Preface to the
Final Environmental Assessment for
2022 Ocean Salmon Fisheries Management Measures
(RIN 0648-BK78)

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. 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 under the National Environmental Policy Act (NEPA) of the proposed action of adopting the 2022 ocean salmon fisheries management measures. This Preface is provided to guide the reader through the three documents that, collectively, form the EA (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 2022 Ocean Salmon Fishery Regulations (March 2022).
>
> *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 2022 Ocean Salmon Fishery Regulations (March 2022).
>
> *PRE II describes the analysis of the action alternatives.*
>
> Preseason Report III (PRE III): Analysis of Council Adopted Management Measures for 2022 Ocean Salmon Fisheries (April 2022).
>
> *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 2021 Ocean Salmon Fisheries (February 2022).

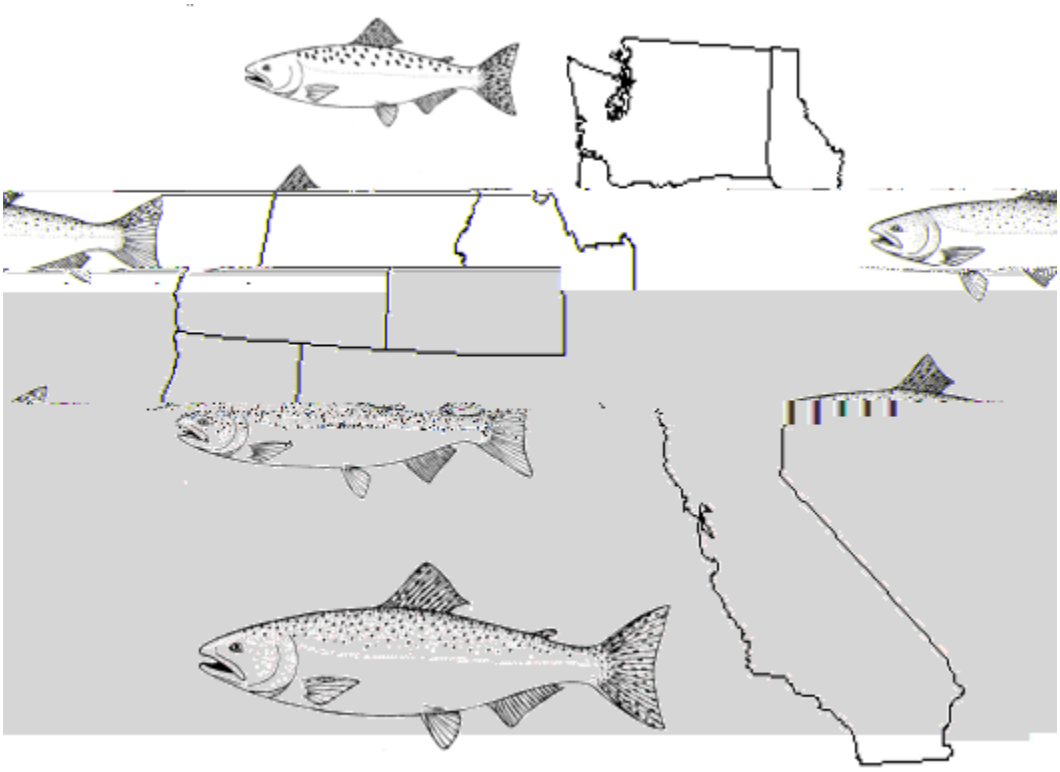
This final EA includes minor language edits added after review of the initial documents and in response to public comments. Therefore, this final EA will have differences from the Preseason Report documents on the Council's website.

Table 1. Directory of NEPA elements in the Environmental Assessment for 2022 Ocean Salmon Fisheries Management Measures (RIN 0648-BK78).

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
Salmon Species Listed Under the ESA	PRE II: Chapter 5
Salmon Stocks in the Fishery	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 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 2022 OCEAN SALMON FISHERY REGULATIONS

REGULATION IDENTIFIER NUMBER 0648-BK78



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

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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 stocks listed under the Endangered Species Act (ESA) that may be incidentally caught in the fisheries. This report was formally reviewed at the Council's March 2022 meeting. This report provides 2022 salmon stock abundance forecasts, and an analysis of the impact of 2021 management measures or regulatory procedures on the projected 2022 abundance. This analysis is intended to give perspective in developing 2022 management measures.

This report constitutes the first part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2022 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 description of the affected environment, a description of the No-Action Alternative, and an analysis of the No-Action Alternative effects on the salmon stocks included in the Council's Salmon Fishery Management Plan (FMP).

The STT will provide two additional reports prior to the beginning of the ocean salmon season to help guide the Council's selection of annual fishery management measures. These reports (Preseason Report II and Preseason Report III) will analyze the impact of the Council's proposed alternatives and adopted fishery management recommendations, respectively. Preseason Report II will constitute the second part of the EA and will include additional description of the affected environment relevant to the alternative management measures considered for 2022 ocean salmon fisheries, a description of management alternatives, and an analysis of the environmental consequences of the alternatives. Preseason Report II will inform the final fishery management measures included in Preseason Report III. Preseason Report III will describe and analyze the effects of the Council's final proposed action, including cumulative effects. Together, these 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.

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 2021 regulations (the No-Action Alternative) applied to 2022 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, implementation of the 2022 ocean salmon fishery management measures, 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 the National Marine Fisheries Service (NMFS) under ESA section 7(a)(2) to protect ESA-listed salmon species (referred to in the salmon 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, 2021 management measures would be in effect, which do not consider changes in abundance of stocks in the mixed stock ocean salmon fisheries. 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 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 2022 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 2022 fisheries.

TECHNICAL CHALLENGES ARISING FROM THE COVID-19 PANDEMIC

The STT has no technical concerns due to the COVID-19 pandemic in 2022.

However, as described in the *Review of 2020 Ocean Salmon Fisheries* (PFMC, 2021a), the COVID-19 pandemic presented some challenges for fishery monitoring in California, as ocean salmon fisheries commenced before personal protective equipment was acquired and COVID-19-related field sampling protocols were developed and authorized by the California Department of Fish and Wildlife (CDFW). This resulted in a lapse for some data collection during the early part of the 2020 season, compared to data that would be collected following standard protocols. While most of the season was sampled adequately, estimates of recreational catch and effort during May and June utilizing standard methodology are currently unavailable. However, it was necessary to develop alternative harvest estimates for these strata that are lacking empirical data in order to update cohort reconstructions, develop postseason estimates of abundance and harvest, and determine if overfishing occurred. To accomplish this, recreational harvest during May was estimated using the preseason model-predicted harvest, scaled by the postseason/preseason ratio of harvest during the first month for which complete sampling occurred (i.e., July). Recreational harvest during June was estimated in a different manner given that the fishery was partially sampled in this month; charter boats were sampled, but private skiffs were not. The ratio of total recreational harvest to charter boat harvest during June was estimated for each management area using data from the ten prior seasons and then applied to the June 2020 estimate of charter boat harvest to estimate total recreational harvest for this month.

Coded-wire tags (CWTs), which inform harvest stock composition estimates, were not collected during May from both the recreational and commercial fisheries and during June in the Fort Bragg and California Klamath Management Zone (KMZ) recreational fisheries. To estimate the hatchery contribution and stock composition of the harvest during strata lacking CWT recovery data, recoveries and the associated catch/sample data from June (or July for Fort Bragg and KMZ recreational fisheries) were used to impute CWT recoveries during May and, if necessary, June. In other words, the CWT composition of catch from the sampled, surrogate period was applied to catch from the unsampled period to generate expected recoveries, with minor modifications made to account for the presence of stocks and ages in mid-season surrogate samples that would not typically be observed in May.

