Oregon portion of the Klamath Management Zone (KMZ), from Humbug Mountain to the Oregon/California border, the season will be closed in 2023.

The area from the Oregon/California border to the U.S./Mexico border will be closed to ocean salmon fishing.

## 9.2 Recreational

North of Cape Falcon, the recreational Chinook quota of 39,000 is increased from the 2022 quota of 27,000 Chinook. The recreational coho quota of 159,600 is slightly decreased from the 2022 quota of 168,000 coho. All landed coho must be marked with a healed adipose fin clip.

The Neah Bay and La Push subareas will open seven days per week for all salmon species June 17 through the earlier of September 30 or when Chinook subarea guidelines or coho subarea quotas are attained. The daily bag limit in both subareas is two salmon, of which only one may be a Chinook. The La Push subarea reopens for a limited area fishery October 3-7 with a daily bag limit of one salmon, Chinook only.

The Westport and Columbia River subareas will open seven days per week for all salmon species June 24. through the earlier of September 30 or when Chinook subarea guidelines or coho subarea quotas are attained. The daily bag limit in both subareas is two salmon, of which only one may be a Chinook.

In Oregon from Cape Falcon to the Oregon/California border the coho fisheries include an opening from June 17 through August 31 with a mark-selective coho quota of 110,000. From Cape Falcon to Humbug Mountain, all salmon may be retained in the month of September, with a non-mark-selective coho quota of 25,000 and daily bag limit of two salmon per day but only one may be a Chinook. In October, the fishery is open shoreward of the 40 fathom regulatory line and all salmon except coho may be retained with a bag limit of one salmon per day.

The area from the Oregon/California border to the U.S./Mexico border will be closed to ocean salmon fishing.

### *9.3 Treaty Indian*

The Treaty Indian Troll Chinook quota is split evenly between the spring (May-June) fishery and the summer fishery (July-September). The Treaty Indian troll fishery opens on May 1 with a Chinook only fishery and runs through June 30 with a sub-quota of 22,500. The summer fishery opens on July 1 and runs through September 15 with a sub-quota of 22,500 Chinook and 57,000 coho. The Treaty Indian fishery management areas are located between the U.S./Canada border and Pt. Chehalis, Washington (Table 3, C.1).

## 10.0 SOCIOECONOMIC IMPACTS OF THE ADOPTED MANAGEMENT MEASURES

### *10.1 Economic Impacts*

The short-term economic effects of the Council-adopted management measures for non-Indian fisheries are shown in Tables 9 and 10. Table 9 shows projected commercial troll impacts by management (catch) area expressed in terms of estimated potential exvessel value. Table 10 shows projected recreational fishery impacts by management area in terms of the number of projected angler-trips and community personal income impacts generated by those activities. Note that exvessel revenue values shown for the commercial troll fishery in Table 9 and income impact values shown for the recreational fishery in Table 10 are not directly comparable. More directly comparable measures of short-term economic impacts from commercial and recreational salmon fisheries appear in Figures 3 and 4, which show estimated community income impacts under the Council-adopted commercial troll and recreational fishery management measures, respectively, compared to historic levels in real (inflation-adjusted) dollars. Income impacts indicate the amount of income generated by the economic linkages associated with commercial and recreational fishing. While reductions in income impacts associated with an activity may not necessarily reflect net losses in a particular community (depending on the degree to which there is compensating activity), they are likely to indicate losses to the community's businesses and individuals that depend on the lost activity for their livelihood.

Total economic effects may vary from what is indicated by the short-term impact estimates from ocean fisheries activities reported in Tables 9 and 10 and Figures 3 and 4. Salmon that remain unharvested in the ocean do not necessarily represent an economic loss, as they may augment inside harvest or provide additional spawning escapement that contributes to ocean abundance in subsequent years. Restricting ocean harvests may increase opportunities for inside harvesters (e.g., higher commercial revenue or more angler trips) or contribute to higher inside CPUE representing lower costs for commercial harvesters and/or higher success rates for recreational fishers. Salmon that remain unharvested by both ocean fisheries and inside fisheries may impact future production, although the magnitude and direction of this effect varies depending on the biology of the affected stocks, habitat, and environmental factors.

Exvessel revenues in Table 9 are based on estimated harvest by catch area, while commercial income impacts in Figure 3 are based on projected deliveries by landing area. Historically there has been a divergence between catch and deliveries (landings) associated with a particular area. The difference is due to salmon caught in certain management areas being delivered to ports in neighboring management areas. In an attempt to account for this effect and assign income impacts to the "correct" landing area, adjustments are made based on historical patterns. The patterns are typically inferred from the most recent year's catch and landings data. For example, 2022 data shows there were deliveries of salmon: (1) caught north of Cape Falcon to landing ports between Cape Falcon and Humbug Mountain; (2) caught between Cape Falcon and Humbug Mountain to landing ports in the Oregon KMZ region; (3) caught between 40°10' N. Lat. and Point Arena (Fort Bragg Region) to landing ports in the California KMZ region (Crescent City and Eureka); (4) caught between Point Arena and Pigeon Point (San Francisco Region) to landing ports south of Pigeon Point (Monterey region); and (5) caught south of Pigeon Point to landing ports in the San Francisco region and also a small amount delivered in the California KMZ region.

The expected harvest levels used to model commercial fishery impacts are taken from Table 6. Estimated harvests do not include a relatively small amount occurring in the state-waters-only (SWO) fishery off southern Oregon. Estimated total commercial harvest combined with the prior year's average Chinook and coho weights per fish caught and exvessel prices per pound were assumed to be the best indicators of expected revenues in the coming season. Coastwide average Chinook weight per fish in 2022 was approximately seven percent below the prior year and three percent below the recent five-year (2018-2022) average, while coastwide average Chinook exvessel prices in 2022 were 14 percent below the prior year and 10 percent below the recent five-year (2018-2022) average in inflation-adjusted terms. Coastwide average coho weight per fish in 2022 was approximately five percent below the prior year but roughly equal to the recent five-year (2018-2022) average, while coastwide average coho exvessel prices in 2022 were 30 percent below the prior year and 15 percent below the recent five-year (2018-2022) average in inflation-adjusted terms. If this year's actual average weights per fish or exvessel prices diverge significantly from what was observed last year, then salmon exvessel revenues and resulting commercial fisheries income impacts projected in this document may prove to be correspondingly biased.

Fishing effort estimates for the recreational fishery south of Cape Falcon are based on measures developed by the STT for modeling Chinook biological impacts. STT estimates for recreational Chinook fisheries south of Cape Falcon use multi-year averages to predict effort for the coming year. Consequently, if the multi-year average for a particular time period and area happens to be higher than last year's effort level, then the model may forecast an increase in effort for the coming year even if management measures did not change from the previous year. Estimated recreational effort does not include a relatively small amount that often occurs in the SWO fisheries off central and southern Oregon. For the first time since 2009, in the area between Cape Falcon and the Oregon/California border, recreational Chinook catch is projected to be minimal (i.e., fewer than 1,000 fish) while coho were projected to be at least as available as last year. Consequently, to account for expected coho-driven recreational effort, additional parameters were calculated using the historical relationship between observed catch and effort in the two management areas in the region (i.e., Cape Falcon to Humbug Mountain, and Humbug Mountain to the Oregon/California border). These parameters were then applied to projected coho availability south of Cape Falcon in order to estimate the geographic distribution of recreational catch and effort under the adopted Alternative.

Recreational fishery effort north of Cape Falcon was estimated using historical CPUE estimates ("success rates") applied to salmon quotas and expected harvest levels under the adopted Alternative. Projections of recreational catch north of Cape Falcon were made by multiplying the proposed quotas for Chinook and coho by historic ratios of actual catch to actual quotas. Effort and economic impacts were then estimated by summing recent year weighted average coho and Chinook angler success rates multiplied by projected coho and Chinook recreational catch.

Unless otherwise noted, economic effects of the proposed commercial and recreational fisheries actions summarized below are compared in terms of estimated community income impacts.

## *10.2 Community Impacts*

Two types of impacts are discussed in this section. "Income impacts" are the measures of economic activity as described in the previous section. "Impacts" of the action, from a NEPA perspective, are the change from a baseline. In this case, the baseline is the 2022 fishery, but information is also provided comparing projections to 2018-2022 five-year averages. When referencing impacts of the action from a NEPA perspective, either a comparison to the baseline is provided or the generic term "impacts" is used. An overall summary of impacts from the Proposed Action (adopted Alternative) is provided in the following section.

Projected income impacts under the Proposed Action in coastal communities adjacent to commercial and recreational salmon fishery management areas are shown in Figure 3 and Figure 4; and comparisons of income impacts under the Proposed Action with income impacts under Alternatives I, II and III are summarized in Table 11. For an assessment of the impact of the Proposed Action, comparisons to 2022 and 2018-2022 average income impacts are provided.

Projected coastwide income impacts from commercial salmon landings and processing under the Proposed Action are within the range analyzed under the Alternatives and will result in an approximately 85 percent reduction in estimated total coastwide commercial fisheries income impacts compared to last year, which is also approximately 84 percent below the recent five-year (2018-2022) average (Figure 3 and Table 11). Regionally the picture is mixed, with income impacts from commercial salmon fisheries under the Proposed Action projected to be 61 percent above last year's level north of Cape Falcon, but below last year's levels in all six regions south of Cape Falcon, including a reduction of 87 percent between Cape Falcon and Humbug Mountain, and reductions approaching 100 percent between Humbug Mountain and the Oregon/California border and in all areas south of the Oregon/California border due to closures of commercial salmon fisheries in those areas. With respect to the 2018-2022 inflation-adjusted average, income impacts from commercial salmon fisheries under the Proposed Action are projected to be 56 percent above the recent average level north of Cape Falcon, but below the average in all six regions south of Cape Falcon, including a reduction of 84 percent between Cape Falcon and Humbug Mountain, and reductions approaching 100 percent between Humbug Mountain and the Oregon/California border and all areas south of the Oregon/California border due to closures of commercial salmon fisheries in those areas (Figure 3 and Table 11).

Projected coastwide income impacts resulting from expenditures by recreational salmon anglers under the Proposed Action are within the range analyzed under the Alternatives and are projected to result in an approximately 56 percent reduction in total coastwide recreational fisheries income impacts compared to last year's activity (Table 11 and Figure 4), which is also 50 percent below the recent five-year (2018-2022) average. Regionally the picture is mixed, with income impacts from recreational salmon fisheries under the Proposed Action projected to be four percent above last year's level north of Cape Falcon, but below last year's levels in all six regions south of Cape Falcon, including reductions of 28 percent between Cape Falcon and Humbug Mountain, and 12 percent between Humbug Mountain and the Oregon/California border, and reductions of 100 percent for all areas south of the Oregon/California border due to closures of recreational salmon fisheries in those areas. With respect to the 2018-2022 inflation-adjusted average, income impacts from recreational salmon fisheries under the Proposed Action are projected to be 36 percent above the average level north of Cape Falcon, but below the recent average in all six regions south of Cape Falcon, including reductions of 19 percent between Cape Falcon and Humbug Mountain, and 46 percent between Humbug Mountain and the Oregon/California border, and reductions of 100 percent for all areas south of the Oregon/California border due to closures of recreational salmon fisheries in those areas (Figure 4, and Tables 10 and 11).

## *10.3 Social Impacts*

The effect of the Proposed Action on other indicators of community social welfare (e.g., poverty, divorce rates, graduation/dropout rates, incidents of domestic violence, etc.) cannot be directly measured. Change in personal income in communities may be used as a rough proxy for other socioeconomic effects. However, changes in the broader regional economy ("cumulative effects") and long-term trends in fishery-related employment are more likely to drive these indicators of social wellbeing than the short-term economic effects of the Proposed Action.

To the extent practicable, social impacts were considered when tribal and non-tribal commercial and recreational salmon seasons were shaped. To minimize regulatory complexity in recreational fisheries,

season dates and regulations were kept as consistent as possible within major management areas. Bag limits allow a greater number of fishers to participate in the fishery. Minimum size limits generally remain consistent throughout the season in most areas, which, in addition to biological benefits, tends to increase regulatory compliance. Where size limits do change in-season, the size limits decrease, such that anglers complying with earlier size limits will still be in compliance with the smaller size limits. Efforts were made to accommodate important cultural events such as Memorial Day, Independence Day, and Labor Day holidays as well as traditional fishing derby events. Commercial fisheries often include vessel limits per trip or per open period to stretch quota attainment over a longer period of time. Doing so can provide greater access for smaller vessels, increase safety at sea by limiting the incentive to fish in inclement weather, improve marketing opportunities, and extend the period during which consumers have access to fresh, wild caught salmon. Notification mechanisms by phone, text or email allow commercial vessels greater flexibility in choosing a port of landing to take advantage of better markets or to access better infrastructure.

Salmon are an important part of tribal culture and have been since time immemorial. Salmon provide economic, cultural, ceremonial, and subsistence benefits to west coast tribal communities. Under the Proposed Action, based on the adopted Chinook and coho quotas, Washington coastal treaty tribes are projected to have somewhat greater opportunities to harvest ocean Chinook and coho compared with 2022. Tribal ocean fisheries north of Cape Falcon would be allocated 45,000 Chinook and 57,000 coho for ocean-area harvest compared with the actual 2022 allocations of 40,000 Chinook and 52,000 coho (Table 3 and Table 6). The Klamath River tribal share under the Proposed Action is 1,872 adult KRFC, an 80 percent reduction from the 2022 allocation of 9,434 adult KRFC (Table 5). Note that as with the non-tribal commercial and recreational salmon fisheries described in Section 10.1, restricting ocean salmon harvests may allow increased opportunities for inside harvest and escapement (and vice versa).

## 11.0 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The Proposed Action, adoption of the 2023 ocean salmon management measures, was assessed relative to the environmental components and criteria established in Preseason Report II (Part 2 of this EA). The impacts of the Proposed Action on most target stocks and ESA-listed salmon fall within the range of impacts analyzed for the Alternatives in Preseason Report II. For stocks where the impacts of the Proposed Action may fall outside the range of impacts under the Alternatives in Preseason Report II, such impacts result from the shaping of fisheries that occur outside of the Council area, and are within the impact limitations of the FMP, ESA consultation standards, and PST (Table 11). Economic impacts of the Proposed Action fall within the range of impacts projected for the Alternatives in Preseason Report II as summarized in Table 11.

Under No Action, the seasons would be the same as in 2022. Although not true for all regions, relative to No Action (as represented by the 2022 values) the Proposed Action would provide lower overall coastwide income impacts from commercial fishing and recreational fishing (Table 11).

As stated in Preseason Report II (PFMC, 2023c), it was not possible to discern differences in the effects of the Alternatives or Proposed Action on other components of the environment (non-target fish species, marine mammals, other ESA-listed species, sea birds, biodiversity and ecosystem function, and public health and safety), and the effects were not expected to be significant under any of the Alternatives.

## 12.0 REFERENCES

PFMC. 2023a. Review of 2022 ocean salmon fisheries. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/

PFMC. 2023b. Preseason Report I: Stock abundance analysis and environmental assessment part 1 for 2023 ocean salmon fishery regulations. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/

PFMC. 2023c. Preseason Report II: Proposed alternatives and environmental assessment part 2 for 2023 ocean salmon fishery regulations. Pacific Fishery Management Council, Portland, Oregon. https://www.pcouncil.org/

TABLE 1. 2023 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 1 of 6)

**A. SEASON DESCRIPTIONS**

**North of Cape Falcon**

**Supplemental Management Information**

1. Overall non-Indian TAC: 78,000 Chinook and 190,000 coho marked with a healed adipose fin clip (marked).
2. Non-Indian commercial troll TAC: 39,000 Chinook and 30,400 marked coho.
3. For fisheries scheduled prior to May 16, 2023: See 2022 management measures, which are subject to inseason action and the 2023 season description described below.

*Model run:* Coho-2317, Chinook-2023

**U.S./Canada Border to Cape Falcon**

- May 1-15. See 2022 management measures, which are subject to inseason action and the 2023 season described below.

- May 16 through the earlier of June 29, or 26,000 Chinook. No more than 6,890 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 6,040 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8).

  - May 16 – June 21; open seven days per week (C.1); then
  - June 22 – June 29.

In the area between the U.S./Canada border and the Queets River the landing and possession limit is 70 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly, inseason (C.1, C.6).

In the area between the Queets River and Leadbetter Pt. the landing and possession limit is 150 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly, inseason (C.1, C.6).

In the area between Leadbetter Pt. and Cape Falcon the landing and possession limit is 60 Chinook per vessel per landing week (Thurs.-Wed.) and June 22-29. Landing limits will be evaluated weekly inseason (C.1, C.6).

All salmon, except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

When it is estimated that approximately 50% of the overall Chinook quota or any Chinook subarea guideline has been landed, inseason action may be considered to ensure the quota and subarea guidelines are not exceeded.

If the Chinook quota is exceeded, the excess will be deducted from the all-salmon season (C.5).

In 2024, the season will open May 1 consistent with all preseason regulations in place in this area and subareas during May 16-June 30, 2023, including subarea salmon guidelines and quotas and weekly vessel limits except as described below for vessels fishing or in possession of salmon north of Leadbetter Point. This opening could be modified following Council review at its March and/or April 2024 meetings.

**U.S./Canada Border to Cape Falcon**

- July 1 through the earlier of September 30, or 13,000 Chinook or 30,400 marked coho (C.8).

Open seven days per week. All salmon. Chinook minimum size limit of 27 inches total length. Coho minimum size limit of 16 inches total length (B, C.1). All coho must be marked with a healed adipose fin clip (C.8.d). No chum retention north of Cape Alava, Washington in August and September (C.4, C.7). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

Landing and possession limit of 150 marked coho per vessel per landing week (Thurs.-Wed.). Landing limits will be evaluated weekly inseason (C.1).

When it is estimated that approximately 50% of the overall Chinook quota has been landed, inseason action may be considered to ensure the quota is not exceeded.

An impact neutral, non-selective coho fishery may be considered through inseason management action later in the season.

TABLE 1. 2023 Commercial troll management measures for non-tribal ocean salmon fisheries – **Council adopted**. (Page 2 of 6)

**A. SEASON DESCRIPTIONS**

**North of Cape Falcon**

**For all commercial troll fisheries north of Cape Falcon**:

Mandatory closed areas include Salmon Troll Yelloweye Rockfish Conservation Area, Cape Flattery, and Columbia Control Zones.

Vessels must land and deliver their salmon within 24 hours of any closure of this fishery.

Vessels may not land fish east of the Sekiu River or east of Tongue Point, Oregon.

Vessels fishing or in possession of salmon north of Leadbetter Point must land and deliver all species of fish in a Washington port and must possess a Washington troll and/or salmon delivery license. For delivery to Washington ports south of Leadbetter Point, vessels must notify the Washington Department of Fish and Wildlife at 360-249-1215 prior to crossing the Leadbetter Point line with area fished, total Chinook, coho, and halibut catch aboard, and destination with approximate time of delivery. **During any single trip, only one side of the Leadbetter Point line may be fished** (C.11).

Vessels fishing or in possession of salmon while fishing south of Leadbetter Point must land and deliver all species of fish within the area and south of Leadbetter Point, except that Oregon permitted vessels may also land all species of fish in Garibaldi, Oregon. All Chinook caught north of Cape Falcon and being delivered by boat to Garibaldi must meet the minimum legal total length of 28 inches for Chinook for south of Cape Falcon seasons unless the season in waters off Garibaldi have been closed for Chinook retention for more than 48 hours (C.1.).