1 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 2022 ocean salmon fishery management measures consists of the following components:

- Target species – Chinook, coho, and pink salmon
- Non-target species - ESA-listed salmon species
- Socioeconomic aspects of coastal communities, federally-recognized Tribes, and states
- Non-target 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 2021 Ocean Salmon Fisheries (PFMC 2022). The current status (2022 ocean abundance forecasts) of the environmental components expected to be affected by the 2022 ocean salmon fisheries regulation alternatives (FMP salmon stocks, including those species listed under the ESA) are described in this report (Part 1 of the 2022 salmon EA); the Review of 2021 Ocean Salmon Fisheries (PFMC 2022) 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 2021 NEPA process for ocean salmon regulations (Preseason Reports II and III; PFMC 2021c and 2021d). In those analyses, proposed management measures were determined to have no significant impacts the affected environment.

The 2022 No-Action Alternative is the same as the 2021 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 2022 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 2022 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 2022 ocean salmon fishery regulation alternatives, including socioeconomic components, and updated additional information on the biological components of the environment, is presented in Preseason Report II, issued after the March Council meeting.

1.1 ABUNDANCE FORECASTS

Abundance forecasts for 2022 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 2022 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 tule Chinook, 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 species, 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 x (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 2021 Ocean Salmon Fisheries (PFMC 2022). 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	2017	2018	2019	2020	2021	2022	Methodology for 2022 Prediction and Source
Sacramento River							
Fall (Sacramento Index)	230.7	229.4	379.6	473.2	271.0	396.5	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	Stochastic life cycle model applied to natural- and hatchery-origin production. STT.
Klamath River (Ocean Abundance)							
Fall	54.2	359.2	274.2	186.6	181.5	200.1	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	17.1	5.2	1.3	1.4	1.8	4.1	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	3.1	1.5	1.4	1.0	2.2	2.0	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Lewis Spring	0.7	3.7	1.5	1.4	2.4	2.4	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Willamette Spring	38.1	53.8	40.2	40.8	50.1	51.2	Age-specific linear regressions of cohort returns in previous run years. ODFW. Forecast includes adult fish only.
Sandy Spring	3.6	5.3	5.5	5.2	5.3	5.6	Recent 3-year average. ODFW.
Upriver Spring [a/]	160.4	166.7	99.3	81.7	75.2	122.9	Log-linear sibling regressions of cohort returns in previous run years.
Upriver Summer[b/]	63.1	67.3	35.9	38.3	77.6	57.5	Log-linear sibling regressions or average return (4-ocean fish). Columbia River TAC subgroup.
LRW Fall	12.5	7.6	13.7	19.7	20.0	10.8	Columbia River Fall Chinook: AIC-weighted average of age-specific
LRH Fall	92.4	62.4	54.5	51.0	73.1	73.0	cohort ratios and sibling regression models. Columbia River TAC
SCH Fall	158.4	50.1	46.0	46.2	46.8	91.2	subgroup and WDFW.
MCB Fall	45.6	36.4	56.7	71.8	77.4	70.2	
URB Fall	260.0	200.1	158.4	233.4	354.2	230.4	

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

Production Source and Stock or Stock Group		2017	2018	2019	2020	2021	2022	Methodology for 2022 Prediction and Source
Washington Coast								
Willapa Bay Fall	Natural	4.2	3.8	4.3	2.9	3.9	3.1	Sibling and environmental relationships from recent year returns.
	Hatchery	34.3	40.3	23.6	28.3	30.5	30.1	Relationships betw een brood year survival and number of spaw ners.
Grays Harbor Fall	Natural	--	16.4	18.0	15.0	15.5	17.9	Combination of geometric mean of recent year returns and linear relationships of sibling recruits per spaw ner.
	Hatchery	--	4.8	7.7	6.9	7.6	8.6	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	
Quinault Fall	Natural	5.9	5.2	5.3	4.2	6.0	3.2	Regression of age-specific Quinault returns on age-specific Queets returns applied to age-specific Queets forecasts
	Hatchery	4.4	3.1	2.7	4.5	4.9	5.6	Estimated age-specifc Queets smolt return rates applied by brood and age class to Quinault smolt releases.
Queets Spring/Sum	Natural	0.5	0.5	0.6	0.6	0.6	0.6	Recent 5 year average terminal return.
Queets Fall	Natural	3.7	3.3	3.4	4.1	4.3	5.3	Natural: Log linear sibling regressions of returns per spaw ner.
	Hatchery	0.9	0.6	0.8	0.7	0.6	0.5	Hatchery: Estimates of smolt return rates applied to smolt releases.
Hoh Spring/Summer	Natural	1.0	1.1	1.0	0.8	1.0	0.7	Spring/Summer and Fall: Recent 3 year mean recruit per spaw ner
Hoh Fall	Natural	2.7	2.6	2.5	2.6	2.6	3.4	adjusted by previous performance.
Quillayute Spring	Hatchery	2.2	2.1	2.1	2.4	2.6	3.0	Spring: Recent 5 year mean for all ages.
Quillayute Sum/Fall	Natural	7.6	8.0	7.9	9.8	9.6	8.8	Summer: Recent 5 year mean for all ages. Fall: Recent 5 year average of adjusted and unadjusted mean for all ages.
Hoko[c/]	Natural	1.5	1.5	2.8	2.6	1.3	0.9	Naïve forecast - recent 5-yr average.
North Coast Totals								
Spring/Summer	*Natural*	*1.5*	*1.6*	*1.7*	*1.4*	*1.5*	*1.3*	
Fall	*Natural*	*19.9*	*19.1*	*19.2*	*20.6*	*22.5*	*20.7*	
Spring/Summer	*Hatchery*	*2.2*	*2.1*	*2.1*	*2.4*	*2.6*	*3.0*	
Fall	*Hatchery*	*5.3*	*3.7*	*3.5*	*5.2*	*5.5*	*6.1*	