Under state law, vessels must report their catch on a state fish receiving ticket. Oregon State regulations require all fishers landing salmon into Oregon from any fishery between Leadbetter Point, Washington and Cape Falcon, Oregon to notify ODFW within one hour of delivery or prior to transport away from the port of landing by either calling 541-857-2546 or sending notification via e-mail to nfalcon.trollreport@odfw.oregon.gov. Notification shall include vessel name and number, number of salmon by species, port of landing and location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

Vessels in possession of salmon north of the Queets River may not cross the Queets River line without first notifying WDFW at 360-249-1215 with area fished, total Chinook, coho and halibut catch aboard, and destination. Vessels in possession of salmon south of the Queets River may not cross the Queets River line without first notifying WDFW at 360-249-1215 with area fished, total Chinook, coho and halibut catch aboard, and destination (C.11). Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

**A. SEASON DESCRIPTIONS**

**South of Cape Falcon**

**Supplemental Management Information**

1. Sacramento River fall Chinook spawning escapement of 164,964 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 2.8 %.
3. Klamath River recreational fishery allocation: 1,804 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 1,872 adult Klamath River fall Chinook.
5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: NA.
6. Overall commercial troll coho TAC: 10,000.

**Cape Falcon to Humbug Mt.**

- September 1-October 31 (C.9.a).

Open seven days per week. All salmon, through the earlier of September 30 or reaching the 10,000 non-mark selective coho quota; all salmon except coho thereafter (C.4, C.7). Coho minimum size limit of 16 inches total length, and Chinook minimum size limit of 28 inches total length (B, C.1). All vessels fishing in the area must land their salmon in the State of Oregon. See gear restrictions and definitions (C.2, C.3). Beginning October 1, open shoreward of the 40-fathom regulatory line (C.5.f).

No more than 75 Chinook allowed per vessel per landing week (Thurs.-Wed.) (C.8.f).

Coho quota of 10,000 non-mark selective. No more than 75 coho allowed per vessel per landing week (Thurs.-Wed.). Vessel limits may be modified inseason (C.8.f).

Any remainder of the mark-selective coho quota from Cape Falcon to Humbug Mt. recreational fishery may be transferred inseason to the Cape Falcon to Humbug Mt. troll fishery on an impact neutral basis. Recreational fishery needs will be prioritized for this transfer (C.8.h).

In 2024, the season will open March 15 for all salmon except coho. Chinook minimum size limit of 28 inches total length. Gear restrictions same as in 2023. This opening could be modified following Council review at its March 2024 meeting.

TABLE 1. 2023 Commercial troll management measures for non-tribal ocean salmon fisheries – **Council adopted**. (Page 3 of 6)

**Humbug Mt. to OR/CA Border (Oregon KMZ)**
- Closed.

In 2024, the season will open March 15 for all salmon except coho. Chinook minimum size limit of 28 inches total length. Gear restrictions same as in 2023. This opening could be modified following Council review at its March 2024 meeting.

**OR/CA Border to Humboldt South Jetty (California KMZ)**
- Closed.

In 2024, the season will open May 1 through the earlier of May 31, or a 3,000 Chinook quota. Chinook minimum size limit of 27 inches total length. Landing and possession limit of 20 Chinook per vessel per day (C.8.f). Open five days per week (Fri.-Tue.). All salmon except coho (C.4, C.7). Any remaining portion of Chinook quotas may be transferred inseason on an impact neutral basis to the next open quota period (C.8.b). All fish caught in this area must be landed within the area, within 24 hours of any closure of the fishery (C.6), and prior to fishing outside the area (C.10). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.e). See California State regulations for an additional closure adjacent to the Smith River. This opening could be modified following Council review at its March or April 2024 meetings.

**Humboldt South Jetty to Latitude 40°10' N**
- Closed.

When the fishery is closed between the OR/CA border and Humbug Mountain and open to the south, vessels with fish on board caught in the open area off California may seek temporary mooring in Brookings, Oregon prior to landing in California only if such vessels first notify the Chetco River Coast Guard Station via VHF channel 22A between the hours of 0500 and 2200 and provide the vessel name, number of fish on board, and estimated time of arrival (C.6).

**Latitude 40°10' N. to Point Arena (Fort Bragg)**
- Closed.

In 2024, the season will open April 16 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). All salmon must be landed in California and north of Point Arena (C.6, C.11). Landing and possession limits may be considered inseason (C.8.g). This opening could be modified following Council review at its March 2024 meeting.

**Pt. Arena to Pigeon Pt. (San Francisco)**
- Closed.

In 2024, the season will open May 1 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B, C.1); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Landing and possession limits may be considered inseason (C.8.g). This opening could be modified following Council review at its March or April 2024 meeting.

**Point Reyes to Point San Pedro (Fall Area Target Zone)**
- Closed.

**Pigeon Point to U.S./Mexico Border (Monterey)**
- Closed.

In 2024, the season will open May 1 for all salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Landing and possession limits may be considered inseason (C.8.g). This opening could be modified following Council review at its March or April 2024 meeting.

California State regulations require all salmon be made available to a CDFW representative for sampling immediately at port of landing. Any person in possession of a salmon with a missing adipose fin, upon request by an authorized agent or employee of the CDFW, shall immediately relinquish the head of the salmon to the State (California Fish and Game Code §8226).

**B. MINIMUM SIZE (Inches) (See C.1)**

| Area (when open) | Chinook | | Coho | | Pink |
|---|---|---|---|---|---|
| | Total Length | Head-off | Total Length | Head-off | |
| North of Cape Falcon | 27 | 20.5 | 16 | 12 | None |
| Cape Falcon to Humbug Mt. | 28 | 21.5 | 16 | 12 | None |
| Humbug Mt. to OR/CA Border | 28 | 21.5 | - | - | None |
| OR/CA Border to Humboldt South Jetty | - | - | - | - | - |
| Latitude 40°10' N. to Pt. Arena | - | - | - | - | - |
| Pt. Arena to Pigeon Pt. | - | - | - | - | - |
| Pigeon Pt. to U.S./Mexico Border (Alt. 3) | - | - | - | - | - |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Compliance with Minimum Size or Other Special Restrictions: All salmon on board a vessel must meet the minimum size, landing/possession limit, or other special requirements for the area being fished and the area in which they are landed if the area is open or has been closed less than 48 hours for that species of salmon. Salmon may be landed in an area that has been closed for a species of salmon more than 48 hours only if they meet the minimum size, landing/possession limit, or other special requirements for the area in which they were caught. Salmon may not be filleted prior to landing.

Any person who is required to report a salmon landing by applicable state law must include on the state landing receipt for that landing both the number and weight of salmon landed by species. States may require fish landing/receiving tickets be kept on board the vessel for 90 days or more after landing to account for all previous salmon landings.

C.2. Gear Restrictions:

a. Salmon may be taken only by hook and line using single point, single shank, barbless hooks.
b. Cape Falcon, Oregon, to the OR/CA border: No more than 4 spreads are allowed per line.
c. OR/CA border to U.S./Mexico border: No more than 6 lines are allowed per vessel, and barbless circle hooks are required when fishing with bait by any means other than trolling.

C.3. Gear Definitions:

*Trolling defined*: Fishing from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

*Troll fishing gear defined*: One or more lines that drag hooks behind a moving fishing vessel engaged in trolling. In that portion of the fishery management area off Oregon and Washington, the line or lines must be affixed to the vessel and must not be intentionally disengaged from the vessel at any time during the fishing operation.

*Spread defined*: A single leader connected to an individual lure and/or bait.

*Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90º angle.

C.4. Vessel Operation in Closed Areas with Salmon on Board:

a. Except as provided under C.4.b below, it is unlawful for a vessel to have troll or recreational gear in the water while in any area closed to fishing for a certain species of salmon while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.
b. When Genetic Stock Identification (GSI) samples will be collected in an area closed to commercial salmon fishing, the scientific research permit holder shall notify NOAA OLE, USCG, CDFW, WDFW, ODFW, and OSP at least 24 hours prior to sampling and provide the following information: the vessel name, date, location, and time collection activities will be done. Any vessel collecting GSI samples in a closed area shall not possess any salmon other than those from which GSI samples are being collected. Salmon caught for collection of GSI samples must be immediately released in good condition after collection of samples.

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48º23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to Cape Alava (48º10'00" N. lat.) and east of 125º05'00" W. long.
b. *Salmon Troll Yelloweye Rockfish Conservation Area* – The area in Washington Marine Catch Area 3 from 48°00.00' N. lat.; 125°14.00' W. long. to 48°02.00' N. lat.; 125°14.00' W. long. to 48°02.00' N. lat.; 125°16.50' W. long. to 48°00.00' N. lat.; 125°16.50' W. long. and connecting back to 48°00.00' N. lat.; 125°14.00' W. long.
c. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 55'36" N. lat., 124°10'51" W. long.).
d. *Columbia Control Zone* - An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat.,124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°15'48" N. lat., 124°05'20" W. long.), and then along the north jetty to the point of intersection with the Buoy #10 line; and, on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.
e. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately 6 nautical miles north of the Klamath River mouth); on the west by 124°23'00" W. long. (approximately 12 nautical miles off shore); and on the south by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

f. Waypoints for the 40 fathom regulatory line from Cape Falcon to Humbug Mt. (50 CFR 660.71 (o) (12)-(62), when in place.

| | | |
|---|---|---|
| 45°46.00′ N. lat., 124°04.49′ W. long.; | 44°41.68′ N. lat., 124°15.38′ W. long.; | 43°17.96′ N. lat., 124°28.81′ W. long.; |
| 45°44.34′ N. lat., 124°05.09′ W. long.; | 44°34.87′ N. lat., 124°15.80′ W. long.; | 43°16.75′ N. lat., 124°28.42′ W. long.; |
| 45°40.64′ N. lat., 124°04.90′ W. long.; | 44°33.74′ N. lat., 124°14.44′ W. long.; | 43°13.97′ N. lat., 124°31.99′ W. long.; |
| 45°33.00′ N. lat., 124°04.46′ W. long.; | 44°27.66′ N. lat., 124°16.99′ W. long.; | 43°13.72′ N. lat., 124°33.25′ W. long.; |
| 45°32.27′ N. lat., 124°04.74′ W. long.; | 44°19.13′ N. lat., 124°19.22′ W. long.; | 43°12.26′ N. lat., 124°34.16′ W. long.; |
| 45°29.26′ N. lat., 124°04.22′ W. long.; | 44°15.35′ N. lat., 124°17.38′ W. long.; | 43°10.96′ N. lat., 124°32.33′ W. long.; |
| 45°20.25′ N. lat., 124°04.67′ W. long.; | 44°14.38′ N. lat., 124°17.78′ W. long.; | 43°05.65′ N. lat., 124°31.52′ W. long.; |
| 45°19.99′ N. lat., 124°04.62′ W. long.; | 44°12.80′ N. lat., 124°17.18′ W. long.; | 42°59.66′ N. lat., 124°32.58′ W. long.; |
| 45°17.50′ N. lat., 124°04.91′ W. long.; | 44°09.23′ N. lat., 124°15.96′ W. long.; | 42°54.97′ N. lat., 124°36.99′ W. long.; |
| 45°11.29′ N. lat., 124°05.20′ W. long.; | 44°08.38′ N. lat., 124°16.79′ W. long.; | 42°53.81′ N. lat., 124°38.57′ W. long.; |
| 45°05.80′ N. lat., 124°05.40′ W. long.; | 44°08.30′ N. lat., 124°16.75′ W. long.; | 42°50.00′ N. lat., 124°39.68′ W. long.; |
| 45°05.08′ N. lat., 124°05.93′ W. long.; | 44°01.18′ N. lat., 124°15.42′ W. long.; | 42°49.13′ N. lat., 124°39.70′ W. long.; |
| 45°03.83′ N. lat., 124°06.47′ W. long.; | 43°51.61′ N. lat., 124°14.68′ W. long.; | 42°46.47′ N. lat., 124°38.89′ W. long.; |
| 45°01.70′ N. lat., 124°06.53′ W. long.; | 43°42.66′ N. lat., 124°15.46′ W. long.; | 42°45.74′ N. lat., 124°38.86′ W. long.; |
| 44°58.75′ N. lat., 124°07.14′ W. long.; | 43°40.49′ N. lat., 124°15.74′ W. long.; | 42°44.79′ N. lat., 124°37.96′ W. long.; |
| 44°51.28′ N. lat., 124°10.21′ W. long.; | 43°38.77′ N. lat., 124°15.64′ W. long.; | 42°45.01′ N. lat., 124°36.39′ W. long.; |
| 44°49.49′ N. lat., 124°10.90′ W. long.; | 43°34.52′ N. lat., 124°16.73′ W. long.; | 42°44.14′ N. lat., 124°35.17′ W. long.; |
| 44°44.96′ N. lat., 124°14.39′ W. long.; | 43°28.82′ N. lat., 124°19.52′ W. long.; | 42°42.14′ N. lat., 124°32.82′ W. long.; |
| 44°43.44′ N. lat., 124°14.78′ W. long.; | 43°23.91′ N. lat., 124°24.28′ W. long.; | 42°40.50′ N. lat., 124°31.98′ W. long. |
| 44°42.26′ N. lat., 124°13.81′ W. long.; | 43°20.83′ N. lat., 124°26.63′ W. long.; | |

C.6. Notification When Unsafe Conditions Prevent Compliance with Regulations: If prevented by unsafe weather conditions or mechanical problems from meeting special management area landing restrictions, vessels must notify the U.S. Coast Guard and receive acknowledgment of such notification prior to leaving the area. This notification shall include the name of the vessel, port where delivery will be made, approximate number of salmon (by species) on board, the estimated time of arrival, and the specific reason the vessel is not able to meet special management area landing restrictions.

In addition to contacting the U.S. Coast Guard, vessels fishing south of the Oregon/California border must notify CDFW within one hour of leaving the management area by calling 800-889-8346 and providing the same information as reported to the U.S. Coast Guard. All salmon must be offloaded within 24 hours of reaching port.

C.7. Incidental Pacific Halibut Harvest: Permit applications for incidental harvest for Pacific halibut during commercial salmon fishing must be obtained from NMFS.

a. Pacific halibut retained must be no less than 32 inches in total length (with head on).

b. During the salmon troll season, incidental harvest is authorized only during April, May, and June, and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825 or 206-526-6667). WDFW, ODFW, and CDFW will monitor landings. If the landings are projected to exceed the preseason allocation for this fishery or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to prohibit retention of halibut in the non-Indian salmon troll fishery. See the most current Pacific Halibut Catch Sharing Plan for more details.

c. Incidental Pacific halibut catch regulations in the commercial salmon troll fishery adopted for 2023, prior to any 2023 inseason action, will be in effect when incidental Pacific halibut retention opens on April 1, 2023 unless otherwise modified by inseason action at the March 2023 Council meeting.

Beginning May 16, 2023, through the end of the 2023 salmon troll fishery, and beginning April 1, 2024, until modified through inseason action or superseded by the 2024 management measures license holders may land or possess no more than one Pacific halibut per two Chinook, except one Pacific halibut may be possessed or landed without meeting the ratio requirement, and no more than 35 halibut may be possessed or landed per trip.

d. "C-shaped" yelloweye rockfish conservation area is an area to be voluntarily avoided for salmon trolling.
NMFS and the Council request salmon trollers voluntarily avoid this area in order to protect yelloweye rockfish. The area is defined in the Pacific Council Halibut Catch Sharing Plan in the North Coast subarea (Washington marine area 3), with the following coordinates in the order listed:

48°18' N. lat.; 125°18' W. long.;
48°18' N. lat.; 124°59' W. long.;
48°11' N. lat.; 124°59' W. long.;
48°11' N. lat.; 125°11' W. long.;
48°04' N. lat.; 125°11' W. long.;
48°04' N. lat.; 124°59' W. long.;
48°00' N. lat.; 124°59' W. long.;
48°00' N. lat.; 125°18' W. long.;
and connecting back to 48°18' N. lat.; 125°18' W. long.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

C.8. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June non-Indian commercial troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline if the transfer would not result in exceeding preseason impact expectations on any stocks.
b. Chinook remaining from May, June, and/or July non-Indian commercial troll quotas in the Oregon or California KMZ may be transferred to the Chinook quota for the next open period if the transfer would not result in exceeding preseason impact expectations on any stocks.
c. NMFS may transfer salmon between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the areas' representatives on the Salmon Advisory Subpanel (SAS), and if the transfer would not result in exceeding preseason impact expectations on any stocks.
d. The Council will consider inseason recommendations for special regulations for any experimental fisheries annually in March; proposals must meet Council protocol and be received in November the year prior.
e. If retention of unmarked coho (adipose fin intact) is permitted by inseason action, the allowable coho quota will be adjusted to ensure preseason projected impacts on all stocks is not exceeded.
f. Landing limits may be modified inseason to sustain season length and keep harvest within overall quotas.
g. Landing limits in California may be implemented and/or modified inseason to sustain season length and keep harvest within preseason expectations.
h. Deviations from the allocation of allowable ocean harvest of coho salmon in the area south of Cape Falcon may be allowed to meet consultation standards for ESA-listed stocks (FMP 5.3.2). Therefore, should any rollovers result in a deviation from the south of Cape Falcon coho allocation schedule between sectors would still fall underneath this exemption.

C.9. State Waters Fisheries: Consistent with Council management objectives:
a. The State of Oregon may establish additional late-season fisheries in state waters.
b. The State of California may establish limited fisheries in selected state waters.
c. Check state regulations for details.

C.10. For the purposes of California Fish and Game Code, Section 8232.5, the definition of the Klamath Management Zone (KMZ) for the ocean salmon season shall be that area from Humbug Mountain, Oregon, to the Southern KMZ Boundary.

C.11. Latitudes for geographical reference of major landmarks along the west coast. Majority of information from source: 2022 West Coast federal salmon regulations.
https://www.federalregister.gov/documents/2022/05/16/2022-10430/fisheries-off-west-coast-states-west-coast-salmon-fisheries-2022-specifications-and-management

| | | | |
|---|---|---|---|
| Cape Flattery, WA | 48°23′00″ N lat. | Humboldt South Jetty, CA | 40°45′53″ N lat. |
| Cape Alava, WA | 48°10′00″ N lat. | 40°10′ line (near Cape Mendocino, CA) | 40°10′00″ N lat |
| Queets River, WA | 47°31′42″ N lat. | Horse Mountain, CA | 40°05′00″ N lat. |
| Leadbetter Point, WA | 46°38′10″ N lat. | Point Arena, CA | 38°57′30″ N lat. |
| Cape Falcon, OR | 45°46′00″ N lat. | Point Reyes, CA | 37°59′44″ N lat. |
| South end Heceta Bank line, OR | 43°58′00″ N lat. | Point San Pedro, CA | 37°35′40″ N lat. |
| Humbug Mountain, OR | 42°40′30″ N lat. | Pigeon Point, CA | 37°11′00″ N lat. |
| Oregon-California border | 42°00′00″ N lat. | Point Sur, CA | 36°18′00″ N lat. |
| | | Point Conception, CA | 34°27′00″ N lat. |

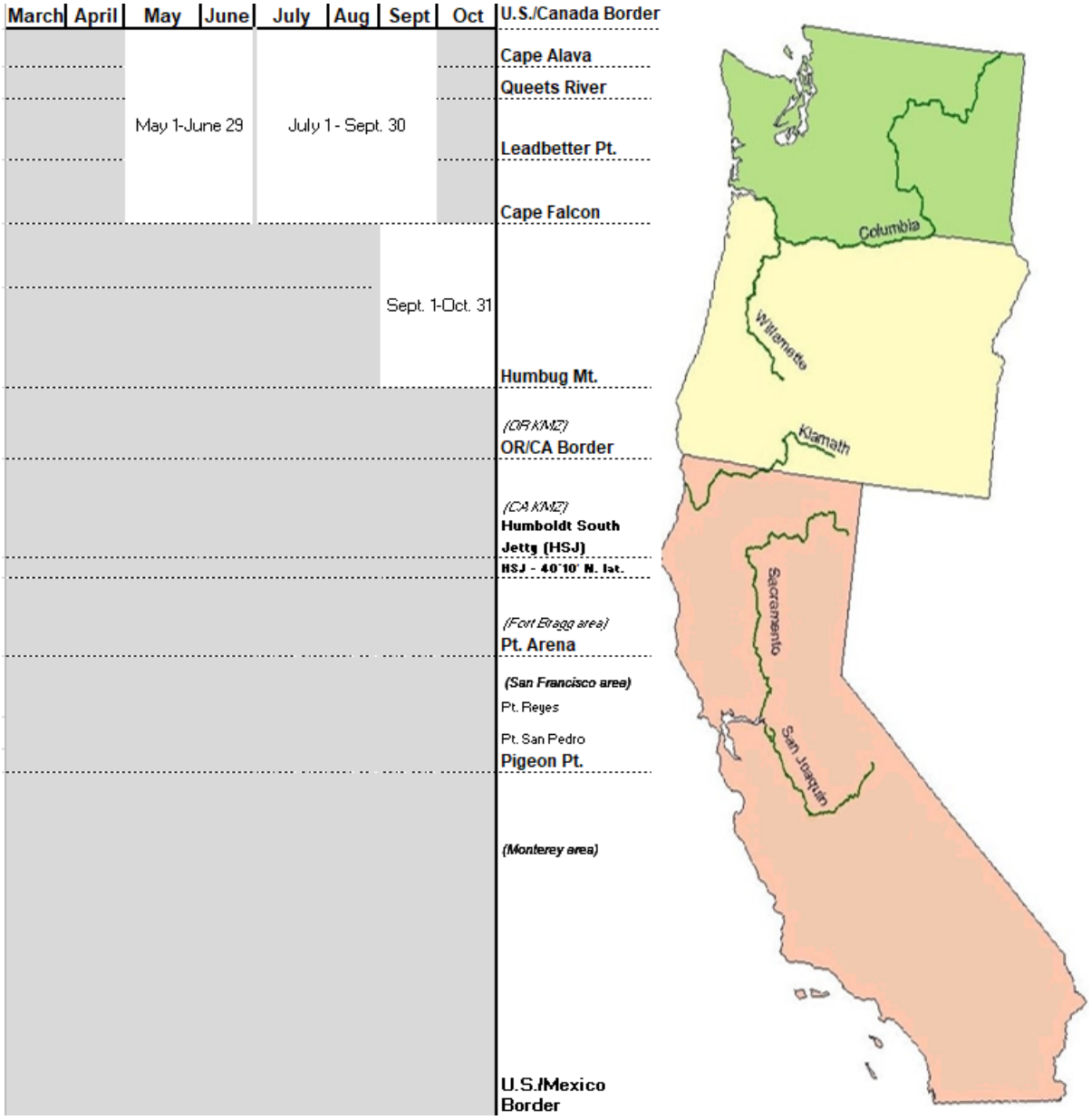



FIGURE 1. 2023 non-Indian commercial salmon seasons – Council adopted.

TABLE 2. 2023 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 1 of 5)

**A. SEASON DESCRIPTIONS**

**North of Cape Falcon**

**Supplemental Management Information**

1. Overall non-Indian TAC: 78,000 Chinook and 190,000 coho marked with a healed adipose fin clip (marked).
2. Recreational TAC: 39,000 Chinook and 159,600 marked coho; all retained coho must be marked.
3. Buoy 10 fishery opens August 1 with an expected landed catch of 40,000 marked coho in August and September

**U.S./Canada Border to Cape Alava (Neah Bay Subarea**)

- June 17 through earlier of September 30, or 16,600 marked coho subarea quota, with a subarea guideline of 8,710 Chinook (C.5).

Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day, of which only one may be a Chinook. All coho must be marked with a healed adipose fin clip. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).

An impact neutral non-selective coho fishery may be considered through inseason management action later in the season.

Beginning August 1, no Chinook retention east of the Bonilla-Tatoosh line (C.4.a) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5).

**Cape Alava to Queets River (La Push Subarea)**

- June 17 through earlier of September 30, or 4,150 marked coho subarea quota, with a subarea guideline of 1,440 Chinook (C.5).

Open seven days per week. All salmon, except no chum beginning August 1; two salmon per day, of which only one may be a Chinook. All coho must be marked with a healed adipose fin clip. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).

Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5).

An impact neutral non-selective coho fishery may be considered through inseason management action later in the season.

- October 3 through earlier of October 7, or 150 Chinook quota (C.5) in the area north of 47°50'00" N. lat. and south of 48°00'00" N. lat.

Chinook only, one Chinook per day. See minimum size limits (B). See gear restrictions and definitions (C.1, C.2, C.3).

Fishery may be closed if extreme freshwater temperature and/or flow events occur in the Quillayute basin in September.

**Queets River to Leadbetter Point (Westport Subarea)**

- June 24 through earlier of September 30, or 59,050 marked coho subarea quota, with a subarea guideline of 17,210 Chinook (C.5).

Open seven days per week. All salmon, two salmon per day, of which only one may be a Chinook. All coho must be marked with a healed adipose fin clip. See gear restrictions and definitions (C.1, C.2, C.3). Chinook minimum size limit of 22 inches total length (B).

An impact neutral non-selective coho fishery may be considered through inseason management action later in the season.

Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5).

**Leadbetter Point to Cape Falcon (Columbia River Subarea)**

- June 24 through earlier of September 30, or 79,800 marked coho subarea quota, with a subarea guideline of 11,490 Chinook (C.5).

Open seven days per week. All salmon, two salmon per day, of which only one may be a Chinook. All coho must be marked with a healed adipose fin clip. See gear restrictions and definitions (C.1, C.2, C.3). Chinook minimum size limit of 22 inches total length (B).

An impact neutral non-selective coho fishery may be considered through inseason management action later in the season.

Columbia Control Zone closed (C.4.c). Inseason management may be used to sustain season length and keep harvest within the overall Chinook and coho recreational TACs for north of Cape Falcon (C.5).

TABLE 2. 2023 Recreational management measures for non-tribal ocean salmon fisheries – Council adopted. (Page 2 of 5)

**South of Cape Falcon**

**Supplemental Management Information**

1. Sacramento River fall Chinook spawning escapement of 164,964 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 2.8 %.
3. Klamath River recreational fishery allocation: 1,804 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 1,872 adult Klamath River fall Chinook.
5. Overall recreational coho TAC: 110,000 coho marked with a healed adipose fin clip (marked), and 25,000 coho in the non-mark-selective coho fishery.
6. Fisheries may need to be adjusted to meet NMFS ESA consultation standards, FMP requirements, other management objectives, or upon receipt of new allocation recommendations from the CFGC.

**A. SEASON DESCRIPTIONS**

**South of Cape Falcon**

**Cape Falcon to OR/CA Border**

Mark-selective coho fishery:

- June 17 through the earlier of August 31, or 110,000 marked coho quota (C.6).

Open seven days per week. All salmon except Chinook, two salmon per day. All retained coho must be marked with a healed adipose fin clip (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3).

Any remainder of the mark-selective coho quota may be transferred inseason on an impact neutral basis to the recreational and/or commercial troll quotas for the non-selective coho fishery from Cape Falcon to Humbug Mountain. Recreational needs will be prioritized for this transfer (C.5).

**Cape Falcon to Humbug Mt.**

- September 1-October 31 (C.6).

Open seven days per week. All salmon except coho, except as described in the non-mark-selective coho fishery (C.5), one fish per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3). Beginning October 1, open only shoreward of the 40-fathom regulatory line (C.5.g).

In 2024, the season will open March 15 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); and the same gear restrictions as in 2023 (C.2, C.3). This opening could be modified following Council review at its March 2024 meeting.

**Cape Falcon to Humbug Mt.**

Non-mark-selective coho fishery:

- September 1 through the earlier of September 30, or 25,000 non-mark-selective coho quota (C.6). Open days may be modified inseason.

Open seven days per week. All salmon, two salmon per day only one of which may be a Chinook (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3).

**For Recreational Fisheries from Cape Falcon to Humbug Mt.:** Fishing in the Stonewall Bank yelloweye rockfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (call the halibut fishing hotline 1-800-662-9825 for specific dates) (C.3.b, C.4.d).

TABLE 2. 2023 Recreational management measures for non-tribal ocean salmon fisheries – Council adopted. (Page 3 of 5)

**A. SEASON DESCRIPTIONS**

**OR/CA Border to latitude 40°10' N. (California KMZ)**

- Closed.

In 2024, season opens May 1 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March or April 2024 meeting.

**Latitude 40°10' N. to Point Arena (Fort Bragg)**

- Closed.

In 2024, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March or April 2024 meeting.

**Point Arena to Pigeon Point (San Francisco)**

- Closed.

In 2024, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March 2024 meeting.

**Pigeon Point to U.S./Mexico Border (Monterey)**

- Closed.

In 2024, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Bag limits may be modified in season. This opening could be modified following Council review at its March 2024 meeting

California State regulations require all salmon be made available to a CDFW representative for sampling immediately at port of landing. Any person in possession of a salmon with a missing adipose fin, upon request by an authorized agent or employee of the CDFW, shall immediately relinquish the head of the salmon to the State (California Code of Regulations Title 14 Section 1.73).

**B. MINIMUM SIZE (Inches) (See C.1)**

| Area (when open) | Chinook | Coho | Pink |
|---|---|---|---|
| North of Cape Falcon (Westport and Col R) | 22 | 16 | None |
| North of Cape Falcon (Neah Bay and La Push) | 24 | 16 | None |
| Cape Falcon to Humbug Mt. | 24 | 16 | None |
| Humbug Mt. to OR/CA Border | 24 | 16 | None |
| OR/CA Border to Pt. Arena | - - | - - | - |
| Pt. Arena to Pigeon Pt. | - - | - - | - |
| Pigeon Pt. to U.S./Mexico Border | - - | - - | - |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Compliance with Minimum Size and Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught. Salmon may not be filleted, or salmon heads removed prior to landing.
*Ocean Boat Limits*: Off the coast of Washington, Oregon, and California, each fisher aboard a vessel may continue to use angling gear until the combined daily limits of Chinook and coho salmon for all licensed and juvenile anglers aboard have been attained (additional state restrictions may apply).

C.2. Gear Restrictions: Salmon may be taken only by hook and line using barbless hooks. All persons fishing for salmon, and all persons fishing from a boat with salmon on board must meet the gear restrictions listed below for specific areas or seasons.

a. *U.S./Canada Border to Pt. Conception, California*: No more than one rod may be used per angler; and no more than two single point, single shank, barbless hooks are required for all fishing gear.

b. *Latitude 40°10' N. to Pt. Conception, California:* Single point, single shank, barbless circle hooks (see gear definitions below) are required when fishing with bait by any means other than trolling, and no more than two such hooks shall be used. When angling with two hooks, the distance between the hooks must not exceed five inches when measured from the top of the eye of the top hook to the inner base of the curve of the lower hook, and both hooks must be permanently tied in place (hard tied). Circle hooks are not required when artificial lures are used without bait.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

C.3. Gear Definitions:

a. *Recreational fishing gear defined*: Off Oregon and Washington, angling tackle consists of a single line that must be attached to a rod and reel held by hand or closely attended; the rod and reel must be held by hand while playing a hooked fish. No person may use more than one rod and line while fishing off Oregon or Washington. Off California, the line must be attached to a rod and reel held by hand or closely attended; weights directly attached to a line may not exceed four pounds (1.8 kg). While fishing off California north of Pt. Conception, no person fishing for salmon, and no person fishing from a boat with salmon on board, may use more than one rod and line. Fishing includes any activity which can reasonably be expected to result in the catching, taking, or harvesting of fish.

b. *Trolling defined*: Angling from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

c. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

C.4. Control Zone Definitions:

a. *The Bonilla-Tatoosh Line*: A line running from the western end of Cape Flattery to Tatoosh Island Lighthouse (48°23'30" N. lat., 124°44'12" W. long.) to the buoy adjacent to Duntze Rock (48°24'37" N. lat., 124°44'37" W. long.), then in a straight line to Bonilla Pt. (48°35'39" N. lat., 124°42'58" W. long.) on Vancouver Island, British Columbia.

b. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 55'36" N. lat., 124°10'51" W. long.).

c. *Columbia Control Zone*: An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat., 124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°15'48" N. lat., 124°05'20" W. long. and then along the north jetty to the point of intersection with the Buoy #10 line; and on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

d. *Stonewall Bank Yelloweye Rockfish Conservation Area*: The area defined by the following coordinates in the order listed:
44°37.46' N. lat.; 124°24.92' W. long.
44°37.46' N. lat.; 124°23.63' W. long.
44°28.71' N. lat.; 124°21.80' W. long.
44°28.71' N. lat.; 124°24.10' W. long.
44°31.42' N. lat.; 124°25.47' W. long.
and connecting back to 44°37.46' N. lat.; 124°24.92' W. long.

e. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately 6 nautical miles north of the Klamath River mouth); on the west by 124°23'00" W. long. (approximately 12 nautical miles offshore); and, on the south by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

C.5. Inseason Management: Regulatory modifications may become necessary inseason to meet preseason management objectives such as quotas, harvest guidelines, and season duration. In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Actions could include modifications to bag limits, or days open to fishing, and extensions or reductions in areas open to fishing.

b. Coho may be transferred inseason among recreational subareas north of Cape Falcon to help meet the recreational season duration objectives (for each subarea) after conferring with representatives of the affected ports and the Council's SAS recreational representatives north of Cape Falcon, and if the transfer would not result in exceeding preseason impact expectations on any stocks.

c. Chinook and coho may be transferred between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS, and if the transfer would not result in exceeding preseason impact expectations on any stocks.

d. Fishery managers may consider inseason action modifying regulations restricting retention of unmarked (adipose fin intact) coho. To remain consistent with preseason expectations, any inseason action shall consider, if significant, the difference between observed and preseason forecasted (adipose-clipped) mark rates. Such a consideration may also include a change in bag limit of two salmon, no more than one of which may be a coho.

e. Marked coho remaining from the Cape Falcon to OR/CA Border recreational mark-selective coho quota may be transferred inseason to the Cape Falcon to Humbug Mt. non-mark-selective recreational fishery or the Cape Falcon to Humbug Mt. commercial troll fishery if the transfer would not result in exceeding preseason impact expectations on any stocks.

f. Deviations from the allocation of allowable ocean harvest of coho salmon in the area south of Cape Falcon may be allowed to meet consultation standards for ESA-listed stocks (FMP 5.3.2). Therefore, should any rollovers result in a deviation from the south of Cape Falcon coho allocation schedule between sectors would still fall underneath this exemption.

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)**

g. Waypoints for the 40 fathom regulatory line from Cape Falcon to Humbug Mt. (50 CFR 660.71 (o) (12)-(62), when in place.

| | | |
|---|---|---|
| 45°46.00′ N. lat., 124°04.49′ W. long.; | 44°44.96′ N. lat., 124°14.39′ W. long.; | 43°40.49′ N. lat., 124°15.74′ W. long.; |
| 45°44.34′ N. lat., 124°05.09′ W. long.; | 44°43.44′ N. lat., 124°14.78′ W. long.; | 43°38.77′ N. lat., 124°15.64′ W. long.; |
| 45°40.64′ N. lat., 124°04.90′ W. long.; | 44°42.26′ N. lat., 124°13.81′ W. long.; | 43°34.52′ N. lat., 124°16.73′ W. long.; |
| 45°33.00′ N. lat., 124°04.46′ W. long.; | 44°41.68′ N. lat., 124°15.38′ W. long.; | 43°28.82′ N. lat., 124°19.52′ W. long.; |
| 45°32.27′ N. lat., 124°04.74′ W. long.; | 44°34.87′ N. lat., 124°15.80′ W. long.; | 43°23.91′ N. lat., 124°24.28′ W. long.; |
| 45°29.26′ N. lat., 124°04.22′ W. long.; | 44°33.74′ N. lat., 124°14.44′ W. long.; | 43°20.83′ N. lat., 124°26.63′ W. long.; |
| 45°20.25′ N. lat., 124°04.67′ W. long.; | 44°27.66′ N. lat., 124°16.99′ W. long.; | 43°17.96′ N. lat., 124°28.81′ W. long.; |
| 45°19.99′ N. lat., 124°04.62′ W. long.; | 44°19.13′ N. lat., 124°19.22′ W. long.; | 43°16.75′ N. lat., 124°28.42′ W. long.; |
| 45°17.50′ N. lat., 124°04.91′ W. long.; | 44°15.35′ N. lat., 124°17.38′ W. long.; | 43°13.97′ N. lat., 124°31.99′ W. long.; |
| 45°11.29′ N. lat., 124°05.20′ W. long.; | 44°14.38′ N. lat., 124°17.78′ W. long.; | 43°13.72′ N. lat., 124°33.25′ W. long.; |
| 45°05.80′ N. lat., 124°05.40′ W. long.; | 44°12.80′ N. lat., 124°17.18′ W. long.; | 43°12.26′ N. lat., 124°34.16′ W. long.; |
| 45°05.08′ N. lat., 124°05.93′ W. long.; | 44°09.23′ N. lat., 124°15.96′ W. long.; | 43°10.96′ N. lat., 124°32.33′ W. long.; |
| 45°03.83′ N. lat., 124°06.47′ W. long.; | 44°08.38′ N. lat., 124°16.79′ W. long.; | 43°05.65′ N. lat., 124°31.52′ W. long.; |
| 45°01.70′ N. lat., 124°06.53′ W. long.; | 44°08.30′ N. lat., 124°16.75′ W. long.; | 42°59.66′ N. lat., 124°32.58′ W. long.; |
| 44°58.75′ N. lat., 124°07.14′ W. long.; | 44°01.18′ N. lat., 124°15.42′ W. long.; | 42°54.97′ N. lat., 124°36.99′ W. long.; |
| 44°51.28′ N. lat., 124°10.21′ W. long.; | 43°51.61′ N. lat., 124°14.68′ W. long.; | 42°53.81′ N. lat., 124°38.57′ W. long.; |
| 44°49.49′ N. lat., 124°10.90′ W. long.; | 43°42.66′ N. lat., 124°15.46′ W. long.; | 42°50.00′ N. lat., 124°39.68′ W. long.; |

C.6. Additional Seasons in State Territorial Waters: Consistent with Council management objectives, the States of Washington, Oregon, and California may establish limited seasons in state waters. Check state regulations for details.