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

Production Source and Stock or Stock Group		2017	2018	2019	2020	2021	2022	Methodology for 2022 Prediction and Source
Puget Sound summer/fall[d/]								
Nooksack/Samish	Hatchery	21.2	24.6	21.3	18.2	18.9	28.1	Three year average return rate.
East Sound Bay	Hatchery	0.8	0.7	0.3	0.3	0.6	0.4	Three year average return rate.
Skagit	Natural	15.8	13.3	13.6	12.9	10.5	12.5	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	0.4	0.3	0.3	0.5	0.5	0.5	
Stillaguamish[e/]	Natural	1.5	1.6	0.9	0.9	0.9	0.9	Natural plus hatchery. Multiple regression environmental model (Environmental Model to Predict Adult Returns, EMPAR).
Snohomish[e/]	Natural	3.4	3.5	3.2	3.0	2.9	2.4	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	4.8	6.5	7.0	6.8	6.1	6.0	Hatchery: Recent 3-year geomean of total return broken out into returns from fingerling and yearling releases and age at return.
Tulalip[e/]	Hatchery	5.3	7.5	12.5	6.0	5.8	7.7	Multiple regression environmental model (EMPAR).
South Puget Sound	Natural	4.7	4.8	8.4	5.8	7.0	6.9	Natural: Lake Washington; 4-yr avg recruit per spawner for age 3, 4-yr avg sibling ratios for ages 4 & 5. Green; 2 year average return rates. Puyallup; climate relationship for age 3, 5 year average return per spawner for ages 4-5. Nisqually; average smolt to adult return rates (2-yr avg for ages 3 &4, 5-yr avg for age 5) Hatchery: Variety of recent year average return rates or sibling relationships.
	Hatchery	80.4	123.6	99.9	100.7	78.8	90.3	
Hood Canal	Natural	2.5	3.9	1.2	4.6	5.7	5.4	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 2017-2021 return years. Area 12B returns derived by applying an average proportion of natural origin recruits returning to area 12B for 2017-2020.
	Hatchery	48.3	57.6	66.0	67.6	64.1	51.9	Brood 2017 fingerling lbs released from WDFW facilities in 2018, multiplied by the average of post-season estimated terminal area return rates for the last 5 years (2017-2021).
Strait of Juan de Fuca Including Dungeness spring run	Natural	3.1	6.0	8.3	5.0	5.5	5.0	Natural and hatchery. Dungeness and Elwha hatchery estimated by mean return rates times average releases. Dungeness wild estimated by smolts times 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. 2022 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		2017	2018	2019	2020	2021	2022	Methodology for 2022 Prediction and Source
OPI Area Total Abundance (California, Oregon Coasts, and Columbia River)		496.2	349.0	1,009.6	268.7	1,732.9	1,225.9	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	394.3	294.1	933.5	185.7	1607.9	1003.5	OPIH: Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2021 adults. Columbia/Coastal proportions based on jacks; Columbia early/late proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		231.7	164.7	545.0	130.7	1014.0	592.5	
Columbia River Late		154.6	121.5	360.6	50.3	576.0	404.7	
Coastal N. of Cape Blanco		3.5	3.3	12.0	2.4	6.4	1.9	
Coastal S. of Cape Blanco		4.5	4.6	15.9	2.3	11.5	4.4	
Lower Columbia River	Natural	30.1	21.9	36.9	24.8	39.2	65.7	Oregon: recent two year average return; Washingtion: natural smolt production multiplied by 2019 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	101.9	54.9	76.1	83.0	125.0	222.4	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	36.7	20.6	63.4	17.9	19.0	35.8	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	55.0	44.5	94.0	51.8	61.6	74.7	
Grays Harbor	Natural	50.0	42.4	71.5	50.0	44.8	120.4	
	Hatchery	36.4	51.4	64.3	42.3	31.7	78.3	
Quinault	Natural	26.3	25.4	13.9	17.5	15.0	19.4	
	Hatchery	29.4	29.6	26.9	27.0	24.6	42.7	
Queets	Natural	6.5	7.0	11.1	7.8	3.9	18.2	
	Hatchery	13.7	10.8	13.2	10.9	11.8	22.2	
Hoh	Natural	6.2	5.8	7.0	4.2	3.0	4.7	

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

Production Source and Stock or Stock Group		2017	2018	2019	2020	2021	2022	Methodology for 2022 Prediction and Source
Quillayute Fall	Natural	15.8	10.6	14.7	9.2	7.5	12.5	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	17.6	16.5	17.0	13.0	15.1	20.3	
Quillayute Summer	Natural	1.5	2.7	1.2	0.8	0.3	0.9	
	Hatchery	3.4	3.3	3.4	3.4	3.4	4.6	
North Coast Independent Tributaries	Natural	6.5	4.1	8.1	5.1	4.7	18.0	
	Hatchery	0.2	7.9	12.5	1.3	0.1	0.1	
WA Coast Total	*Natural*	*149.5*	*118.7*	*191.0*	*112.4*	*98.4*	*229.8*	
	Hatchery	*155.6*	*164.1*	*231.3*	*149.6*	*148.2*	*230.8*	
Puget Sound								
Strait of Juan de Fuca	Natural	13.1	7.2	8.8	7.5	6.7	7.3	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	15.4	10.6	16.8	20.6	12.5	12.7	
Nooksack-Samish	Natural	13.2	20.6	25.1	15.4	35.3	36.0	
	Hatchery	45.6	61.3	59.8	42.5	54.6	73.8	
Skagit	Natural	11.2	59.2	57.9	31.0	58.4	80.4	
	Hatchery	7.6	13.1	9.9	18.2	22.0	21.3	
Stillaguamish	Natural	7.6	19.0	23.8	19.5	26.8	24.9	
	Hatchery	1.5	0.0	2.2	2.3	4.0	1.9	
Snohomish	Natural	107.3	65.9	62.6	39.0	60.0	64.2	
	Hatchery	62.0	38.3	43.7	26.6	29.9	22.6	
South Sound	Natural	20.2	15.0	30.4	7.3	27.5	31.0	
	Hatchery	102.4	103.0	180.4	164.0	192.7	208.5	
Hood Canal	Natural	115.6	59.5	40.1	35.0	28.8	20.2	
	Hatchery	74.9	84.5	87.9	72.2	55.7	61.4	
Puget Sound Total	*Natural*	*288.3*	*246.4*	*248.8*	*154.6*	*243.5*	*264.0*	
	Hatchery	*309.3*	*310.8*	*400.7*	*346.3*	*371.4*	*402.3*	

2 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.

2.1.1.1 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; β_0 is the intercept; β_1 is the slope; ρ is the autocorrelation coefficient; and ε_{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 back-transformed to the arithmetic scale and corrected for bias in this transformation,

$$\mathrm{SI}_t = \mathrm{e}^{\log \mathrm{SI}_t + 0.5\sigma^2},$$

where σ^2 is the variance of the normally distributed error component of the fitted model (referred to as the "innovation" variance). A more detailed description of the forecast approach can be found in Appendix E of the 2014 Preseason Report I (PFMC 2014).

2.1.1.2 Predictor Performance

The performance of past SI forecasts is displayed graphically in Figure II-4. For 2021, the preseason forecast of the SI (270,958) was 84 percent of the postseason estimate (322,137).

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 2021 were expected

to result in 133,913 hatchery and natural area adult spawners and an exploitation rate of 50.6 percent. Postseason estimates of these quantities were 104,483 hatchery and natural area adult spawners and an exploitation rate of 67.6 percent (Table II-1).

2.1.1.3 Stock Forecast and Status

Sacramento Index forecast model parameters were estimated from SI data for years 1983-2021 and jack escapement data for years 1982-2020. A total of 17,003 SRFC jacks were estimated to have escaped to Sacramento River basin hatcheries and natural spawning areas in 2021. This jack escapement and the estimated parameters

$\beta_o = 7.46197,$
$\beta_1 = 0.5579154,$
$\rho = 0.7478184,$
$\epsilon_{t-1} = -0.102194,$
$\sigma^2 = 0.140084,$

result in a 2022 SI forecast of 396,458.

Figure II-2 graphically displays the 2022 SI forecast. The model fit (line in Figure II-2) was slightly higher than the 2021 postseason estimate of the SI. As a result, the 2022 SI forecast value is adjusted downward, by a small amount, 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 69.2 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 2022.

2.1.1.4 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} = 396,458 × (1-0.78) = 87,221. 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} = 396,458 × (1-0.70) = 118,937, 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 taken 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.

2.1.2.1 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.

2.1.2.2 Predictor Performance

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

2.1.2.3 Stock Forecast and Status

The forecast of SRWC age-3 escapement absent fishing is 5,971, with 80 percent of the forecast comprised of natural-origin fish. 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 2022 (Table II-2).

2.1.3 Klamath River Fall Chinook

2.1.3.1 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 (brood years 1979-2019). 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.