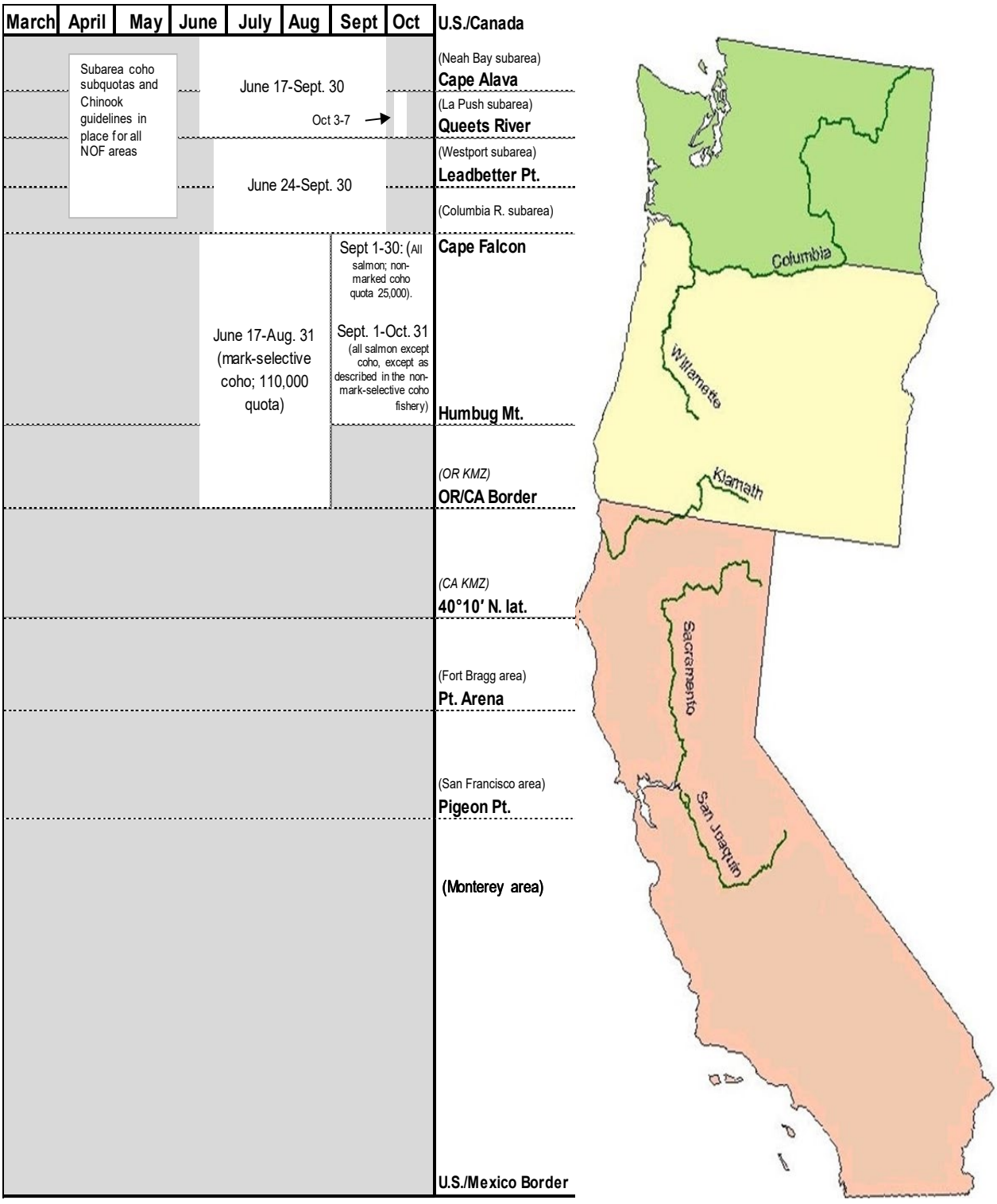



FIGURE 2. 2023 recreational salmon seasons – Council adopted.

TABLE 3. 2023 Treaty Indian ocean troll management measures for ocean salmon fisheries - Council adopted. (Page 1 of 2)

**A. SEASON DESCRIPTIONS**

**Supplemental Management Information**

1. Overall Treaty-Indian TAC: 45,000 Chinook and 57,000 coho.
2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.
3. In 2024, the season will open May 1, consistent with all preseason regulations in place for Treaty Indian Troll fisheries during May 16-June 30, 2023. All catch in May 2024 applies against the 2024 Treaty Indian Troll fisheries quota. This opening could be modified following Council review at its March and/or April 2024 meetings.

- May 1 through the earlier of June 30 or 22,500 Chinook quota.

All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C).

- July 1 through the earlier of September 15, or 22,500 Chinook quota or 57,000 coho quota.

All salmon. See size limit (B) and other restrictions (C).

**B. MINIMUM LENGTH (TOTAL INCHES)**

| | Chinook | | Coho | | |
|---|---|---|---|---|---|
| Area (when open) | Total Length | Head-off | Total Length | Head-off | Pink |
| North of Cape Falcon | 24.0 (61.0 cm) | 18.0 (45.7 cm) | 16.0 (40.6 cm) | 12.0 (30.5 cm) | None |

**C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS**

C.1. Tribe and Area Boundaries. All boundaries may be changed to include such other areas as may hereafter be authorized by a Federal court for that tribe's treaty fishery.

S'KLALLAM - Washington State Statistical Area 4B (defined to include those waters of Puget Sound easterly of a line projected from the Bonilla Point light on Vancouver Island to the Tatoosh Island light, thence to the most westerly point on Cape Flattery and westerly of a line projected true north from the fishing boundary marker at the mouth of the Sekiu River [WAC 220-301-030]).

MAKAH - Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.

QUILEUTE - A polygon commencing at Cape Alava, located at latitude 48°10'00" north, longitude 124°43'56.9" west; then proceeding west approximately forty nautical miles at that latitude to a northwestern point located at latitude 48°10'00" north, longitude 125°44'00" west; then proceeding in a southeasterly direction mirroring the coastline at a distance no farther than forty nautical miles from the mainland Pacific coast shoreline at any line of latitude, to a southwestern point at latitude 47°31'42" north, longitude 125°20'26" west; then proceeding east along that line of latitude to the Pacific coast shoreline at latitude 47°31'42" north, longitude 124°21'9.0" west.

HOH - That portion of the FMA between 47°54'18" N. lat. (Quillayute River) and 47°21'00" N. lat. (Quinault River) and east of 125°44'00" W. long.

QUINAULT - A polygon commencing at the Pacific coast shoreline near Destruction Island, located at latitude 47°40'06" north, longitude 124°23'51.362" west; then proceeding west approximately thirty nautical miles at that latitude to a northwestern point located at latitude 47°40'06" north, longitude 125°08'30" west; then proceeding in a southeasterly direction mirroring the coastline no farther than thirty nautical miles from the mainland Pacific coast shoreline at any line of latitude, to a southwestern point at latitude 46°53'18" north, longitude 124°53'53" west; then proceeding east along that line of latitude to the pacific coast shoreline at latitude 46°53'18" north, longitude 124°7'36.6" west.

C.2. Gear restrictions
a. Single point, single shank, barbless hooks are required in all fisheries.
b. No more than eight fixed lines per boat.
c. No more than four hand-held lines per person in the Makah area fishery (Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.)

C.3. Quotas
a. The quotas include troll catches by the S'Klallam and Makah Tribes in Washington State Statistical Area 4B from May 1 through September 15.
b. The **Quileute Tribe may continue a ceremonial and subsistence fishery** during the time frame of October 1 through October 15 in the same manner as in 2004-2015. Fish taken during this fishery are to be counted against treaty troll quotas established for the 2024 season (estimated harvest during the October ceremonial and subsistence fishery: 20 Chinook; 40 coho).

TABLE 3. 2023 Treaty Indian troll management measures for ocean salmon fisheries – Council adopted. (Page 1 of 2)

C.4. Area Closures

a. The area within a six nautical mile radius of the mouths of the Queets River (47°31'42" N. lat.) and the Hoh River (47°45'12" N. lat.) will be closed to commercial fishing.

b. A closure within two nautical miles of the mouth of the Quinault River (47°21'00" N. lat.) may be enacted by the Quinault Nation and/or the State of Washington and will not adversely affect the Secretary of Commerce's management regime.

C.5. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June treaty-Indian ocean troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline on a fishery impact equivalent basis.

TABLE 4. Chinook and coho harvest quotas and guidelines for 2023 ocean salmon fishery management measures - Council adopted.

| Fishery or Quota Designation | Chinook | Coho | |
|---|---|---|---|
| **NORTH OF CAPE FALCON** | | | |
| TREATY INDIAN OCEAN TROLL[a/] | | | |
| U.S./Canada Border to Cape Falcon (All Except Coho) | 22,500 | - | |
| U.S./Canada Border to Cape Falcon (All Species) | 22,500 | 57,000 | |
| Subtotal Treaty Indian Ocean Troll | 45,000 | 57,000 | |
| NON-INDIAN COMMERCIAL TROLL[b/] | | | |
| U.S./Canada Border to Cape Falcon (All Species Except Coho) | 26,000 | - | |
| U.S./Canada Border to Cape Falcon (All Species) | 13,000 | 30,400 | |
| Subtotal Non-Indian Commercial Troll | 39,000 | 30,400 | |
| RECREATIONAL | | | |
| U.S./Canada Border to Cape Alava[b/] | 8,710 | 16,600 | |
| Cape Alava to Queets River[b/] | 1,590 | 4,150 | |
| Queets River to Leadbetter Pt.[b/] | 17,210 | 59,050 | |
| Leadbetter Pt. to Cape Falcon[b/c/] | 11,490 | 79,800 | |
| Subtotal Recreational | 39,000 | 159,600 | |
| TOTAL NORTH OF CAPE FALCON | 123,000 | 247,000 | |
| **SOUTH OF CAPE FALCON** | | | |
| COMMERCIAL TROLL[a/] | | | |
| Cape Falcon to Humbug Mt. | - | 10,000 | |
| Humbug Mt. to OR/CA Border | - | - | |
| OR/CA Border to Humboldt South Jetty | - | - | |
| Subtotal Troll | - | 10,000 | |
| RECREATIONAL | | | |
| Cape Falcon to OR/CA Border[d/e/] | - | 135,000 | d/ |
| TOTAL SOUTH OF CAPE FALCON | - | 145,000 | |

a/ Quotas are non-mark selective for both Chinook and coho.

b/ Quotas are non-mark-selective for Chinook and mark-selective for coho.

c/ Does not include Buoy 10 fishery. Expected catch of 32,000 Chinook and 40,000 marked coho.

d/ The quota consists of both mark-selective and non-mark-selective quotas of 110,000 and 25,000, respectively.

e/ The non-mark-selective fishery is only open from Cape Falcon to Humbug Mt.

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2023 ocean salmon fishery management measures - Council adopted.[a/] (Page 1 of 5)

| Key Stock/Criteria | Projected | 2023 Criteria | Spawner Objective or Other Comparative Standard as Noted [b/] |
|---|---|---|---|
| **CHINOOK** | **CHINOOK** | | **CHINOOK** |
| SRKW PREY ABUNDANCE: | | | |
| North of Falcon | 889.9 | ≥ 623.0 | Oct 1 starting abundance of age 3+ Chinook from U.S./Canada Border to Cape Falcon |
| Oregon Coast | 467.1 | NA | Oct 1 starting abundance of age 3+ Chinook from Cape Falcon to Horse Mt. |
| California Coast | 249.0 | NA | Oct 1 starting abundance of age 3+ Chinook south of Horse Mt. |
| Southwest WCVI | 662.2 | NA | Oct 1 starting abundance of age 3+ Chinook off Southwest Vancouver Island |
| Salish Sea | 1,053.3 | NA | Oct 1 starting abundance of age 3+ Chinook in the Salish Sea |
| PUGET SOUND: | | | |
| Elwha Summer/Fall | 4.9% | ≤ 10.0% | Southern U.S. exploitation rate (NMFS ESA consultation standard). |
| Dungeness Spring | 4.7% | ≤ 10.0% | Southern U.S. exploitation rate (NMFS ESA consultation standard). |
| Mid-Hood Canal Summer/Fall | 15.5% | ≤ 15.5% | Preterminal Southern U.S. exploitation rate consistent with NMFS guidance. |
| Skokomish Summer/Fall | 49.8% | ≤ 50.0% | Total exploitation rate (NMFS ESA consultation standard). |
| Nooksack Spring | 10.9% | ≤ 10.9% | Southern U.S. exploitation rate (NMFS ESA consultation standard). |
| | 0.96 | ≤ 1.00 | ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC. |
| Skagit Summer/Fall | 16.6% | ≤ 17.0% | Southern U.S. exploitation rate (NMFS ESA consultation standard). |
| | -- | ≤ 0.95 | ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC. |
| Skagit Spring | 24.4% | ≤ 36.0% | Total exploitation rate (NMFS ESA consultation standard). |
| | -- | ≤ 0.95 | ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC. |
| Stillaguamish Summer/Fall | 9.0% | ≤ 9.0% | Southern U.S. exploitation rate (NMFS ESA consultation standard). |
| | 0.62 | ≤ 1.00 | ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC. |
| Snohomish Summer/Fall | 8.3% | ≤ 8.3% | Southern U.S. exploitation rate limit (NMFS ESA consultation standard). |
| | 0.84 | ≤ 1.00 | ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC. |
| Lake Washington Summer/Fall | 0.638 | ≥ 0.500 | Natural spawning escapement in the Cedar River (NMFS ESA consultation standard). |
| Green River Summer/Fall | 3.762 | ≥ 2.744 | Natural spawning escapement in the Green River (NMFS ESA consultation standard). |
| White River Spring | 17.1% | ≤ 22.0% | Southern U.S. exploitation rate (NMFS ESA consultation standard). |
| Puyallup Summer/Fall | 2.682 | >1.170 | Natural spawning escapement in the Puyallup River (NMFS ESA consutation standard). |
| Nisqually River Summer/Fall | 46.7% | ≤ 47.0% | Total exploitation rate (NMFS ESA consultation standard). |
| Puget Sound Spring | 2.1% | ≤ 3.0% | Exploitation rate in PFMC fisheries (NMFS ESA consultation standard). |
| Puget Sound Summer/Fall | 5.6% | ≤ 6.0% | Exploitation rate in PFMC fisheries (NMFS ESA consultation standard). |

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2023 ocean fishery management measures - Council adopted.[a/] (Page 2 of 5)

| Key Stock/Criteria | Projected | 2023 Criteria | Spawner Objective or Other Comparative Standard as Noted[b/] |
|---|---|---|---|
| **CHINOOK** | **CHINOOK** | | **CHINOOK** |
| WASHINGTON COAST: | | | |
| Hoko Fall | 2.364 | 0.85 | FMP MSY spawning escapement objective. |
| | 2.8% | ≤ 10.0% | Calendar year exploitation rate ISBM obligation. Compliance assessed postseason by the PSC. |
| Quillayute Fall | >3.0 | 3.0 | FMP MSY spawning escapement objective. |
| | -- | ≤ 0.85 | ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC. |
| Hoh Fall | >1.2 | 1.2 | FMP MSY spawning escapement objective. |
| | -- | ≤ 0.85 | ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC. |
| Queets Fall | >2.5 | 2.5 | FMP MSY spawning escapement objective. |
| | -- | ≤ 0.85 | ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC. |
| Grays Harbor Fall | >13.3 | 13.3 | FMP MSY spawning escapement objective. |
| | -- | ≤ 0.85 | ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC. |
| COLUMBIA RIVER: | | | |
| Columbia Upriver Brights | 278.5 | 74.0 | Minimum ocean escapement to attain 40.0 adults over McNary Dam, with normal distribution and no mainstem harvest. The management goal has been increased to 60.0 by Columbia River managers. |
| Mid-Columbia Brights | 53.8 | 14.9 | Minimum ocean escapement to attain 7.9 for Little White Salmon egg-take, assuming average conversion and no mainstem harvest. |
| Columbia Lower River Hatchery Tules | 77.0 | 25.0 | Minimum ocean escapement to attain 14.8 adults for hatchery egg-take, with average conversion and no lower river mainstem or tributary harvest. |
| Columbia Lower River Natural Tules (threatened) | 38.0% | ≤ 38.0% | Total adult equivalent fishery exploitation rate (2023 NMFS ESA guidance). |
| Columbia Lower River Wild[e/] (threatened) | 8.7 | 6.9 | Minimum ocean escapement to attain MSY spawner goal of 5.7 for N. Lewis River fall Chinook (NMFS ESA consultation standard). |
| Spring Creek Hatchery Tules | 135.3 | 8.2 | Minimum ocean escapement to attain 6.0 adults for Spring Creek Hatchery egg-take, assuming average conversion and no mainstem harvest. |
| Upper Columbia River Summer | 85.4 | 29.0 | Aggregate escapement to mouth of Columbia River. |
| Snake River Fall (threatened) SRFI | 49.0% | ≤ 70.0% | Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard). |

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2023 ocean fishery management measures - Council adopted.[a/] (Page 3 of 5)

| Key Stock/Criteria | Projected | 2023 Criteria | Spawner Objective or Other Comparative Standard as Noted [b/] |
|---|---|---|---|
| **CHINOOK** | **CHINOOK** | | **CHINOOK** |
| OREGON COAST: | | | |
| Nehalem Fall | -- | ≤ 0.85 | ISBM obligation applicable, escapement goal not expected to be met. Compliance assessed postseason by the PSC. |
| Siletz Fall | -- | ≤ 0.85 | ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC. |
| Siuslaw Fall | -- | ≤ 0.85 | ISBM obligation applicable, escapement goal not expected to be met. Compliance assessed postseason by the PSC. |
| South Umpqua | -- | ≤ 0.85 | ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC. |
| Coquille | -- | ≤ 0.85 | ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC. |
| CALIFORNIA: | | | |
| Klamath River Fall | 23.614 | ≥ 23.614 | 2023 minimum natural area adult escapement (FMP control rule). |
| Federally recognized tribal harvest | 50.0% | 50.0% | Equals 1,872 adult Chinook for Yurok and Hoopa Valley tribal fisheries. |
| Exploitation (spawner reduction) rate | 10.0% | ≤ 10.0% | FMP control rule. |
| Adult river mouth return | 39.9 | NA | Total adults in thousands. |
| Age-4 ocean harvest rate | 0.3% | ≤ 10.0% | NMFS guidance. |
| KMZ sport fishery share | 37.7% | | |
| River recreational fishery share | 96.3% | NA | Equals 1,804 adult Chinook for recreational inriver fisheries. |
| Sacramento River Winter (endangered) | 0.0% | ≤ 20.0% | Age-3 ocean impact rate in fisheries south of Pt. Arena. In addition, the following season restrictions apply: Recreational- Pt. Arena to Pigeon Pt. between the first Saturday in April and the second Sunday in November; Pigeon Pt. to the U.S./Mexico border between the first Saturday in April and the first Sunday in October. Minimum size limit ≥ 20 inches total length. Commercial- Pt. Arena to the U.S./Mexico border between May 1 and September 30, except Pt. Reyes to Pt. San Pedro between October 1 and 15 (Monday-Friday). Minimum size limit ≥ 26 inches total length (NMFS 2023 ESA |
| Sacramento River Fall | 164.964 | ≥ 122.000 | 2023 minimum hatchery and natural area adult escapement (FMP). |
| Sacramento Index Exploitation Rate | 2.8% | ≤ 28.1% | FMP control rule. |
| Ocean commercial impacts | 3.0 | | Includes fall (Sept-Dec) 2022 impacts (3.0 thousand SRFC). |
| Ocean recreational impacts | 1.8 | | Includes fall (Sept-Dec) 2022 impacts (1.7 thousand SRFC). |
| River recreational impacts | 0.0 | | |

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2023 ocean fishery management measures - Council adopted.[a/] (Page 4 of 5)

| Key Stock/Criteria | Projected | 2023 Criteria | Spawner Objective or Other Comparative Standard as Noted [b/] |
|---|---|---|---|
| **COHO** | **COHO** | | **COHO** |
| Interior Fraser (Thompson River) | 9.7%(5.0%) | ≤ 10.0% | 2023 Southern U.S. exploitation rate ceiling; PSC coho agreement. |
| Skagit | 35.0%(4.5%) | ≤ 35.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Stillaguamish | 28.5%(3.1%) | ≤ 50.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Snohomish | 32.0%(3.2%) | ≤ 40.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Hood Canal | 42.8%(4.9%) | ≤ 45.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Strait of Juan de Fuca | 12.1%(4.2%) | ≤ 40.0% | 2023 total exploitation rate ceiling; FMP matrix[d/] |
| Quillayute Fall | 12.5 | 6.3 | FMP MSY adult spawner estimate. Value depicted is ocean escapement. |
| | 42.6% | ≤ 53% | PST total exploitation rate constraint for 2023.[d/f/] |
| Hoh | 5.4 | 2.0 | FMP MSY adult spawner estimate. Value depicted is ocean escapement. |
| | 51.0% | ≤ 65% | FMP total exploitation rate constraint (MFMT).[e/f/] |
| Queets Wild | 10.3 | 5.8 | FMP MSY adult spawner estimate. Value depicted is ocean escapement. |
| | 40.9% | ≤ 53% | PST total exploitation rate constraint for 2023.[e/f/] |
| Grays Harbor | 102.1 | 35.4 | FMP MSP natural area adult spawner estimate. Value depicted is ocean escapement. |
| | 55.6% | ≤ 65% | FMP total exploitation rate constraint (MFMT).[d/f/] |
| Willapa Bay | 49.5 | 17.2 | FMP MSY natural area adult spawner estimate. Value depicted is ocean escapement. |
| Lower Columbia River Natural (threatened) | 18.9% | ≤23.0% | Total marine and mainstem Columbia R. fishery exploitation rate (2023 NMFS ESA guidance). |
| Upper Columbia | 59.8% | ≥ 50% | Minimum percentage of the run to Bonneville Dam. |
| Columbia River Hatchery Early | 318.9 | 77.2 | Minimum ocean escapement to attain hatchery egg-take goal of 21.7 early adult coho, with average conversion and no mainstem or tributary fisheries. |
| Columbia River Hatchery Late | 230.6 | 9.7 | Minimum ocean escapement to attain hatchery egg-take goal of 6.4 late adult coho, with average conversion and no mainstem or tributary fisheries. |
| Oregon Coastal Natural[c/] | 19.8% | ≤ 20.0% | Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard). |
| Southern Oregon/Northern California Coast (threatened) | | | |
| Trinity Natural | 15.0% | ≤ 16.0% | Total exploitation rate ceiling. |
| Klamath Natural | 7.7% | ≤ 15.0% | Total exploitation rate ceiling. |
| Rogue Natural | 6.7% | ≤ 15.0% | Total exploitation rate ceiling. |
| Other Natural | 1.8% | ≤ 15.0% | Total exploitation rate ceiling. |

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2023 ocean fishery management measures - Council adopted.[a/] (Page 5 of 5)

a/ Reflects 2023 fisheries and abundance estimates.

b/ ISBM obligation is assessed as a proportion of the 2009-2015 average calendar year exploitation rate. Ocean escapement is the number of salmon escaping ocean fisheries and entering freshwater with the following clarifications. Ocean escapement for Puget Sound stocks is the estimated number of salmon entering Area 4B that are available to U.S. net fisheries in Puget Sound and spawner escapement after impacts from the Canadian, U.S. Ocean, and Puget Sound troll and recreational fisheries have been deducted. Numbers in parentheses represent Council area ERs for Puget Sound coho stocks. For Columbia River early and late coho stocks, ocean escapement represents the number of coho after the Buoy 10 fishery. Exploitation rates for LCN coho, OCN coho, SONCC coho, and LCR Tule Chinook represent marine and freshwater impacts. Values reported for Klamath River fall Chinook, Grays Harbor coho, and Willapa Bay coho are natural area adult spawners. Values reported for Sacramento River fall Chinook are hatchery and natural area adult spawners.

c/ Includes projected impacts of inriver fisheries that have not yet been shaped.

d/ Annual management objectives may be different than FMP goals and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders. It is anticipated that fishery management will be adjusted by state and tribal comanagers during the preseason planning process to comply with stock management objectives.

e/ Includes minor contributions from East Fork Lewis River and Sandy River.

f/ Management criteria depicted represent the lower of the FMP and PST Southern Coho Management Plan ER constraints in a given year (see Table III-5 in most recent Preseason Report I). PST ER constraints represent an approximation of the maximum ER associated with achieving the escapement goal. Per the provisions of the PST Southern Coho Management Plan, Parties may request increases to management unit specific ER caps, so long as it occurs prior to March 31 in a given year.

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2023 ocean salmon fishery management measures - Council adopted. (Page 1 of 2)

| Area and Fishery | Catch Projection | Bycatch Mortality[a/] Projection | Bycatch Projection[b/] | Observed in 2022 Catch | Observed in 2022 Bycatch Mortality | |
|---|---|---|---|---|---|---|
| OCEAN FISHERIES: | | **CHINOOK (thousands of fish)** | | | | |
| NORTH OF CAPE FALCON | | | | | | |
| Treaty Indian Ocean Troll | 45.00 | 4.61 | 11.49 | 34.68 | 3.55 | |
| Non-Indian Commercial Troll | 39.00 | 15.80 | 56.25 | 25.98 | 11.14 | |
| Recreational | 39.00 | 4.72 | 21.48 | 24.83 | 3.39 | |
| CAPE FALCON TO HUMBUG MT.[c/] | | | | | | |
| Commercial Troll | 1.34 | 0.27 | 0.74 | 29.68 | 6.86 | |
| Recreational | 0.93 | 0.11 | 0.37 | 4.63 | 0.53 | |
| HUMBUG MT. TO OR/CA BORDER | | | | | | |
| Commercial Troll | - | - | - | 0.78 | 0.18 | |
| Recreational | - | 0.02 | 0.08 | 0.40 | 0.05 | d/ |
| OR/CA BORDER TO 40°10′ N. LAT. | | | | | | |
| Commercial Troll | - | - | - | 0.00 | - | |
| Recreational | - | - | - | 4.35 | 0.52 | d/ |
| 40°10′ N. LAT. TO PT. ARENA | | | | | | |
| Commercial Troll | - | - | - | 21.66 | 6.35 | d/ |
| Recreational | - | - | - | 2.64 | 0.33 | d/ |
| PT. ARENA TO PIGEON PT. | | | | | | |
| Commercial Troll | - | - | - | 97.57 | 24.39 | d/ |
| Recreational | - | - | - | 66.11 | 7.60 | d/ |
| SOUTH OF PIGEON PT. | | | | | | |
| Commercial Troll | - | - | - | 91.96 | 11.22 | d/ |
| Recreational | - | - | - | 15.86 | 1.40 | d/ |
| TOTAL OCEAN FISHERIES | | | | | | |
| Commercial Troll | 85.34 | 20.67 | 68.49 | 302.31 | 63.68 | |
| Recreational | 39.93 | 4.84 | 21.93 | 118.81 | 13.82 | |
| INSIDE FISHERIES: | | | | | | |
| Area 4B | - | - | - | - | - | |
| Buoy 10 | 32.00 | 5.50 | 29.00 | 28.36 | 5.59 | d/ |

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2023 ocean salmon fishery management measures - Council adopted. (Page 2 of 2)

| Area and Fishery | Catch Projection | Bycatch Mortality[a/] Projection | Bycatch Projection[b/] | Observed in 2022 Catch | Observed in 2022 Bycatch Mortality |
|---|---|---|---|---|---|
| OCEAN FISHERIES: | | **COHO (thousands of fish)** | | | |
| NORTH OF CAPE FALCON | | | | | |
| Treaty Indian Ocean Troll[e/] | 57.00 | 3.73 | 6.25 | 36.15 | 2.31 |
| Non-Indian Commercial Troll | 30.40 | 13.08 | 42.47 | 12.92 | 4.20 |
| Recreational | 159.60 | 27.57 | 116.31 | 81.36 | 15.95 |
| SOUTH OF CAPE FALCON | | | | | |
| Commercial Troll | 10.00 | 0.52 | 0.58 | 2.17 | 2.90 |
| Recreational[e/] | 135.00 | 29.49 | 132.62 | 58.28 | 14.26 |
| TOTAL OCEAN FISHERIES | | | | | |
| Commercial Troll | 97.40 | 17.33 | 49.29 | 51.24 | 9.41 |
| Recreational | 294.60 | 57.05 | 248.93 | 139.64 | 30.21 |
| INSIDE FISHERIES: | | | | | |
| Area 4B | - | - | - | - | - |
| Buoy 10 | 40.00 | 8.49 | 37.84 | 8.85 | 1.37 [d/] |

a/ The bycatch mortality reported in this table consists of drop-off mortality (includes predation on hooked fish) plus hook-and-release mortality of Chinook and coho salmon in Council-area fisheries. Drop-off mortality for both Chinook and coho is assumed to be equal to 5% of total encounters. The hook-and-release mortality (HRM) rates used for both Chinook and coho are:

Commercial: 26%.

Recreational, north of Pt. Arena: 14%.

Recreational, south of Pt. Arena: 16% (based on the expected proportion of fish that will be caught using mooching versus trolling gear, and the HRMs of 42.2% and 14% for these two respective gear types).

b/ Bycatch calculated as dropoff mortality plus fish released.

c/ Includes Oregon territorial water, late season Chinook fisheries.

d/ Based on reported released Chinook or coho. Reported releases in California fisheries are used as a surrogate in Oregon fisheries.

e/ Includes fisheries that allow retention of all legal sized coho.

TABLE 7. Expected coastwide exploitation rates by fishery for 2023 ocean fisheries management measures for lower Columbia Natural (LCN), Oregon coastal natural (OCN), Lower Columbia River (LCR) tule Chinook, and Southern Oregon Northern California Coastal (SONCC) coho salmon by natural-origin subcomponent - Council Adopted (Page 1 of 2)

| | Exploitation Rate (Percent) | | |
|---|---|---|---|
| Fishery | LCN Coho | OCN Coho | LCR Tule Chinook |
| SOUTHEAST ALASKA | 0.0% | 0.0% | 2.2% |
| BRITISH COLUMBIA | 0.3% | 0.4% | 14.0% |
| PUGET SOUND/STRAIT | 0.2% | 0.0% | 0.4% |
| | | | |
| NORTH OF CAPE FALCON | | | |
| Treaty Indian Ocean Troll | 2.0% | 0.5% | 2.2% |
| Recreational | 4.6% | 0.9% | 4.0% |
| Non-Indian Troll | 1.5% | 0.3% | 5.3% |
| | | | |
| SOUTH OF CAPE FALCON | | | |
| Recreational: | | | 0.2% |
| Cape Falcon to Humbug Mt. | 4.9% | 10.4% | - |
| Humbug Mt. to OR/CA border (KMZ) | 0.1% | 0.4% | - |
| OR/CA border to Lat.40°10' N. (KMZ) | 0.0% | 0.0% | - |
| Fort Bragg | 0.0% | 0.0% | - |
| South of Pt. Arena | 0.0% | 0.0% | - |
| Troll: | | | 0.2% |
| Cape Falcon to Humbug Mt. | 0.8% | 1.3% | - |
| Humbug Mt. to OR/CA border (KMZ) | 0.0% | 0.0% | - |
| OR/CA border to Lat. 40°10' N. (KMZ) | 0.0% | 0.0% | - |
| Fort Bragg | 0.0% | 0.0% | - |
| South of Pt. Arena | 0.0% | 0.0% | - |
| | | | |
| BUOY 10 | 2.0% | 0.1% | 9.4% |
| ESTUARY/FRESHWATER | 2.6% | 5.6% | |
| | | | |
| TOTAL[a/] | 18.9% | 19.8% | 38.0% |

TABLE 7. Expected coastwide exploitation rates by fishery for 2023 ocean fisheries management measures for lower Columbia Natural (LCN) coho, Oregon coastal natural (OCN) coho, Lower Columbia River (LCR) tule Chinook, and Southern Oregon Northern California Coastal (SONCC) coho salmon by natural-origin subcomponent - Council adopted (Page 2 of 2).

| | Exploitation Rate (Percent) | | | |
|---|---|---|---|---|
| Fishery | Trinity Natural | Klamath Natural | Rogue Natural | Other SONCC |
| SOUTHEAST ALASKA | 0.0% | 0.0% | 0.0% | 0.0% |
| BRITISH COLUMBIA | 0.2% | 0.2% | 0.2% | 0.2% |
| PUGET SOUND/STRAIT | 0.0% | 0.0% | 0.0% | 0.0% |
| NORTH OF CAPE FALCON | | | | |
| Treaty Indian Ocean Troll | 0.0% | 0.0% | 0.0% | 0.0% |
| Recreational | 0.0% | 0.0% | 0.0% | 0.0% |
| Non-Indian Troll | 0.0% | 0.0% | 0.0% | 0.0% |
| SOUTH OF CAPE FALCON | | | | |
| Recreational: | | | | |
| Cape Falcon to Humbug Mt. | 0.7% | 0.7% | 0.7% | 0.7% |
| Humbug Mt. to OR/CA border (KMZ) | 0.7% | 0.7% | 0.7% | 0.7% |
| OR/CA border to Lat.40°10' N. (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% |
| Fort Bragg | 0.0% | 0.0% | 0.0% | 0.0% |
| South of Pt. Arena | 0.0% | 0.0% | 0.0% | 0.0% |
| Troll: | | | | |
| Cape Falcon to Humbug Mt. | 0.2% | 0.2% | 0.2% | 0.2% |
| Humbug Mt. to OR/CA border (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% |
| OR/CA border to Lat. 40°10' N. (KMZ) | 0.0% | 0.0% | 0.0% | 0.0% |
| Fort Bragg | 0.0% | 0.0% | 0.0% | 0.0% |
| South of Pt. Arena | 0.0% | 0.0% | 0.0% | 0.0% |
| BUOY 10 | 0.0% | 0.0% | 0.0% | 0.0% |
| ESTUARY/FRESHWATER | 13.2% | 5.9% | 4.9% | 0.0% |
| TOTAL[a/] | 15.0% | 7.7% | 6.7% | 1.8% |

a/ Estuary/freshwater catch is included in the total for LCN, OCN, SONCC, and LCR Tule Chinook populations. Bolded values identify exploitation rates that would exceed the total allowable exploitation rate.

TABLE 8. 2023 projected coho mark rates for mark-selective fisheries under Council adopted management measures (percent marked).

| Area | Fishery | June | July | August | September |
|---|---|---|---|---|---|
| Canada | | | | | |
| Johnstone Strait | Recreational | 30% | 27% | 21% | -- |
| West Coast Vancouver Island | Recreational | 46% | 43% | 41% | 40% |
| North Georgia Strait | Recreational | 43% | 44% | 43% | 36% |
| South Georgia Strait | Recreational | 46% | 49% | 43% | 44% |
| Juan de Fuca Strait | Recreational | 46% | 45% | 44% | 43% |
| Johnstone Strait | Troll | -- | -- | -- | -- |
| NW Vancouver Island | Troll | 48% | 43% | 43% | 42% |
| SW Vancouver Island | Troll | 56% | 49% | 48% | 48% |
| Georgia Strait | Troll | -- | -- | 51% | 45% |
| Puget Sound | | | | | |
| Strait of Juan de Fuca (Area 5) | Recreational | -- | 49% | 49% | 46% |
| Strait of Juan de Fuca (Area 6) | Recreational | -- | 47% | 49% | 43% |
| San Juan Island (Area 7) | Recreational | -- | 55% | 47% | 32% |
| North Puget Sound (Areas 6 & 7A) | Net | -- | -- | 49% | 36% |
| Council Area | | | | | |
| Neah Bay (Area 4/4B) | Recreational | 47% | 57% | 51% | 57% |
| LaPush (Area 3) | Recreational | 58% | 60% | 65% | 46% |
| Westport (Area 2) | Recreational | 74% | 70% | 65% | 58% |
| Columbia River (Area 1) | Recreational | 77% | 78% | 66% | 65% |
| Tillamook | Recreational | 68% | 60% | 50% | 35% |
| Newport | Recreational | 61% | 53% | 48% | 30% |
| Coos Bay | Recreational | 50% | 43% | 30% | 15% |
| Brookings | Recreational | 44% | 28% | 22% | -- |
| Neah Bay (Area 4/4B) | Troll | -- | 53% | 53% | 53% |
| LaPush (Area 3) | Troll | -- | 55% | 51% | 49% |
| Westport (Area 2) | Troll | -- | 63% | 64% | 59% |
| Columbia River (Area 1) | Troll | -- | 74% | 67% | 50% |
| Tillamook | Troll | -- | -- | -- | 48% |
| Newport | Troll | -- | -- | -- | 40% |
| Coos Bay | Troll | -- | -- | -- | 18% |
| Brookings | Troll | -- | -- | -- | -- |
| Columbia River | | | | | |
| Buoy 10 | Recreational | -- | -- | -- | 58% |

TABLE 9. Preliminary projected exvessel value by catch area under Council-adopted 2023 non-Indian commercial troll management measures compared with 2022 and the 2018-2022 average (inflation-adjusted 2022 dollars).

| | Exvessel Value (thousands of dollars)[a/] | | | | |
|---|---|---|---|---|---|
| | | | | Percent Change | |
| Management Area | 2023 Projected[b/] | 2022 | 2018-2022 Average | From 2022 (Modeled) | From 2018-2022 Average |
| North of Cape Falcon | 3,199 | 1,975 | 2,048 | +62% | +56% |
| Cape Falcon to Humbug Mt. | 290 | 2,830 | 2,178 | -90% | -87% |
| Humbug Mt. to OR/CA Border (OR KMZ) | 0 | 86 | 187 | -100% | -100% |
| OR/CA Border to 40º10' N. Lat. (CA KMZ) | 0 | 0 | 235 | - | -100% |
| 40º10' N. Lat. to Pt. Arena (Fort Bragg) | 0 | 1,466 | 1,378 | -100% | -100% |
| Pt. Arena to Pigeon Pt. (SF) | 0 | 7,748 | 9,435 | -100% | -100% |
| South of Pigeon Pt. (MO) | 0 | 8,076 | 5,468 | -100% | -100% |
| Total South of Cape Falcon | 290 | 20,207 | 18,883 | -99% | -98% |
| West Coast Total | 3,489 | 22,181 | 20,932 | -84% | -83% |

a/ All dollar amounts are inflation-adjusted 2022 values. Exvessel value estimates are not comparable to the community income impacts shown in Table 10.

b/ 2023 projections are based on expected catches in the Council management areas, 2022 exvessel prices and 2022 average weights per fish.

TABLE 10. Preliminary projected angler trips and associated state-level personal income impacts under Council-adopted 2023 recreational ocean salmon management measures compared with 2022 and the 2018-2022 average (inflation-adjusted 2022 dollars).

| | | | | Coastal Community Income Impacts[a/] | | | | |
|---|---|---|---|---|---|---|---|---|
| | Angler Trips (thousands) | | | (thousands of dollars)[b/] | | | Percent Change | |
| Management Area | 2023 Projected | 2022 | 2018-2022 Avg. | 2023 Projected | 2022 | 2018-2022 Avg. | Compared to 2022 | Compared to 2018-2022 Avg. |
| North of Cape Falcon | 89.9 | 86.5 | 63.1 | 12,671 | 12,184 | 9,339 | +4% | +36% |
| Cape Falcon to Humbug Mt. | 54.9 | 76.3 | 65.6 | 4,099 | 5,699 | 5,088 | -28% | -19% |
| Humbug Mt. to OR/CA Border (OR KMZ) | 2.8 | 3.2 | 5.3 | 159 | 181 | 293 | -12% | -46% |
| OR/CA Border to 40º10' N. Lat. (CA KMZ) | 0.0 | 5.3 | 5.5 | 0 | 636 | 688 | -100% | -100% |
| 40º10' N. Lat. to Pt. Arena (Fort Bragg) | 0.0 | 6.8 | 7.6 | 0 | 1,110 | 1,280 | -100% | -100% |
| Pt. Arena to Pigeon Pt. (SF) | 0.0 | 62.1 | 55.4 | 0 | 14,900 | 13,911 | -100% | -100% |
| South of Pigeon Pt. (MO) | 0.0 | 24.3 | 20.9 | 0 | 3,547 | 3,055 | -100% | -100% |
| Total South of Cape Falcon | 57.7 | 178.0 | 160.4 | 4,258 | 26,073 | 24,314 | -84% | -82% |
| West Coast Total | 147.6 | 264.4 | 223.5 | 16,929 | 38,257 | 33,653 | -56% | -50% |

a/ Income impacts are not comparable to exvessel values shown in Table 9.

b/ Dollar amounts are in inflation-adjusted 2022 values.