2.1.3.2 Predictor Performance

The performance of past KRFC forecasts is displayed graphically in Table II-4 and in Figure II-4. For 2021, the preseason forecast of the KRFC total adult abundance (181,508) was 94 percent of the postseason estimate (193,586).

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 2021 salmon fishery regulations were expected to result in 31,574 natural-area spawning adults and an age-4 ocean harvest rate of 10.5 percent. Postseason estimates of these quantities were 30,196 natural-area adult spawners and an age-4 ocean harvest rate of 27.2 percent (Table II-5 and Table II-6).

2.1.3.3 Stock Forecast and Status

The 2022 forecast for the ocean abundance of KRFC as of September 1, 2021 (preseason) is 154,998 age-3 fish, 43,211 age-4 fish, and 1,908 age-5 fish.

Late-season commercial ocean fisheries in 2021 (September through November) were estimated to have harvested 182 adult KRFC, 63 of which were age-4. Late-season recreational fisheries were estimated to have harvested 68 age-4 KRFC. This fall harvest equates to a 0.3 percent age-4 ocean harvest rate, which will be deducted from the ocean fishery's allocation in determining the 2022 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 2022 KRFC potential spawner abundance forecast is 50,906 natural-area adults. This potential spawner abundance forecast applied to the KRFC control rule results in an allowable exploitation rate of 25.0 percent, which produces, in expectation, 38,180 natural-area adult spawners. Therefore, fisheries impacting KRFC must be crafted to achieve, in expectation, a minimum of 38,180 natural-area adult spawners in 2022.

2.1.3.4 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 = 50,906 × (1-0.71) = 14,763. 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} = 50,906 × (1-0.68) = 16,290, 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 to limit impacts on these stocks. In 2021, the age-4 ocean harvest rate was estimated to be 27.2 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.

2.1.5.1 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.

2.1.5.2 Predictor Description

Quantitative abundance predictions are made for all three of the coastal Chinook groups (NOC, MOC, and SOC), but are not used in annual development of Council area fishery regulations. Quantitative forecasts of abundance are based on sibling regression analyses from individual basins' escapement assessment data and scale sampling, which occur coast-wide. Forecast data for the NOC and MOC are used in the PSC management process in addition to terminal area management actions.

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 (PFMC 2021b, 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, Alsea, and Elk rivers.

Basin-specific forecasts constitute 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.

2.1.5.3 Predictor Performance

There was no information available to evaluate performance of predictors for NOC and MOC stocks.

2.1.5.4 Stock Forecast and Status

2.1.5.4.1 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 2021 NOC density from standard survey areas (Nehalem R. through the Siuslaw R.) was a decrease from 2020 (PFMC 2022, Appendix B, Table B-11).

Based on the density index of total spawners, the generalized expectation for NOC stocks in 2021 is below recent years' average abundance. Specifically, the 2021 spawner density in standard survey areas for the NOC averaged 92 spawners per mile, the third lowest since 2015.

2.1.5.4.2 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 2021 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.

The 2021 MOC density from standard survey areas (Coos and Coquille basins) averaged 10 adult spawners per mile, a decrease from 2020 (PFMC 2022, Appendix B, Table B-11). Fall Chinook escapement goals are currently under development for the South Umpqua and Coquille basins of the MOC.

2.1.5.5 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.

2.1.5.5.1 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.

2.1.5.6 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 2021 Huntley Park escapement estimate and the resulting 2022 ROPI forecast of 246,900 consists of age-3 (173,400), age-4 (53,500) and age-5-6 (20,000) fish.

2.1.5.7 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.

2.1.5.8 Stock Forecast and Status

The 2022 ROPI is below recent years' average (Table II-7).

2.1.5.9 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 2021 average density from standard survey areas was 20 adult spawners per mile, a slight decrease from 2020 (PFMC 2022 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 2022, 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 stocks generally mature at an earlier age than the bright fall stocks and do not migrate as far north. Minor fall stocks include the Select Area Bright (SAB), a stock 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 guide management measures relevant to ESA-listed species like LRW Chinook. Broodstock goals serve the purpose of ACLs for hatchery-origin stocks like LRH, SCH, and MCB.

2.2.1.1 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 2022 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 2021 Ocean Salmon Fisheries* (Appendix B, Tables B-15 through B-20). The 2021 returns for summer Chinook and the five fall Chinook stocks listed in this report may differ somewhat from those provided in the *Review of 2021 Ocean Salmon Fisheries* (PFMC 2022), 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.

2.2.1.2 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 2021, the March preliminary preseason forecasts as a percentage of the postseason estimates are 148 percent for URB, 118 percent for LRW, 98 percent for LRH, 64 percent for SCH, 117 percent for MCB, and 137 percent for upper Columbia summer Chinook.

2.2.1.3 Stock Forecasts and Status

Ocean escapement of LRW fall Chinook in 2022 is forecast at 10,800 adults, about 55 percent of the recent 10-year average return of 19,600. The forecast is about 64 percent of last year’s actual return of 16,900. The spawning escapement goal of 5,700 in the North Fork Lewis River is expected to be achieved this year.

The preliminary forecast for 2022 ocean escapement of LRH fall Chinook is for a return of 73,000 adults, about 98 percent of last year’s return of 74,700 and 89 percent of the recent 10-year average return of 81,700. Based on this abundance forecast, the total allowable LCR natural tule exploitation rate for 2022

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).

The preliminary ocean escapement forecast of SCH fall Chinook in 2022 is 91,200 adults, about 124 percent of last year's return of 73,700 and 128 percent of the 10-year average of 71,000.

The preliminary forecast for the 2022 ocean escapement of MCB fall Chinook is 70,200 adults, about 106 percent of last year's return of 66,000 and about 65 percent of the recent 10-year average of 107,400.

The preliminary forecast for summer Chinook in 2022 is 57,500 adults, approximately 101 percent of last year's return of 56,800 and about 83 percent of the recent 10-year average of 68,900. 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.

The preliminary forecast for 2022 URB fall Chinook ocean escapement is 230,400 adults, about 96 percent of last year's return of 239,900 and about 55 percent of the recent 10-year average of 416,600. 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.

The forecast for the 2022 ocean escapement of ESA-listed Snake River wild fall Chinook is 11,000 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.

2.2.2.1 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).

2.2.2.2 Stock Forecasts and Status

The 2022 Willapa Bay natural fall Chinook terminal run size forecast is 3,071, which is below the FMP S_{MSY} conservation objective of 3,393. The hatchery fall Chinook terminal run size forecast is 30,071.

The 2022 Grays Harbor spring Chinook terminal run size forecast is 1,323, which is below the FMP S_{MSY} conservation objective of 1,400. The natural fall Chinook terminal run size forecast is 17,909, which is above the FMP S_{MSY} conservation objective of 13,326. The fall hatchery terminal run size forecast is 8,631.

The 2022 Quinault River natural fall Chinook terminal run size forecast is 3,180. The fall hatchery terminal run size forecast is 5,610.

The 2022 Queets River spring Chinook terminal run size forecast is 555. The FMP S_{MSY} conservation objective is 700. The natural fall Chinook terminal run size forecast is 5,313, which is above the FMP S_{MSY} conservation objective of 2,500. The fall hatchery terminal run size forecast is 496.

The 2022 Hoh River natural spring/summer Chinook spawning escapement forecast is 696, which is below the FMP S_{MSY} conservation objective of 900. The natural fall Chinook forecast is 3,380, which is above the FMP S_{MSY} conservation objective of 1,200.