TABLE 11. Environmental effects of the Proposed Action relative to criteria and Alternatives analyzed in Preseason Reports I and II.[a/] (Page 1 of 2)

| Environmental Component | | No-Action Alternative[b/] | Alternative I | Alternative II | Alternative III | Proposed Action | 2023 Criteria | Objective or Other Comparative Standard as Noted |
|---|---|---|---|---|---|---|---|---|
| **Chinook** | | | | | | | | |
| KRFC | Spawning Escapement | **17.792** | 23.614 | 23.614 | 26.133 | 23.614 | ≥ 23.614 | 2023 minimum natural area adult escapement (FMP control rule). |
| | Exploitation (spawner reduction) rate | **32.2%** | 10.0% | 10.0% | 0.4% | 10.0% | ≤ 10.0% | FMP control rule. |
| SRFC | Spawning Escapement | **84.750** | 164.964 | 164.964 | 164.990 | 164.964 | ≥ 122.000 | 2023 minimum hatchery and natural area adult escapement (FMP). |
| | Exploitation Rate | **50.1%** | 2.8% | 2.8% | 2.8% | 2.8% | ≤ 28.1% | FMP control rule. |
| **Canadian Stocks** | | | | | | | | |
| Interior Fraser Coho | | 9.3%(4.6%) | **10.3%(5.7%)** | 9.5%(4.9%) | 8.6%(4.0%) | 9.7%(5.0%) | ≤ 10.0% | 2023 Southern U.S. exploitation rate ceiling; PSC coho agreement. |
| **Puget Sound Coho** | | | | | | | | |
| Skagit | | 47.6% | **48.0%(5.2%)** | **47.4%(4.4%)** | **46.9%(3.6%)** | 35.0%(4.5%) | ≤ 35.0% | 2023 total exploitation rate ceiling; FMP matrix.[c/] |
| Stillaguamish | | 23.9% | 24.2%(3.6%) | 23.7%(3.0%) | 23.2%(2.4%) | 28.5%(3.1%) | ≤ 50.0% | 2023 total exploitation rate ceiling; FMP matrix.[c/] |
| Snohomish | | 20.7% | 21.0%(3.6%) | 20.5%(3.0%) | 19.9%(2.4%) | 32.0%(3.2%) | ≤ 40.0% | 2023 total exploitation rate ceiling; FMP matrix.[c/] |
| Hood Canal | | 39.9% | 40.4%(5.6%) | 39.7%(4.8%) | 39.1%(4.0%) | 42.8%(4.9%) | ≤ 45.0% | 2023 total exploitation rate ceiling; FMP matrix.[c/] |
| Strait of Juan de Fuca | | 10.1% | 10.9%(4.7%) | 10.1%(3.9%) | 9.4%(3.2%) | 12.1%(4.2%) | ≤ 40.0% | 2023 total exploitation rate ceiling; FMP matrix.[c/] |
| **Washington Coastal Coho** (in thousands of fish) | | | | | | | | |
| Quillayute Fall Coho | | 12.6 | 12.6 | 12.7 | 12.8 | 12.5 | 6.3 | FMP MSY adult spawner estimate.[d/] |
| | | | 37.2% | 36.6% | 36.2% | 42.6% | ≤ 53% | PST total exploitation rate constraint for 2023.[c/] |
| Hoh Coho | | 5.5 | 5.5 | 5.6 | 5.7 | 5.4 | 2.0 | FMP MSY adult spawner estimate.[d/] |
| | | | 53.6% | 52.5% | 51.6% | 51.0% | ≤ 65% | FMP total exploitation rate constraint (MFMT).[c/d/] |
| Queets Wild Coho | | 10.4 | 10.3 | 10.5 | 10.7 | 10.3 | 5.8 | FMP MSY adult spawner estimate.[d/] |
| | | | 36.8% | 35.4% | 34.2% | 40.9% | ≤ 53% | PST total exploitation rate constraint for 2023.[c/] |
| Grays Harbor Coho | | 103.7 | 102.8 | 104.0 | 104.9 | 102.1 | 35.4 | FMP MSP natural area adult spawner estimate.[d/] |
| | | | 49.9% | 49.3% | 48.8% | 55.6% | ≤ 65% | FMP total exploitation rate constraint (MFMT).[c/] |
| Willapa Bay Natural Coho | | 49.8 | 49.6 | 50.6 | 51.5 | 49.5 | 17.2 | FMP MSY natural area adult spawner estimate.[d/] |
| **ESA-Listed Salmon** | | | | | | | | |
| California Coastal Chinook | | **12.3%** | 0.3% | 0.3% | 0.3% | 0.3% | ≤ 10.0% | KRFC age-4 ocean harvest rate. (NMFS Guidance) |
| SRWC | | 15.9% | 0.0% | 0.0% | 0.0% | 0.0% | ≤ 20.0% | SRWC age-3 ocean impact rate in fisheries south of Pt. Arena. |
| LCR Natural Tule Chinook[e/] | | NA | **39.1%** | 37.7% | 36.4% | 38.0% | ≤ 38.0% | Total adult equivalent fishery exploitation rate (2023 |
| LCN Coho[e/f/] | | 18.8% | 14.9% | 12.5% | 10.9% | 18.9% | ≤23.0% | Total marine and mainstem Col. R. fishery ER (2023 |
| OCN coho[e/] | | 15.4% | | | | 19.8% | ≤ 20.0% | Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard). |
| | | | 20.0% | 18.1% | 17.4% | | | |
| SONCC coho | | | | | | | | |
| | Trinity Natural[f/] | 13.5% | 1.7% | 1.3% | 1.2% | 15.0% | ≤ 16.0% | Total exploitation rate ceiling. |
| | Klamath Natural[f/] | 8.7% | 1.7% | 1.3% | 1.2% | 7.7% | ≤ 15.0% | Total exploitation rate ceiling. |
| | Rogue Natural[f/] | 7.8% | 1.7% | 1.3% | 1.2% | 6.7% | ≤ 15.0% | Total exploitation rate ceiling. |
| | Other Natural[f/] | 2.9% | 1.7% | 1.3% | 1.2% | 1.8% | ≤ 15.0% | Total exploitation rate ceiling. |

TABLE 11. Environmental effects of the Proposed Action relative to criteria and Alternatives analyzed in Preseason Reports I and II.[a/] (Page 2 of 2)

| Environmental Component | No-Action Alternative[b/] | Alternative I | Alternative II | Alternative III | Proposed Action |
|---|---|---|---|---|---|
| **Socioeconomics** | | | | | |
| Commercial Community Personal Income Impacts (thousands of dollars) | | | | | |
| North of Cape Falcon | 3,363 | 5,853 | 5,200 | 4,548 | 5,398 |
| Cape Falcon to Humbug Mt. | 4,200 | 535 | 224 | 84 | 526 |
| Humbug to OR/CA border (OR KMZ) | 219 | 4 | 3 | - | 4 |
| OR/CA border to 40º10' N. Lat. (CA KMZ) | 161 | - | - | - | - |
| 40º10' N. Lat. to Pt. Arena (Fort Bragg) | 1,968 | - | - | - | - |
| Pt. Arena to Pigeon Pt. (San Francisco) | 25,169 | - | - | - | - |
| South of Pigeon Pt. (Monterey) | 4,161 | - | - | - | - |
| West Coast Total | 39,242 | 6,392 | 5,427 | 4,633 | 5,928 |
| Recreational Community Personal Income Impacts (thousands of dollars) | | | | | |
| North of Cape Falcon | 12,184 | 13,581 | 12,258 | 10,934 | 12,671 |
| Cape Falcon to Humbug Mt. | 5,699 | 4,306 | 3,945 | 3,549 | 4,099 |
| Humbug to OR/CA border (OR KMZ) | 181 | - | - | - | 159 |
| OR/CA border to 40º10' N. Lat. (CA KMZ) | 636 | - | - | - | - |
| 40º10' N. Lat. to Pt. Arena (Fort Bragg) | 1,110 | - | - | - | - |
| Pt. Arena to Pigeon Pt. (San Francisco) | 14,900 | - | - | - | - |
| South of Pigeon Pt. (Monterey) | 3,547 | - | - | - | - |
| West Coast Total | 38,257 | 17,888 | 16,203 | 14,483 | 16,929 |

a/ Impacts assumed when Alternatives were adopted in March may have changed due to updated information from the PSC, North of Falcon process, or other sources.

b/ Socioeconomic impacts under the No-Action Alternative are assumed equal to 2022 estimates.

c/ Annual management objectives may be different than FMP goals, and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders. Values in parentheses indicate impacts in Council-area fisheries.

d/ Value depicted is ocean escapement.

e/ Includes projected impacts of inriver fisheries that have not yet been shaped.

f/ Values depicted for Alternatives I, II, and III are ocean exploitation rates only.

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 adopted 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.

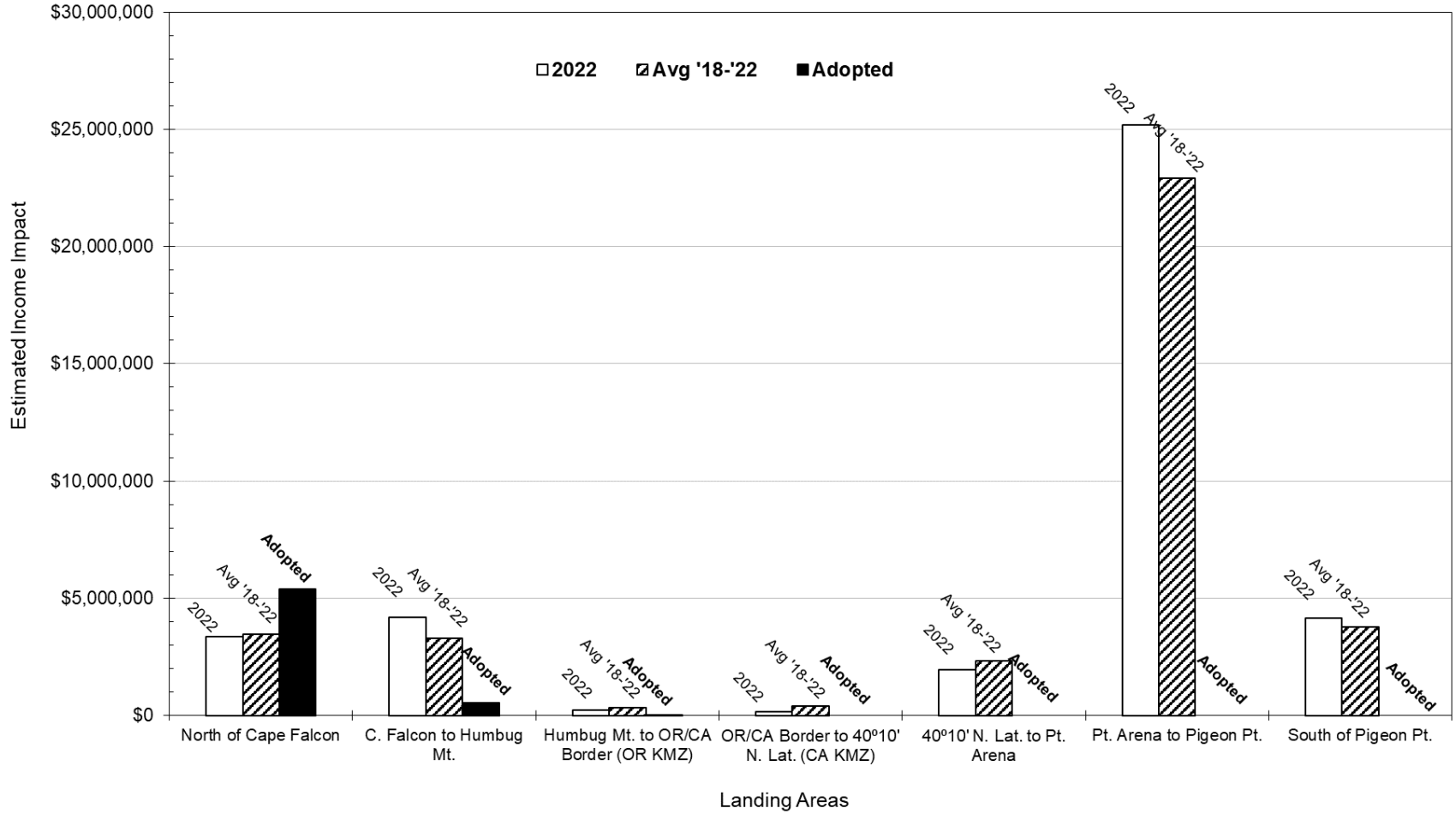



FIGURE 3. Projected coastal community personal income impacts associated with the 2023 commercial troll fishery under Council-adopted management measures compared to estimated 2022 and the 2018-2022 inflation-adjusted average (in 2022 dollars).

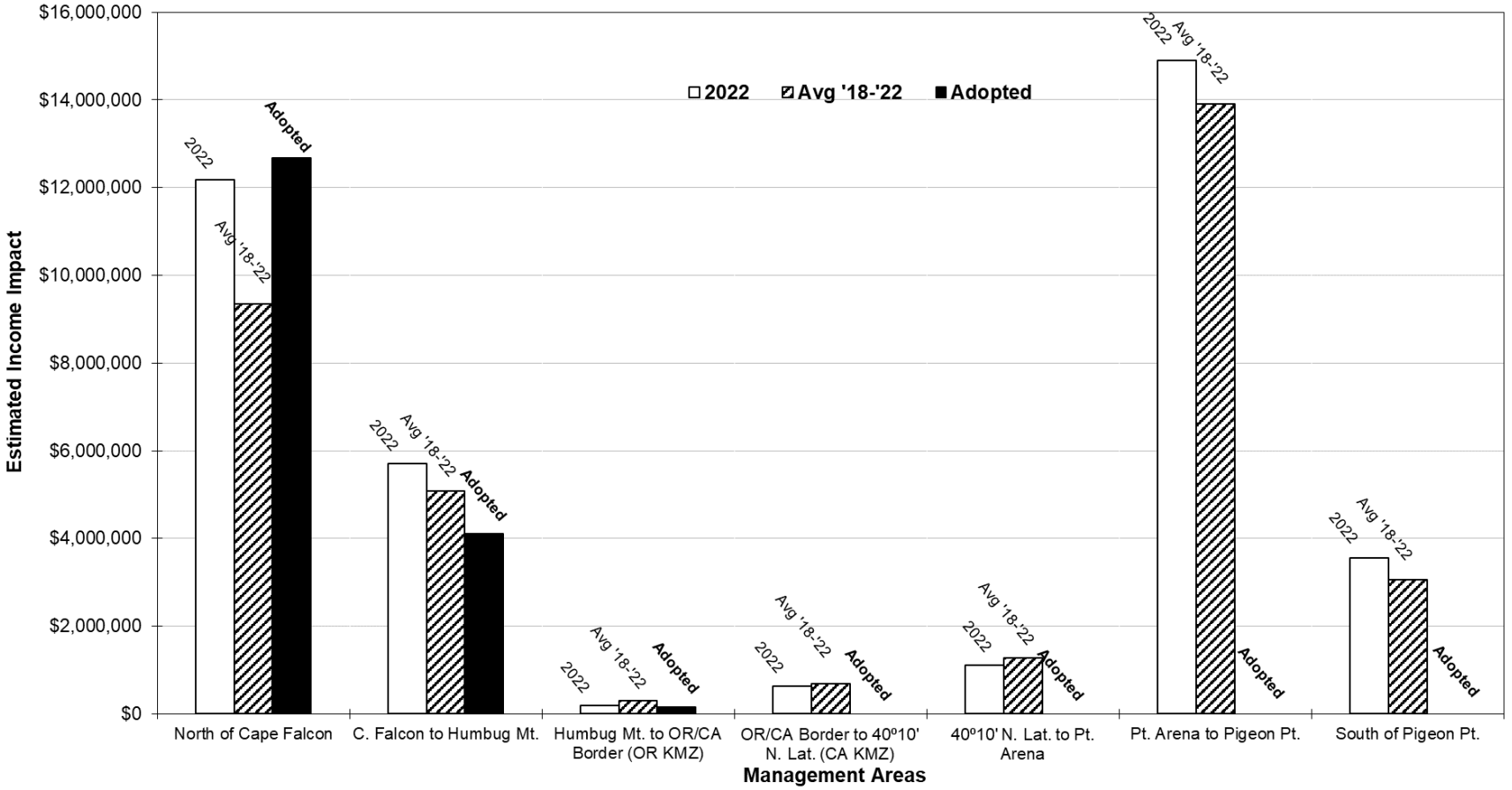



FIGURE 4. Projected coastal community personal income impacts associated with the 2023 recreational ocean salmon fishery under Council-adopted management measures compared to estimated 2022 and the 2018-2022 inflation-adjusted average (in 2022 dollars).

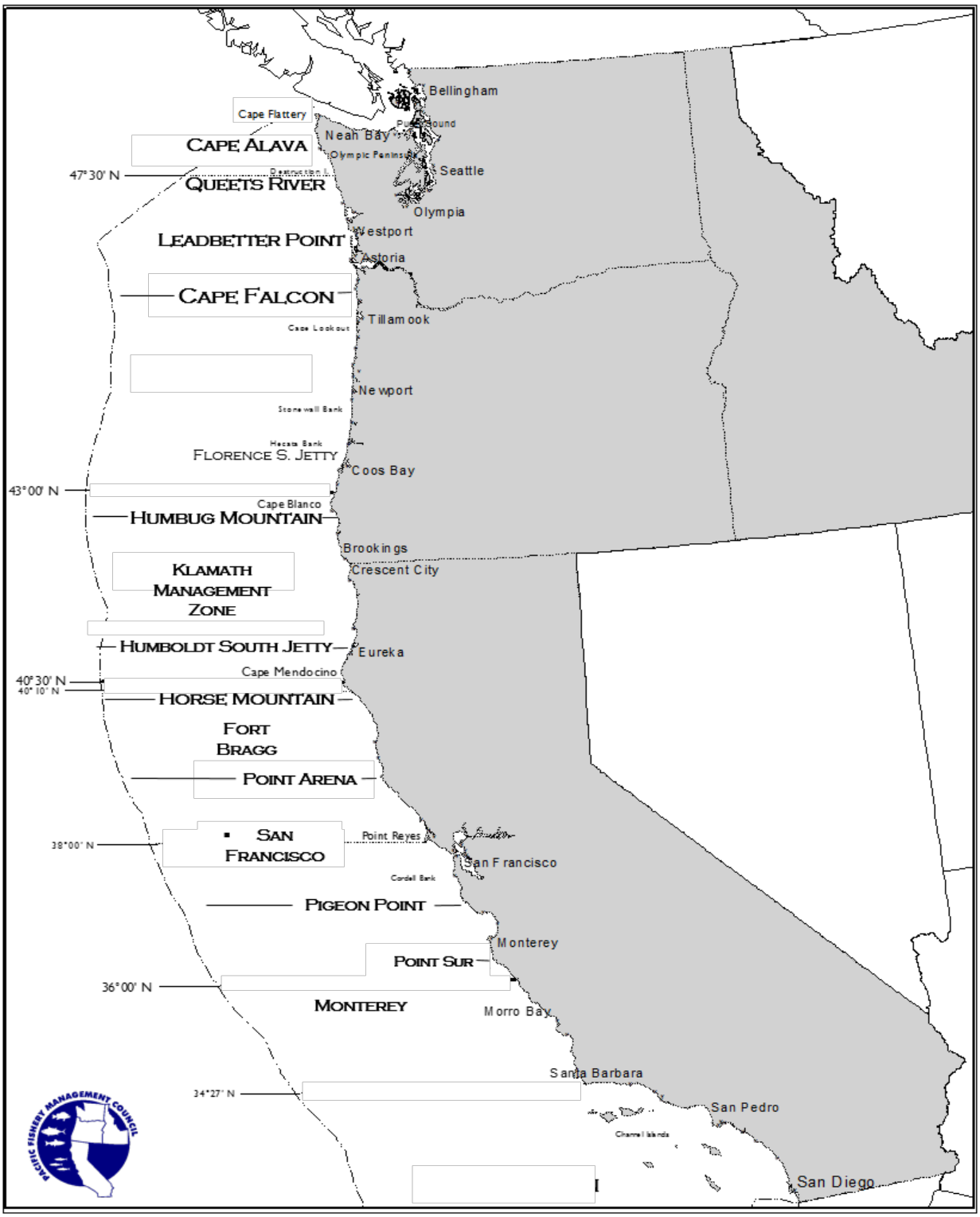



FIGURE 5. Map of Pacific West Coast with major salmon ports and management boundaries. This map is for reference only and is not intended for use in navigation or fishery regulation.

## ADDENDUM: CONSISTENCY WITH OTHER APPLICABLE LAW

### *Magnuson-Stevens Conservation and Management Act (MSA)*

The MSA provides parameters and guidance for Federal fisheries management. Overarching principles for fisheries management are found in the MSA's National Standards, which articulate a broad set of policies governing fisheries management. In crafting fisheries management regimes, the Fishery Management Councils and National Marine Fisheries Service (NMFS) must balance their recommendations to meet these different national standards.

The purpose of this action is to develop annual management measures for Pacific salmon under the Pacific Coast Salmon Fishery Management Plan (FMP). National Standard 1 (NS1) requires that "Conservation and management measures shall prevent overfishing while achieving on a continuing basis, the optimum yield from each fishery for the United States fishing industry." The alternatives for the management measures are designed to ensure that conservation objectives in the salmon FMP and annual catch limits (ACLs) are met. These reference points are in turn designed to prevent overfishing while achieving optimum yield on a continuing basis. In 2023, salmon stocks will be managed to meet harvest control rules, Endangered Species Act (ESA) constraints, and other limits and objectives in the FMP and under the Pacific Salmon Treaty (PST). There are several stocks of primary concern due to constraints on the fishery to meet their conservation and management objectives in 2023. These are: Klamath River fall-run Chinook (KRFC) salmon, Sacramento River fall-run Chinook (SRFC) salmon, California Coastal Chinook salmon, lower Columbia River natural tule Chinook salmon (ESA-listed threatened) north and south of Cape Falcon, and Oregon Coast natural (OCN) coho salmon south of Cape Falcon.

The alternatives were developed to limit impacts to the stocks referenced above while allowing fisheries that are determined to be unlikely to affect the future productivity and sustainability of those stocks (e.g., limiting fishery impacts to the *de minimis* level defined in the harvest control rule for KRFC).

There are currently four overfished salmon stocks managed under rebuilding plans approved by NMFS in 2020 and 2021: Klamath River fall Chinook salmon, Queets coho salmon, Snohomish coho salmon, and Strait of Juan de Fuca coho salmon. Sacramento River fall Chinook salmon were determined to be rebuilt in 2021. In 2023, Snohomish coho salmon stock were found to meet the criteria for rebuilt and the Strait of Juan de Fuca coho salmon stock was found to meet the criteria for 'not overfished-rebuilding' based on improved escapements in 2021. Queets River spring/summer Chinook salmon were found to meet the criteria for being classified as overfished based on the most recent three-year geometric mean of spawning escapement (2019-2021). The alternatives in this EA were designed to be risk averse with respect to these stocks and the recommended fishing would not constitute overfishing and would achieve spawning escapements consistent with the FMP's conservation objectives, rebuilding plans, and PST agreements. The result is that the proposed action is in compliance with provisions of the FMP, ESA and the PST. The three salmon stocks with specified ACLs (KRFC, SRFC, and Willapa Bay natural coho salmon) are each projected to meet the stock-specific ACL set preseason under any of the

alternatives considered. Therefore, except for the No-action alternative, the alternatives are consistent with NS1. The No-action alternative is the same as the previous year's action, and does not reflect consideration of changes in the status of salmon stocks from the previous year; therefore, over- or under- harvest of some salmon stocks would occur if this alternative were implemented (PFMC 2023). As reported in PFMC 2023, under the No-action alternative the SRFC, KRFC and Skagit natural coho stocks would exceed exploitation rate limits set forth under the FMP and the Skagit natural coho stock would exceed the exploitation rate under the Southern Coho Management Plan of the 2019 Pacific Salmon Treaty agreement.

National Standard 2 requires the use of the best available scientific information. The Council's Scientific and Statistical Committee (SSC) reviews and recommends the methods used to develop alternatives for salmon management measures. The No-action Alternative (see PRE I, Chapter V) would not meet this standard, as it does not take into account current abundance projections for salmon stocks. However, the other alternatives are based on up-to-date scientific information regarding abundance and the methods approved by the SSC.

National Standard 3 requires individual stocks of fish to be managed as a unit throughout their ranges and interrelated stocks of fish to be managed as a unit. The conservation objectives and ACLs are established for individual stocks in the Salmon FMP and are based on either escapement or on total fishery exploitation rate, both of which account for impacts to stocks from fisheries throughout their range. All salmon stocks are managed as units in Council-area fisheries to ensure all conservation objectives are met. The alternatives were developed to be consistent with the conservation objectives and ACLs in the FMP.

National Standard 4 requires that "Conservation and management measures shall not discriminate between residents of different States." And that "allocation shall be: (A) fair and equitable…; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no…entity acquires an excessive share." The alternatives were developed to be consistent with the allocation guidelines in the FMP with input from the states and tribes, and Council advisory bodies including the Salmon Advisory Subpanel (SAS), which were in turn developed to meet National Standard 4. The SAS is comprised of stakeholders and tribal representatives representing various gear sectors and fishing communities from Washington, Oregon, California and Idaho.

National Standard 5 requires efficiency, where practicable, in the utilization of fishery resources. All alternatives in this EA meet this standard.

National Standard 6 requires conservation objectives and management measures to take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. All alternatives allow for inseason management of Council-area salmon fisheries to meet conservation objectives and preseason management objectives.

National Standard 7 requires that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication. All alternatives in this EA meet this standard.

National Standard 8 requires that conservation and management measures shall, consistent with the conservation requirements of the MSA, take into account the importance of fishery resources to fishing communities in order to "(A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities." The alternatives represent a range of management measures with various economic impacts. The Final Preferred Alternative (see PRE III) was developed to provide the optimum balance between the short-term needs of the communities and the long-term needs of the communities, both of which rely on long-term health of the salmon stocks.

National Standard 9 requires the reduction, to the extent practicable, of bycatch or bycatch mortality. All alternatives in this EA are expected to have no significant effects due to bycatch mortality on non-target species.

National Standard 10 requires, to the extent practicable, conservation and management measures to promote the safety of human life at sea. The Alternatives in this EA are not expected to impact risks to salmon fishermen.

### *Paperwork Reduction Act (PRA)*

The purposes of the PRA are to minimize the burden of information collection by the Federal Government on the public; maximize the utility of any information thus collected; improve the quality of information used in Federal decision making, minimize the cost of collection, use and dissemination of such information; and improve accountability. The PRA requires Federal agencies to obtain clearance from the Office of Management and Budget before collecting information. This clearance requirement is triggered if certain conditions are met. "Collection of information" is defined broadly. In summary it means obtaining information from third parties or the public by or for an agency through a standardized method imposed on 10 or more persons. Collection of information need not be mandatory to meet the trigger definition. Even information collected by a third party, if at the behest of a Federal agency, may trigger the clearance requirement. Within NMFS, the Office of the Chief Information Officer is responsible for PRA compliance. Obtaining clearance can take up to 9 months and is one aspect of NMFS review and approval of Council decisions.

The proposed action includes an existing approved collection-of-information requirement which is being implemented under Federal regulations. A specific requirement on when and where to land fish is imposed when necessary to ensure timely and accurate assessment of catches in specific regulatory areas. If fishermen are unable to comply with this landing requirement because of unsafe weather or mechanical problems, they must notify the U.S. Coast Guard of their problem, and advise of the name of the vessel, the port where delivery will be made, the approximate amount of salmon on board, and the estimated time of arrival. This emergency provision is rarely used, but is important to be retained for safety purposes. Authorization under the PRA for this information collection (OMB Control No. 0648-0433) was extended on February 23, 2021, and will expire on February 29, 2024.

### *Marine Mammal Protection Act (MMPA)*

The MMPA of 1972 is the principle Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the US Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the west coast, the Southern Resident Puget Sound killer whale stock (SRKW) is listed as endangered under the ESA; Guadalupe fur seal, and Southern sea otter California stock are listed as threatened under the ESA. The sperm whale (WA, OR, CA stock), humpback whale (WA, OR, CA, Central American stock), blue whale eastern north Pacific stock, and Fin whale (WA, OR, CA stock) are listed as endangered under the ESA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The commercial salmon troll fisheries off the west coast are classified as Category III fisheries, indicating a remote or no likelihood of causing incidental mortality or serious injury to marine mammals (88 FR 16919, March 21, 2023). Recreational salmon fisheries are assumed to have similar impacts as they use similar gear and techniques.

### *National Environmental Policy Act (NEPA)*

This environmental assessment (EA) is intended to meet the NEPA requirements that apply to the proposed action.

This EA was prepared using the 2020 Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. This review began on April 17,2023. However, NOAA's National Marine Fisheries Service (NMFS) has received a waiver of the time limits for completing EAs and the page limits for EAs for projects developed to support fishery management actions that are developed by the regional fishery management councils (Councils) pursuant to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).[1]

### *Endangered Species Act (ESA)*

Ocean salmon fisheries conducted under the FMP do affect ESA-listed salmon species. The alternatives analyzed in this EA were developed to be consistent with biological opinions issued by NMFS. The proposed action is consistent with those biological opinions.

Of the ESA-listed marine mammals described above (see MMPA section), Council-managed salmon fisheries only impact the endangered Southern Resident Killer Whale (SRKW) distinct population segment (DPS). NMFS consulted on the effects of the ocean salmon fisheries on the SRKW DPS in 2009. NMFS reinitiated consultation in 2019 to consider new information. NMFS completed the Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Conference

[1] Decision memo from Chris Oliver, Assistant Administrator for Fisheries, to RDML Tim Gallaudet, Assistant Secretary of Commerce for Conservation and Management, waiver granted November 6, 2020.

Opinion: *Biological Opinion on the Authorization of the West Coast Ocean Salmon Fisheries Through Approval of the Pacific Salmon Fishery Management Plan Including Amendment 21 and Promulgation of Regulations Implementing the Plan for Southern Resident Killer Whales and their Current and Proposed Critical Habitat* (WCRO-2019-04074, April 21, 2021). NMFS' biological opinion concluded that the proposed action, authorization of the ocean salmon fishery in the west coast Exclusive Economic Zone (EEZ) (3 to 200 nautical miles off the coast of Washington, Oregon, and California) through approval of the fishery management plan (FMP) and promulgation of regulations implementing the plan, including approval and implementation of Amendment 21, is not likely to jeopardize the continued existence of the SRKW DPS or destroy or adversely modify its designated or proposed critical habitat. The Council and NMFS considered the Chinook salmon abundance threshold consistent with the provisions of Amendment 21 when developing the alternatives for 2023 annual management measures and found that the abundance of Chinook salmon in 2023 exceeds the threshold in Amendment 21 and the alternatives considered in this EA are consistent with the 2021 biological opinion.

Effects on listed Puget Sound yelloweye rockfish and bocaccio, and Pacific eulachon were addressed in a 2010 biological opinion (NMFS 2010b). The effects to ESA-listed North American green sturgeon were considered in a 2007 biological opinion (NMFS 2007b).

The following biological opinions and Section 4(d) determinations have been prepared for West Coast stocks by NMFS.

**Table 1. NMFS ESA Biological Opinions regarding Evolutionarily Significant Units (ESUs) and Distinct Population Segments (DPSs) affected by PFMC Fisheries.**

| Date | Duration | Species Considered |
|---|---|---|
| ***Salmonid Species*** | | |
| March 8, 1996 | until reinitiated | Snake River spring/summer and fall Chinook Snake River sockeye |
| April 28, 1999 | until reinitiated | Central California Coast coho<br>Oregon Coast natural coho |
| April 28, 2002 | until reinitiated | S. Oregon/N. California Coastal coho |
| April 28, 2000 | until reinitiated | Central Valley Spring-run Chinook |
| April 27, 2001 | until withdrawn | Hood Canal summer-run chum |
| April 30, 2001 | until reinitiated | Upper Willamette River Chinook<br>Columbia River chum<br>Ozette Lake sockeye<br>Upper Columbia River spring-run Chinook<br>Ten listed steelhead DPSs |
| February 28, 2023 | reinitiated as of 3/21/2023 | California Coastal Chinook |
| April 4, 2015 | until reinitiated | Lower Columbia River coho |
| March 3, 2018 | until reinitiated | Sacramento River winter-run Chinook |
| April 29, 2004 | until reinitiated | Puget Sound Chinook |
| April 26, 2012 | until reinitiated | Lower Columbia River Chinook |
| ***Non-Salmonid Species*** | | |
| April 30, 2007 | until reinitiated | North American Green Sturgeon |
| December 22, 2008 | until December 2018 | Eastern and Western DPS Steller Sea Lion (eastern DPS was delisted November 4, 2013 (78 FR 66140))[2] |
| April 22, 2021 | until reinitiated | Southern Resident Killer Whales |
| April 30, 2011 | until reinitiated | Puget Sound/Georgia Basin Rockfish |
| April 30, 2011 | until reinitiated | Pacific Eulachon |

### *Coastal Zone Management Act (CZMA)*

Section 307(c)(1) of the CZMA of 1972 requires all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum

[2] This NMFS ESA Biological Opinion included salmon fisheries because they exist within the same range as the eastern DPS Stellar sea lion and were possibly competing with these species to the point where it constitutes a threat to their survival or recovery. However, the eastern DPS is no-longer listed under the ESA.

extent practicable. These management measures are based primarily on the Pacific Coast Salmon Fishery Management Plan (Salmon FMP) and its amendments, which were previously found to be consistent to the maximum extent practicable with the approved coastal zone management programs of the affected states (i.e., Washington, Oregon, and California). This determination was sent to the responsible state agencies on February 3, 2023, for review under section 307(c)(1) of the CZMA. The state of California concurred with this determination. Other entities did not respond, so consistency is inferred.

### *Migratory Bird Treaty Act*

The Migratory Bird Treaty Act of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished populations of many native bird species. The act states it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The Migratory Bird Treaty Act prohibits the directed take of seabirds, but the incidental take of seabirds does occur. None of the alternatives directly affect any seabirds protected by the Migratory Bird Treaty Act.

### *Executive Order 13175: Consultation and Coordination with Indian Tribal Governments (EO 13175)*

Executive Order 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. At Section 302(b)(5), the MSA reserves a seat on the Council for a representative of an Indian tribe with Federally-recognized fishing rights from California, Oregon, Washington, or Idaho.

The U.S. government formally recognizes that the four Washington Coastal Tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for salmon within the Council-managed area. Each of the treaty tribes has the discretion to administer their fisheries and to establish their own policies to achieve program objectives. In addition, other tribes with Federally-recognized fishing rights may be impacted by Council-area fisheries, including tribes from Puget Sound, the Columbia River, and the Klamath River. Accordingly, the proposed action and other alternatives have been developed through the Council process. Through the tribal representative on the Council and tribal comments submitted to NMFS and the Council, the Tribes have had a role in the developing the proposed action and analyzing the effects of the alternatives; therefore, the proposed action is consistent with EO 13175.

### *Executive Order 12898: Environmental Justice*

Executive Order 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on

minority and low-income populations in the United States" as part of any overall environmental analysis associated with an action. NOAA guidance, NAO 216-6, at 7.02, states that "consideration of Executive Order 12898 should be specifically included in the NEPA documentation for decision making purposes." Agencies should also encourage public participation "especially by affected communities" as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic or occupational factor that could amplify the adverse effects of the proposed action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability or price of that fish could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice developed, health effects are usually considered and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

Fisheries conducted under the FMP are not expected to disproportionally affect minority and low-income communities. West Coast Indian tribes are part of the Council's decision-making process on salmon management issues, and tribes with treaty rights to salmon, groundfish, or halibut have a seat on the Council. Available demographic data detailed in the Salmon FMP Amendment 14, Appendix B show that coastal counties where fishing communities are located are variable in terms of social indicators like income, employment, and race and ethnic composition. As a result, the alternatives are not expected to disproportionally affect fishing communities, nor minority and low income groups in particular.

### *Executive Order 13132: Federalism*

Executive Order 13132 enumerates eight "fundamental federalism principles." The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the Executive Order directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement."

The Council process offers many opportunities for states and Indian tribes (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management frameworks and management measures implementing the framework. This process encourages states and tribes to institute complementary measures to manage fisheries under their jurisdiction that may affect federally managed stocks.

The proposed action would not have federalism implications subject to Executive Order 13132.

### *REGULATORY FLEXIBILITY ACT (RFA)*

This action is exempt from the procedures of the RFA because NMFS is waiving notice and comment for the reasons described below under the Administrative Procedures Act determination section.

### *ADMINISTRATIVE PROCEDURE ACT (APA)*

NOAA's Assistant Administrator for Fisheries (AA) finds it is impracticable and contrary to public interest to provide for prior notice and comment on the rule implementing the salmon management measures and waives this requirement under 5 U.S.C. 553(b)(B) for the reasons explained below.

Under Amendment 20 to the FMP, the annual salmon management cycle begins May 16 each year and continues through May 15 of the following year. May 16 was chosen by the Council because the pre-May 16 harvests constitute a relatively small portion of the annual catch, but allows Council and NMFS additional time to complete the necessary environmental and economic analyses and regulatory documentation following the April Council meeting in time for the Secretary of Commerce to approve and implement the Council's annual recommendation. The ability to complete that work was increasingly infeasible under the traditional management cycle, which began May 1 for many years, due to the compressed time frame in which the essential data become available, the growing complexity of the management process and the documentation required. The timeframe for determining the annual modifications to ocean salmon fisheries management measures depends on when the pertinent biological data are available. Salmon stocks are managed to meet annual conservation objectives for spawning escapement and/or specific exploitation rates. Achieving either of these objectives requires designing management measures that are appropriate for the ocean abundance predicted for that year. These pre-season abundance forecasts, which are derived from the previous year's observed spawning escapement, vary substantially from year to year and are not available until January and February because spawning escapement continues through fall.

The preseason planning and public review process associated with developing Pacific Fishery Management Council (Council) recommendations is initiated in February as soon as the forecast information becomes available. The public planning process requires coordination of management actions of four states, numerous Indian tribes, and the Federal Government, all of which have management authority over the stocks. This complex process includes the affected user groups, as well as the general public. The process is compressed into a two-month period which culminates at the April Council meeting at which the Council adopts a recommendation that is forwarded to

NMFS for review, approval, and implementation of fishing regulations that are effective on May 16.