The 2022 Quillayute River hatchery spring Chinook ocean escapement forecast is 2,955. The natural summer Chinook forecast is 1,096, which is below the FMP S_{MSY} conservation objectives of 1,200 summer Chinook. The fall Chinook forecast is 7,687, which is above the FMP S_{MSY} conservation objectives of 3,000 fall Chinook.

The 2022 Hoko River forecast is for an escapement without fishing of 940, which, after fisheries are planned, could result in a spawner estimate that is below the FMP S_{MSY} conservation objective of 850.

2.2.3 Puget Sound Chinook

The Puget Sound Chinook ESU includes 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 populations 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. This opinion does not cover 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 are minor, ocean regulations are not generally used to manage this species.

2.2.3.1 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.

2.2.3.2 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.

2.2.3.3 Stock Forecasts and Status

For ESA-listed species like Puget Sound Chinook, the ESA consultation standards govern fisheries management.

Spring Chinook

Puget Sound Spring Chinook abundances remain depressed.

Summer/Fall Chinook

The 2022 preliminary natural Chinook return forecast is 33,200 (includes supplemental hatchery forecasts) and the preliminary hatchery Chinook return forecast is 185,000. The 2021 preseason natural Chinook return forecast was 32,500 (includes supplemental hatchery forecasts) and the hatchery Chinook return forecast was 174,700.

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.

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 2022 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 2022.

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	154.8	44.6	0.0	199.4	14.9 [e/]	100.2	37.9	138.1	352.4	61
2021[f/]	165.2	41.6	0.0	206.9	10.8 [e/]	73.2	31.3	104.5	322.1	68

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	7,429	2,755	3,077	20.0	16.2	13.6 [f/]
2021	10,506	5,421	9,063	20.0	14.7	NA [g/]
2022	NA	8,593	5,971	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	132.9[a/]	14.2	147.1	0.01[a/]	0.23	9.1	37.8	7.6	0.0	45.4
2021	155.3[b/]	38.3[a/]	193.6	NA[c/]	0.27[a/]	10.4	36.2	17.7	0.2	54.2

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	81,803	2.05
2020	149,600	132,864	1.13
2021[c/]	135,600	155,267	0.87
2022	155,000	--	--

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	14,229	2.54
2021[c/]	45,100	38,319	1.18
2022	43,200	--	--

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[c/]	800	--	--
2022	1,900	--	--

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	97,683	2.81
2020	186,600	147,117	1.27
2021[c/]	181,500	193,586	0.94
2022	200,100	--	--

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	81,803	15,660	0.16	0.47	0.36	0.38	24,800	40,000	8,677	11,365
2020[d/]	149,600	36,200	132,864	14,229	0.09	0.22	0.23	0.37	7,300	9,900	4,735	10,329
2021[e/]	135,600	45,100	155,267	38,319	0.11	0.19	0.27	0.22	6,900	9,400	17,961	2,777
2022	155,000	43,200	-	-	-	-	-	-	-	-	-	-

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	2,390	2,571	3,099	4,089	4,656	8,745
2020[a/]	0	45	45	47	1,288	1,335	1,380	2,997	4,555	7,552
2021[a/]	0	271	271	761	6,503	7,264	7,535	4,648	1,649	6,297

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))							River Fisheries (t)		
	KMZ			North of KMZ	South of KMZ	Subtotal	Ocean Total	Net	Sport	Total
	Troll	Sport	Subtotal							
					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[a/]	53	0	53	228	3,062	3,290	3,343	2,209	561	2,770
2021[a/]	0	247	247	895	9,285	10,180	10,427	3,353	604	3,957

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[a/]	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	0.00	0.04	0.05	0.05	0.13	0.05	0.17

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[a/]	0.00	0.01	0.01	0.02	0.24	0.27	0.27	0.19	0.03	0.22

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	0.02	0.23	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	0.05 [e/]	0.23	217.2 [e/]	35.1	4.6	256.9 [e/]
2021	14.0	22.5	27.0	2.0	65.5	-	0.27 [e/]	211.2 [f/]	57.1 [e/]	5.8 [f/]	274.1 [e/]
2022	NA	NA	NA	NA	NA	-	-	173.4 [f/]	53.5 [f/]	20.0 [f/]	246.9 [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[c/]	354.2	349.2	239.9	1.48	1.46
2022	230.4	-	-	-	-
			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[c/]	20.0	20.4	16.9	1.18	1.21
2022	10.8	-	-	-	-

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[c/]	73.1	73.8	74.7	0.98	0.99
2022	73.0	-	-	-	-
			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[c/]	46.8	47.3	73.7	0.64	0.64
2022	91.2	-	-	-	-

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[c/]	77.4	85.0	66.0	1.17	1.29
2022	70.2	-	-	-	-
			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[c/]	77.6	78.8	56.8	1.37	1.39
2022	57.5	-	-	-	-

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[c/]	18.2	14.7	1.24	0.3	0.0	-	0.5	0.1	5.27	12.9	13.3	0.97
2021	18.9	-	-	0.6	-	-	0.5	-	-	10.5	-	-
2022	28.1	-	-	0.4	-	-	0.5	-	-	12.5	-	-

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[c/]	0.9	1.6	0.56	6.8	5.3	1.28	3.0	2.3	1.28	6.0	3.4	1.78
2021	0.9	-	-	6.1	-	-	2.9	-	-	5.8	-	-
2022	0.9	-	-	6.0	-	-	2.4	-	-	7.7	-	-

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	96.7	0.89	17.5	9.4	1.86	3.6	5.4	0.66	29.6	34.3	0.86
2005	83.1	86.0	0.97	17.7	6.0	2.95	4.2	3.7	1.12	30.6	54.6	0.56
2006	85.8	130.4	0.66	21.3	8.6	2.49	4.2	4.6	0.91	30.2	39.8	0.76
2007	83.0	161.9	0.51	17.0	10.5	1.62	4.4	2.1	2.07	47.5	32.4	1.46
2008	101.6	108.7	0.94	21.1	15.8	1.33	3.2	1.9	1.69	36.8	33.4	1.10
2009	93.0	84.9	1.09	17.2	2.8	6.21	2.4	4.4	0.54	42.6	38.1	1.12
2010	97.4	92.3	1.05	12.7	3.7	3.43	1.9	2.9	0.65	45.0	37.8	1.19
2011	118.6	85.3	1.39	8.9	3.0	2.95	2.5	4.1	0.61	40.6	62.9	0.65
2012	95.8	78.3	1.22	8.9	5.8	1.53	2.9	4.3	0.68	46.8	85.6	0.55
2013	102.0	86.7	1.18	5.0	4.3	1.17	4.3	6.4	0.67	66.2	71.8	0.92
2014	96.7	41.9	2.31	4.8	3.3	1.44	5.3	6.9	0.76	84.1	30.8	2.73
2015	62.4	50.2	1.24	3.8	5.5	0.70	8.4	7.3	1.15	62.1	37.4	1.66
2016	43.1	86.0	0.50	4.5	6.6	0.68	6.6	4.5	1.48	45.0	69.7	0.65
2017	80.4	145.0	0.55	4.7	9.2	0.51	4.6	5.0	0.92	50.8	111.0	0.46
2018	123.6	110.6	1.12	4.8	7.5	0.64	7.4	10.3	0.72	61.4	75.4	0.82
2019	99.9	93.1	1.07	8.4	5.6	1.52	8.3	10.4	0.80	67.2	66.2	1.02
2020[c/]	100.7	60.0	1.68	5.8	5.7	1.01	5.0	5.4	0.91	72.2	32.8	2.20
2021	78.8	-	-	7.0	-	-	5.5	-	-	69.8	-	-
2022	90.3	-	-	6.9	-	-	5.0	-	-	57.3	-	-

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.