As described in the Federal Register Notice for this action under the "Schedule Used to Establish 2023 Management Measures" section, the Council solicited public comment on its proposed management options and notified the public of the measures it recommended to NMFS for implementation. In addition to opportunities for public input at the March and April Council meetings, the Council held public hearings on the alternatives via webinar for each coastal state between the March and April Council meetings. In addition to the Council process, notice and opportunity for public comment is provided through meetings and caucuses of state, tribal, local governments, and the various user groups. This parallel process occurs throughout the February to April time frame when Council recommendations are developed. The major meetings that concern salmon fisheries on the West Coast include the North of Cape Falcon Forum, sponsored by the state of Washington and Northwest Indian tribes with treaty fishing rights; *U.S.* v. *Oregon* meetings related to ocean and Columbia River fisheries; and meetings held by the Oregon Fish and Wildlife Commission and the California Fish and Game Commission. Recommendations and information from these forums are incorporated into the Council process when representatives from these entities provide comments and information at Council sponsored functions.

Providing opportunity for prior notice and public comments on the Council's recommended measures through a proposed and final rulemaking process would require 30 to 60 days in addition to the two-month period required for development of the regulations. Delaying implementation of annual fishing regulations, which are based on the current stock abundance projections, for an additional 60 days, would require that fishing regulations for May and June be set in the previous year, without knowledge of current stock status. For the 2023 fishing regulations, the current stock abundance was not available to the Council until February. In addition, information related to northern fisheries and stock status in Alaska and Canada, which is important to assessing the amount of available salmon in the southern U.S. ocean fisheries is not available until mid- to late-March. Because a substantial amount of fishing normally occurs mid-May through June, managing the fishery with measures developed using the prior year's data could have significant adverse effects on the managed stocks, including ESA-listed stocks. Although salmon fisheries that open prior to May 16 are managed under measures developed the previous year, as modified by the Council at its March and April meetings, relatively little harvest occurs during that period (e.g., on average, less than 10 percent of commercial and recreational harvest occurred prior to May 16 during the years 2011 through 2018). Allowing the much more substantial harvest levels normally associated with the May and June seasons to be promulgated under the prior year's regulations would impair NMFS' ability to protect weak stocks and ESA-listed stocks, and provide harvest opportunity where appropriate (see the assessment of the No-action alternative in Pre-I). The choice of May 16 as the beginning of the regulatory season balances the need to gather and analyze the data needed to meet the management objectives of the Salmon FMP and the requirements to provide adequate public notice and comment on the regulations implemented by NMFS. Providing for notice and public comment on the Council's recommendations, in addition to that provided for through the Council process, is therefore impracticable and contrary to the public interest.

If the 2023 measures are not in place on May 16 when the first salmon fisheries under the 2023 regulations are scheduled to begin, ocean salmon fisheries will not open as scheduled, or would open or continue based on the prior year's management measures which do not account for current year abundance projections without inseason action by NMFS. This would result in lost fishing opportunity, negative economic impacts, potential harm to stocks at low abundance and ESA-listed stocks, and confusion for the public as the state fisheries adopt concurrent regulations that conform to the Federal management measures.

Overall, the annual population dynamics of the various salmon stocks require managers to vary the season structure of the various West Coast area fisheries to both protect weaker stocks and give fishers access to stronger salmon stocks, particularly hatchery produced fish. Failure to implement these measures immediately could compromise the status of certain stocks, or result in foregone opportunity to harvest stocks whose abundance has increased relative to the previous year, thereby undermining the purposes of this Agency action. Based upon the above-described need to have these measures effective on May 16 and the fact that there is limited time available to implement these new measures after the final Council meeting in April and before the commencement of the ocean salmon fishing year on May 16 and the substantial public comment opportunities built into the salmon season setting process described above and in the FMP, NMFS has concluded it is impracticable to provide an opportunity for prior notice and public comment under 5 U.S.C. 553(b)(B).

The AA also finds that good cause exists under 5 U.S.C. 553(d)(3), to waive the 30-day delay in effectiveness of this action. As previously discussed, these measures are essential to conserve threatened and endangered salmon stocks, and to provide for harvest of more abundant stocks. If these measures are not in place on May 16, then the West Coast ocean salmon fisheries will not open as scheduled.

To enhance notification to the fishing industry of this action, NMFS will announce the new measures over the telephone hotline used for inseason management actions and also post the regulations on its West Coast Region website (*www.fisheries.noaa.gov/region/west-coast*). Additionally, NMFS will advise the states of Washington, Oregon, and California on the new management measures. These states announce the seasons for applicable state and Federal fisheries through their own public notification systems.

# ADDENDUM: FINDING OF NO SIGNIFICANT IMPACT (FONSI)

# Environmental Assessment for 2023 Ocean Salmon Fisheries Management 0648-BL66

## FINDING OF NO SIGNIFICANT IMPACT

**I. Purpose of Finding of No Significant Impact (FONSI)**: The National Environmental Policy Act (NEPA) requires the preparation of an Environmental Impact Statement (EIS) for any proposal for a major federal action significantly affecting the quality of the human environment. 42 U.S.C. § 4332(C). The Council on Environmental Quality (CEQ) Regulations direct agencies to prepare a Finding of No Significant Impact (FONSI) when an action not otherwise excluded will not have a significant impact on the human environment. 40 CFR §§ 1500.4(b), 1500.5(b), & 1501.6. To evaluate whether a significant impact on the human environment is likely, the CEQ regulations direct agencies to analyze the potentially affected environment and the degree of the effects of the proposed action. 40 CFR § 1501.3(b). In doing so, agencies should consider the geographic extent of the affected area (i.e., national, regional or local), the resources located in the affected area (40 CFR § 1501.3(b)(1)), and whether the project is considered minor or small-scale (NAO 216-6A CM, Appendix A-2). In considering the degree of effect on these resources, agencies should examine, as appropriate, short- and long-term effects, beneficial and adverse effects, and effects on public health and safety, as well as effects that would violate laws for the protection of the environment (40 CFR § 1501.3(b)(2)(i)-(iv); NAO 216-6A CM Appendix A-2 - A-3), and the magnitude of the effect (e.g., negligible, minor, moderate, major). CEQ identifies specific criteria for consideration. 40 CFR § 1501.3(b)(2)(i)-(iv). Each criterion is discussed below with respect to the proposed action and considered individually as well as in combination with the others.

In preparing this FONSI, we reviewed the Environmental Assessment (EA) for 2023 Ocean Salmon Fisheries Management which evaluates the affected area, the scale and geographic extent of the proposed action, and the degree of effects on those resources (including the duration of impact, and whether the impacts were adverse and/or beneficial and their magnitude). The EA is hereby incorporated by reference. 40 CFR § 1501.6(b).

**II. Approach to Analysis**: The proposed action will not meaningfully contribute to significant impacts to specific resources. The ocean salmon fisheries has limited impacts on non-target species, and negligible impacts on marine habitats.

The proposed action is not connected to other actions that have caused or may cause effects to the resources in the affected area, and there is then no potential for the effects of the proposed action to add to the effects of other projects that have not already been taken into account (see V below), such that the effects taken together could be significant.

**III. Geographic Extent and Scale of the Proposed Action:**
The proposed action establishes annual specifications and management measures for ocean salmon fisheries in the exclusive economic zone (EEZ), 3-200 nautical miles off the coasts of the states of Washington, Oregon, and California, and is, therefore, regional in its geographical extent. The EA describes the management areas within the region where specific fisheries are authorized, and the environmental effects analyzed in the EA occur at a relatively small scale.

**IV. Degree of Effect:**

A. *The potential for the proposed action to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection.*
This proposed action will not threaten a violation of any Federal, state, or local law, or requirement imposed for the protection of the environment. The proposed action is designed to be consistent with Federal law (see EA Addendum: Other Applicable Law); states adopt conforming regulations to manage ocean salmon fisheries in state waters.

B. *The degree to which the proposed action is expected to affect public health or safety.*
This proposed action will not have a significant impact on public health or safety because the proposed action, consistent with the Pacific Coast Salmon Fishery Management Plan (FMP), has provisions to adjust management measures if unsafe weather or public health emergency affects the fisheries' access, and has taken into account safety per the involvement of the fishing communities in their development.

C. *The degree to which the proposed actions is expected to affect a sensitive biological resource, including:*
    a. *Federal threatened or endangered species and critical habitat;*
    This proposed action would not significantly affect any endangered or threated species or its critical habitat. Several salmonid and non-salmonid species that are potentially impacted by the fisheries are listed as threatened or endangered under the Endangered Species Act (ESA). National Marine Fisheries Service (NMFS) has issued biological opinions addressing the effects of the salmon fisheries on all of these species. Stock abundance forecasts are developed each year, for ESA-listed and non-listed salmon species, and annual management measures are crafted to ensure impacts on ESA-listed species are within the range analyzed under the appropriate biological opinions to minimize or avoid adverse effects on each species. The alternatives for the 2023 fisheries were developed consistent with the biological opinions for these species. Applicable biological opinions are listed in the EA.

    As listed in the EA (see Preseason Report III and Addendum—Other Applicable Law). NMFS has reinitiated consultation on the effects of the implementation of the FMP on California Coastal (CC) Chinook salmon because the post-season assessment of the 2022 ocean fisheries indicated that the take limit for CC Chinook salmon had been exceeded. We anticipate completion of a biological opinion after the implementation of the regulations for the 2023 ocean salmon season. NMFS has assessed the potential impacts of the 2023 management measures to CC Chinook salmon, and has made a determination under ESA sections 7(a)(2) and 7(d) that the 2023 fisheries will not jeopardize CC Chinook salmon or destroy or adversely modify its critical habitat, and do not represent an irreversible and irretrievable commitment of resources that would foreclose the formulation or implementation of any reasonable and prudent alternative measures.

    Therefore, while the proposed action may affect ESA-listed species, it is not expected to be significant under NEPA because the proposed action is designed to

minimize or avoid adverse effects on ESA-listed species. The fisheries are developed each year to be responsive to the abundance and conservation needs of each salmon species on an annual basis, and the proposed action is consistent with existing ESA biological opinions.

b. *stocks of marine mammals as defined in the Marine Mammal Protection Act;* Ocean salmon fisheries are classified under the Marine Mammal Protection Act (MMPA) as Category III (88 FR 16899, March 21, 2023), indicating there is "a remote likelihood of or no known incidental mortality or serious injury of marine mammals" (MMPA 118(c) I). ESA-listed Southern Resident killer whales (SRKW) are addressed under item C.a., above, i.e., fisheries are designed to meet the requirements in the biological opinion for SRKW and Amendment 21 to the FMP.

c. *essential fish habitat identified under the Magnuson–Stevens Fishery Conservation and Management Act;*
The area affected by the proposed action has been identified as essential fish habitat (EFH) under the Salmon FMP, Coastal Pelagic Species FMP, and Pacific Coast Groundfish FMP. The proposed action may have an adverse impact on EFH identified in these FMPs. Because the potential adverse impact on EFH is not substantial, NMFS conducted an abbreviated EFH consultation pursuant to 50 CFR 600.920(h), and prepared an EFH Assessment that incorporates all of the information required in 50 CFR 920(g)(2). The abbreviated EFH consultation was incorporated into the NMFS biological opinion on the effects of the salmon FMP on ESA-listed salmonids dated April 30, 2001. The consultation concluded that there are appropriate conservation measures governing fishing actions that occur under the Salmon FMP to minimize potential adverse impacts to EFH for species managed under the FMPs listed above. NMFS has continued to confirm this conclusion from the 2001 EFH consultation through subsequent EFH consultations, including one completed most recently in 2018 for Sacramento River winter-run Chinook salmon.

d. *bird species protected under the Migratory Bird Treaty Act;* The proposed action would not significantly affect bird species, because the EA (see PRE-II, section 8.6), and previous NEPA analysis, found that direct impacts on birds, notably seabirds, are minimal to non-existent in the ocean salmon fisheries, such as the proposed action, because troll gear is not known to intercept birds, and collisions between salmon trollers and birds are rare. Harvest removes fish that otherwise would have remained in the ecosystem to prey on lower tropic level species; however, salmon fisheries' removals are not significant in this respect, and wide-scales changes in oceanographic conditions, resulting from El Niño events for example, are the primary determinants of abundance, variability, and structure of lower tropic level populations. There is no discernible difference between the effects of the Alternatives on seabirds.

e. *national marine sanctuaries or monuments;* National Marine Sanctuaries and Monuments have regulations governing activities within their boundaries. The proposed action does not supersede those regulations. Ocean salmon fisheries

prosecuted under the proposed action do not use any substrate-contacting gear, as they are hook-and-line troll fisheries, so no ground disturbing impacts are expected to result from the proposed action.

*f. vulnerable marine or coastal ecosystems, including, but not limited to, shallow or deep coral ecosystems;* The proposed action is not expected to adversely affect vulnerable marine, coastal, or coral ecosystems. The proposed action does not include any substrate-disturbing activity (see item C.e., above).

*g. biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)* As described in the responses to C.e. and C.f. above, the proposed action will not significantly affect benthic productivity because the proposed action does not use any substrate-contacting gear, as they are hook-and-line troll fisheries. Therefore, no ground disturbing impacts are expected to result from the proposed action.

Substantial impacts to biodiversity and ecosystem function is not anticipated because higher trophic-level species affected by the salmon fisheries are primarily marine mammals, which generally are opportunistic feeders with various available prey options, and their populations have been stable or increasing. With respect to SRKW, NMFS specifically considered predator-prey relationships between the whales and Pacific salmon in its April 21, 2021, biological opinion.

Generally, the Pacific Coast salmon fisheries have a minimal impact on marine mammals, as noted in the response to item C.b. above. Direct salmon fisheries impacts on seabirds are minimal to non-existent. Harvest removes fish that otherwise would have remained in the ecosystem to prey on lower tropic level species; however, salmon fisheries' removals are not significant in this respect, as wide-scale changes in oceanographic conditions, resulting from El Niño events for example, are the primary determinants of abundance, variability, and structure of lower tropic level populations.

In addition, maintaining biodiversity by conserving salmon species is a key management goal. Pacific Fishery Management Council's (Council) fisheries are managed consistent with ESA requirement for listed salmon. The conservation objectives and rebuilding requirements of the FMP are designed to ensure the sustainability of salmon stocks affected by Council fisheries.

*D. The degree to which the proposed action is reasonably expected to affect a cultural resource: properties listed or eligible for listing on the National Register of Historic Places; archeological resources (including underwater resources); and resources important to traditional cultural and religious tribal practice.*
No significant impacts are expected to occur in any of the above areas for the following reasons. The proposed action would not affect historic properties and archeological resources because the proposed action does not use any substrate-contacting gear, as it only includes hook-and-line troll fisheries. Therefore, no ground disturbing impacts are expected

to result from the proposed action. Additionally, no properties listed or eligible for listing on the National Register of Historic Places, or archeological resources are known to occur in the area where the proposed action will occur. The proposed action will not significantly affect cultural resources or resources important to traditional cultural and religious tribal practice, as the proposed action includes treaty Indian fisheries and West Coast Indian tribes are part of the Council's decision-making process on salmon management issues.

E. *The degree to which the proposed action has the potential to have a disproportionately high and adverse effect on the health or the environment of minority or low-income communities, compared to the impacts on other communities (EO 12898).*
Fisheries conducted under the FMP are not expected to disproportionally affect minority and low-income communities. West Coast Indian tribes are part of the Council's decision-making process on salmon management issues. Available demographic data detailed in the Salmon FMP Amendment 14, Appendix B, show that coast counties where fishing communities are located are variable in terms of social indicators like income, employment, and race and ethnic composition. As a result, the alternatives are not expected to disproportionally affect fishing communities, nor minority and low income groups in particular. See discussion in the EA Addendum: Other Applicable Law.

F. *The degree to which the proposed action is likely to result in effects that contribute to the introduction, continued existence, or spread of noxious weeds or nonnative invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of the species.*
The proposed action is not expected to import, introduce, or contribute to the spread of noxious weeds or nonnative invasive species. The West Coast states have regulations in place for vessel inspections to address this issue; this action does not change these state regulations or affect the likelihood of the introduction or spread of these species. The fishing vessels participating in the proposed action would not increase the risk of introduction through ballast water or hull fouling, because salmon troll vessels generally have a limited range of operation and few, if any, use seawater for ballast. Disposition of the catch does not include any translocation of living marine resources nor use of any nonindigenous species as bait.

G. *The potential for the proposed action to cause an effect to any other physical or biological resources where the impact is considered substantial in magnitude (e.g., irreversible loss of coastal resource such as marshland or seagrass) or over which there is substantial uncertainty or scientific disagreement.*
The proposed action is not expected to cause a substantial effect to any other physical or biological resource, nor is there substantial uncertainty or scientific disagreement on the impacts of the proposed action, based on the following reasons. The proposed 2023 ocean salmon fisheries are comparable to previous fisheries developed under the Salmon FMP, which has been in place for many years. Salmon fisheries conducted under the FMP have been monitored and analyzed in the Council's pre-season process for many years and, thus, risks from the fisheries are relatively well known. There is some uncertainty involved in projecting stock abundance in a given year, however, such uncertainty is addressed by implementing precautionary management measures to protect the less abundant stocks (i.e.,

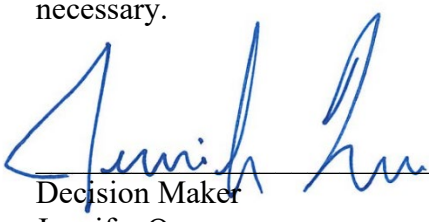
"weak" stocks). In order to prevent overfishing, on, and to conserve, the weaker stocks, there is less harvest opportunity on the more abundant stocks that intermix with weak stocks in the fisheries. In addition to the precautionary measures, the regulations allow, consistent with the FMP, for inseason management actions to be taken in some areas as additional information becomes available.

**V. Other Actions Including Connected Actions**:
The proposed action was developed with consideration of the collective impact of salmon fishery impacts within and beyond Council-area fisheries (e.g., northern salmon fisheries in Alaska and British Columbia, and southern salmon fisheries in state waters) to meet conservation and management criteria in the FMP, under the Pacific Salmon Treaty, and consistent with the ESA.

**VI. Mitigation and Monitoring**:
The proposed action was developed to be consistent with the conservation and management objectives of the FMP, the terms of the Pacific Salmon Treaty, the requirements of the ESA, the Magnuson-Stevens Fishery Conservation and Management Act and other applicable law (Addendum E). Council-managed salmon fisheries use "weak-stock management" to limit fishery impacts on low abundance or protected stocks; weak-stock management results in constraints on abundant stocks beyond what would necessarily be allowed under the FMP.

**DETERMINATION**

The CEQ NEPA regulations, 40 CFR § 1501.6, direct an agency to prepare a FONSI when the agency, based on the EA for the proposed action, determines not to prepare an EIS because the action will not have significant effects. In view of the information presented in this document and the analysis contained in the supporting EA prepared for 2023 Ocean Salmon Fisheries Management, it is hereby determined that the 2023 Ocean Salmon Fisheries Management will not significantly impact the quality of the human environment. The Final EA for 2023 Ocean Salmon Fisheries Management is hereby incorporated by reference. In addition, all beneficial and adverse impacts of the proposed action as well as mitigation measures have been evaluated to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.



April 25, 2023
Date

Decision Maker
Jennifer Quan
Regional Administrator
West Coast Region
National Marine Fisheries Service