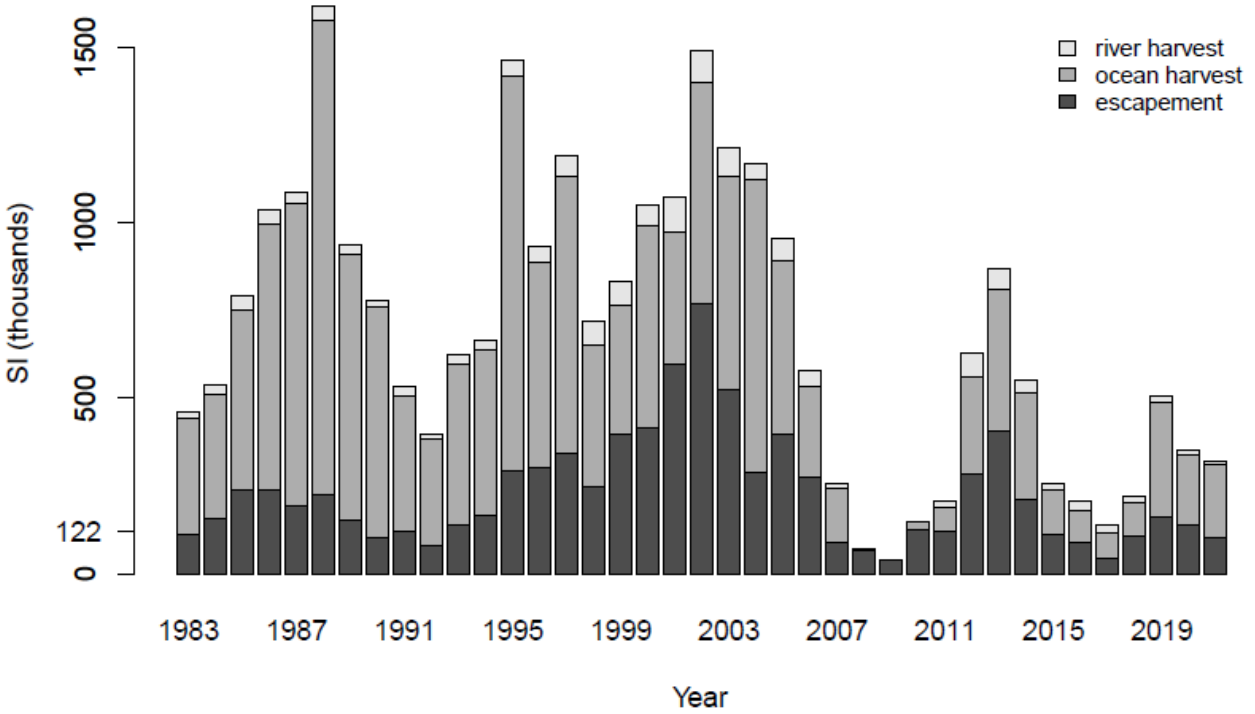

FIGURE II-1. The Sacramento Index (SI) and relative levels of its components. The Sacramento River fall Chinook S_{MSY} of 122,000 adult spawners is noted on the vertical axis.

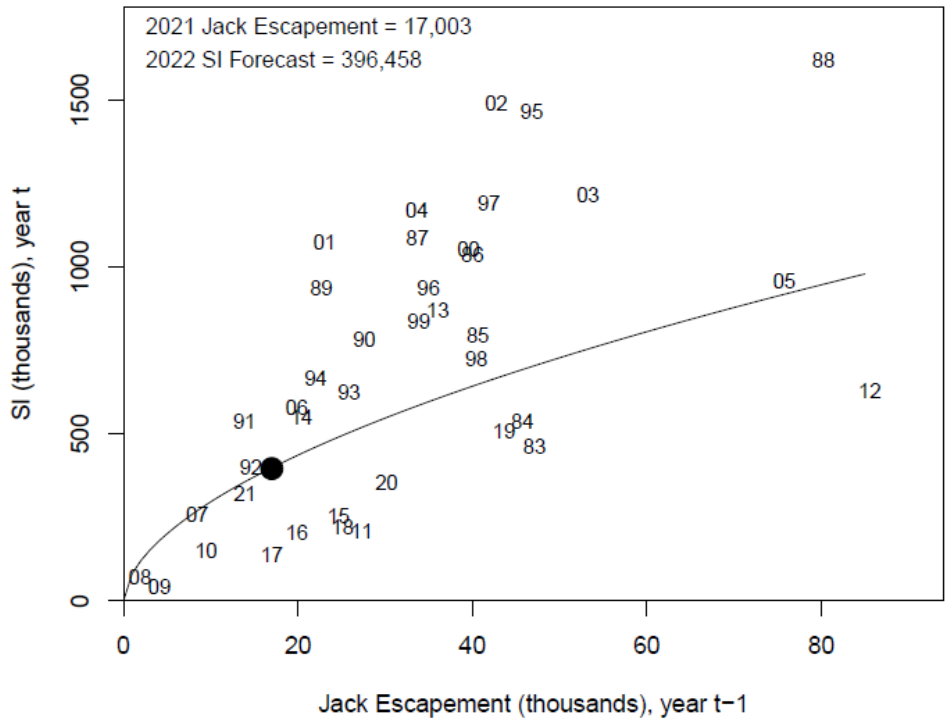

FIGURE II-2. Sacramento Index (SI) forecast based on log-log regression of the SI on jack escapement from the previous year, accounting for autocorrelated errors. The solid line represents the fitted model and the black dot denotes the SI forecast. Years shown are SI years.

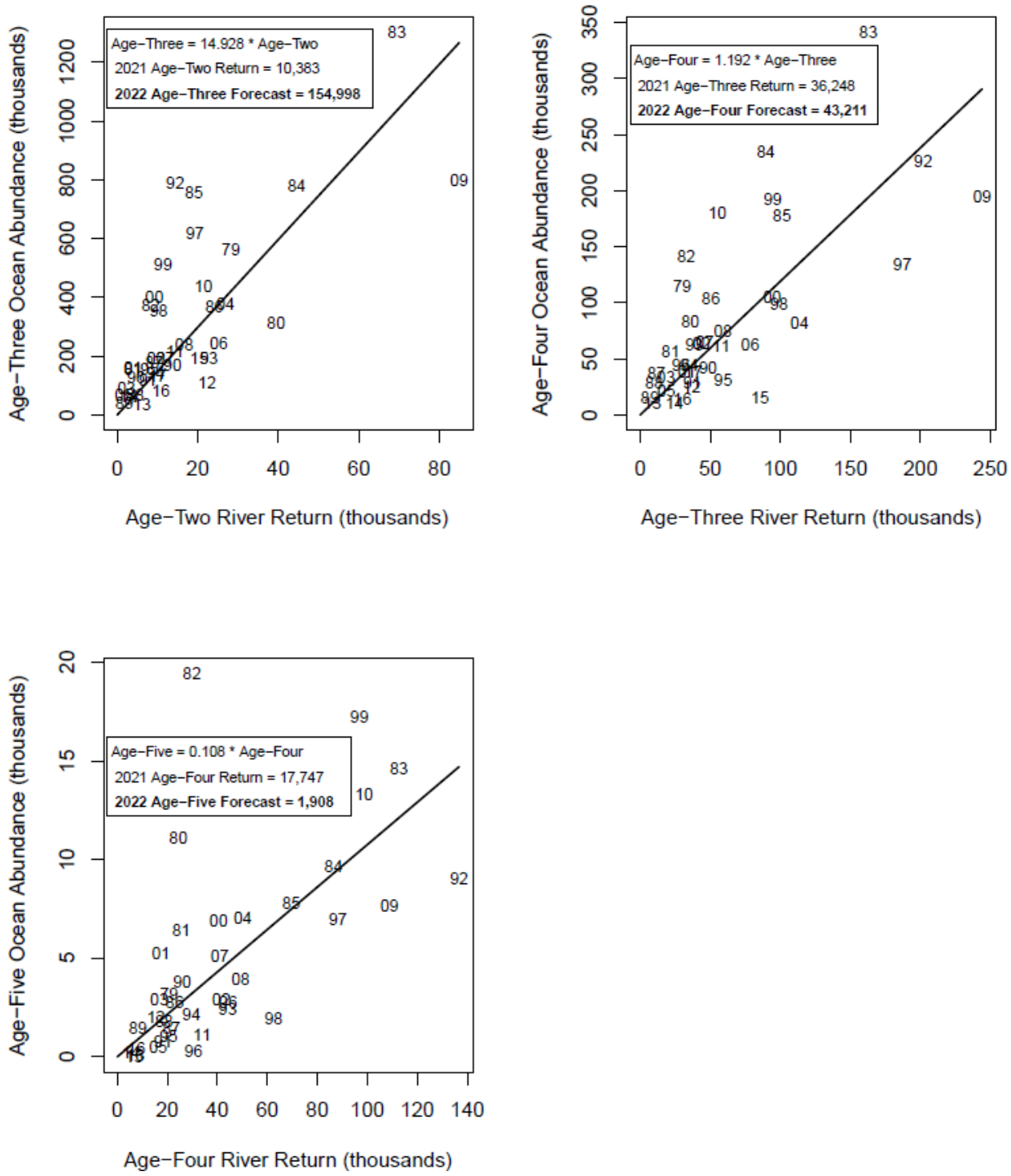

FIGURE II-3. Regression estimators for Klamath River fall Chinook ocean abundance (September 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

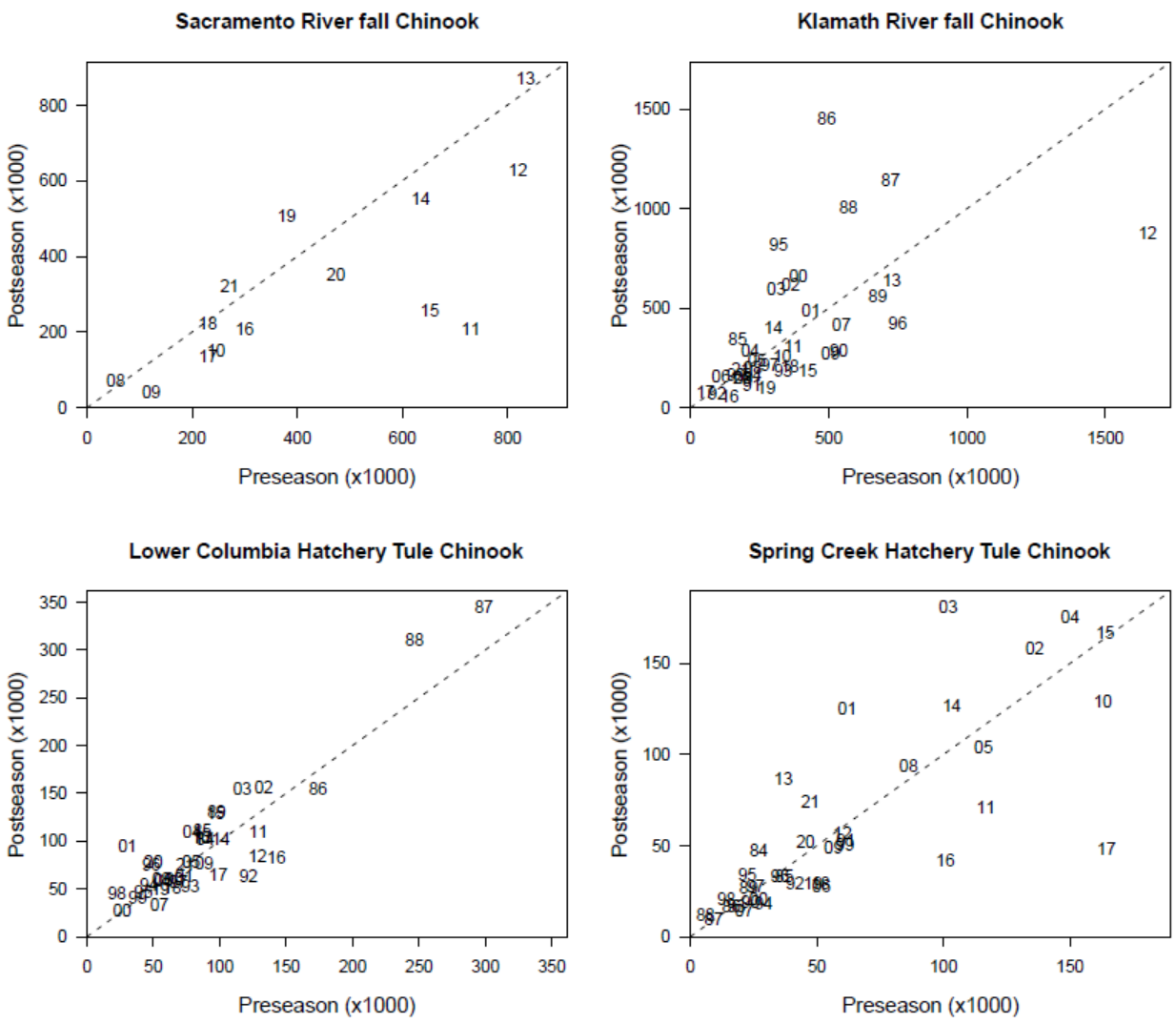

FIGURE II-4. Selected preseason vs. postseason forecasts for Chinook stocks with substantial contribution to Council area fisheries.

3 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 2021 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.

3.1.1.1 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 2021 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 2022 partition was based on the proportion of the smolt releases in 2021.

For the 2022 abundance forecast the regression includes recruits from 1970-2021 and jack returns and smolt production from 1969-2020. The 2022 abundance is predicted using jack returns and smolt releases from 2021. The model was:

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

Where:

a = 18.78
b = 30.19
c = -105.00
adjusted r^2 = 0.92

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

3.1.1.2 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 2021 preseason abundance prediction of 1,607,900 OPIH coho was 191 percent of the preliminary postseason estimate of 841,300 coho.

3.1.1.3 Stock Forecast and Status

Using the appropriate values from Appendix C, Table C-2, the OPIH abundance forecast for 2022 is 1,003,500 coho, 62 percent of the 2021 prediction and 119 percent of the preliminary 2021 postseason estimate.

3.1.2 Oregon Coastal Natural Coho

The OCN stock 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 for ESA-listed species like Oregon Coast coho, of which OCN are a part, (and Southern Oregon/Northern California Coast (SONCC) and Central California Coast (CCC)) coho are used to guide relevant management measures.

3.1.2.1 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.

The GAM with 6 predictor variables 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 ε 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 2022 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)	198,353	0.65	0.55
PDO	Multivariate ENSO Index (Oct-Dec; t-1)	Upwelling (July-Sept; t-1)	232,436	0.68	0.59
PDO	Spring Transition (Julian date; t-1)	Multivariate ENSO Index (Oct-Dec; t-1)	233,280	0.67	0.60
PDO	Upwelling (July-Sept; t-1)	Sea Surface Temperature (May-Jul; t-1)	183,961	0.62	0.50
PDO	Sea Surface Height (Apr-June; t-1)	Upwelling (July-Sept; t-1)	215,593	0.67	0.54
PDO	Upwelling (Sept-Nov; t-1)	Sea Surface Temperature (Jan; t)	195,619	0.63	0.50
Ensemble Mean			209,041	0.69	0.60
(90% prediction intervals)			(100,773-429,912)		

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 2022, the OCNL forecast is 13,400, based on most recent three-year average adult stock abundance.

3.1.2.2 Predictor Performance

Recent year OCN preseason abundance predictions are compared to postseason estimates in Table III-1. The 2021 preseason abundance prediction of 125,000 OCN coho was 46 percent of the preliminary postseason estimate of 273,300 coho.

3.1.2.3 Stock Forecasts and Status

The 2022 preseason prediction for OCN (river and lake systems combined) is 222,400 coho, 178 percent of the 2021 preseason prediction and 81 percent of the 2021 postseason estimate (Table III-1). The 2022 preseason prediction for OCNR and OCNL components are 209,000 and 13,400 coho, respectively.

Based on parent escapement levels and observed OPI smolt-to-jack survival for 2019 brood OPI smolts, the total allowable OCN coho exploitation rate for 2022 fisheries is no greater than 15.0 percent under the Salmon FMP (Amendment 13) and no greater than 15.0 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 7.0 percent and the parent escapement levels, allows for a total allowable exploitation rate for 2022 fisheries that is no greater than 15.0 percent (Table V-8: Appendix Table A-4).

3.1.3 Southern Oregon / Northern California Coast Coho

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

In January 2022, the Council adopted final preferred alternatives for SONCC coho control rules for recommendation to NMFS, informed by the risk assessment produced by the Ad-Hoc SONCC Coho Salmon Technical Workgroup (PFMC 2021e). The alternatives 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 coho consist of 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. The Lower Columbia River coho ESU, of which LCN are a part), was 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 to guide management of fisheries that incidentally take ESA-listed species like LCN coho.

3.1.4.1 Predictor Description

The LCN stock predictor methodology was developed in 2007.

[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 2022 predictions for the Oregon LCN coho populations are derived by the recent 3-year average abundances based on spawning ground counts. The 2022 adult abundance forecast for Oregon LCN coho is 16,200.

The 2022 predictions for the Washington LCN coho populations are derived by combining estimates of the 2019 brood year natural smolt production based on watershed area and the marine survival rate of 8.4 percent. The 2022 adult abundance forecast for Washington LCN coho is 49,500.

3.1.4.2 Predictor Performance

The preseason abundance compared to the postseason estimate is presented in Table III-1. The 2021 preseason abundance prediction of 39,200 LCN coho was 56 percent of the preliminary postseason estimate of 70,500 coho.

3.1.4.3 Stock Forecast and Status

The 2022 prediction for LCN coho is 65,700 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 2022 fisheries would be no more than 23.0 percent.

3.1.5 Oregon Production Index Area Summary of 2022 Stock Forecasts

The 2022 combined OPI area stock abundance is predicted to be 1,225,900 coho, which is 71 percent of the 2021 preseason prediction of 1,732,900 coho, and 110 percent of the 2021 preliminary postseason estimate of 1,114,500 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 ocean age-3 (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

3.2.1.1 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 2022 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 10-year terminal marine survival average, then a pre-terminal impact rate of 32% was applied to the estimated 2019 brood year smolts (1,903,435) released in the spring of 2021 from all Willapa Bay hatchery facilities. The pre-terminal impact rate was evaluated looking at CWT recoveries from Willapa Bay.

3.2.1.2 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 2020, the preseason forecast was 96 percent of the postseason estimate.

3.2.1.3 Stock Forecasts and Status

The 2022 natural coho ocean age-3 abundance forecast is 35,776, compared to a 2021 preseason forecast of 19,040.

The 2022 Willapa Bay hatchery coho ocean age-3 abundance forecast is 74,707 compared to a 2021 preseason forecast of 61,615.

3.2.1.4 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 ocean age-3 abundance, 35,776, to the predicted abundance of ocean age-3 hatchery origin coho spawning in natural areas. The forecast of ocean age-3 naturally spawning, hatchery origin coho is 15,688 and was calculated by multiplying the ocean age-3 hatchery coho abundance forecast, 74,707, by the most recent 3-year average stray rate (0.210). 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 2018, 2019, and 2020 were 0.354, 0.158, and 0.119, 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 $S_{OFL} = 51{,}464 \times (1\text{-}0.74) = 13{,}381$. 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 $S_{ABC} = 51{,}464 \times (1\text{-}0.70) = 15{,}439$, 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.

3.2.2.1 Predictor Description

The natural forecast is the sum of the Chehalis River natural, Humptulips River natural, and South Bay tributary natural forecasts. An ocean age-3 (OA3) Coho marine survival prediction was developed by dividing the Quinault Department of Fisheries prediction of Queets Coho January age-3 marine survival by the natural mortality rate of 1.23169. The Chehalis wild coho smolt production estimate was developed by scaling the 2020 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 ten 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 recent 3-year average return/smolt rates expanded to OA3 recruits based on CWT pre-terminal recoveries for Grays Harbor tag groups from 2011-2015.

3.2.2.2 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 2020, the preseason forecast was 158 percent of the postseason estimate.

3.2.2.3 Stock Forecasts and Status

The 2022 Grays Harbor natural ocean age-3 abundance forecast is 120,381, compared to a 2021 preseason forecast of 44,843. 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 2022 Grays Harbor hatchery coho ocean age-3 abundance forecast is 78,338, compared to a 2021 preseason forecast of 31,675.

3.2.2.4 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 ocean age-3 abundance, 120,381, to the predicted abundance of ocean age-3 hatchery origin coho spawning in natural areas. The forecast of ocean age-3 naturally spawning hatchery origin coho is 9,322 and was calculated by multiplying the ocean age-3 hatchery coho abundance forecast, 78,338, by the most recent 5-year average stray rate (2016-2020 average = 0.119). 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 $S_{OFL} = 129{,}703 \times (1\text{-}0.65) = 45{,}396$. The preseason S_{OFL} will also be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

3.2.3 Quinault River

3.2.3.1 Predictor Description

The 2022 Quinault River Fall Natural Unmarked JA3 abundance is predicted using the geometric mean of of Quinault River JA3 abundances from the run reconstruction for brood years 2001-2003 and 2009-2011.

The hatchery forecast is based on the smolt releases from the Quinault (Cook Creek) Hatchery (672,103) multiplied by the marine survival rate of 6.36 percent. The marine survival rate is based on the median smolt release survival rate of the years from 2001 to 2003 and 2009 to 2011.

3.2.3.2 Predictor Performance

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

3.2.3.3 Stock Forecasts and Status

The 2022 forecast for Quinault natural coho is 19,429 ocean age-3 recruits, an increase from the 2021 forecast of 15,004.

The 2022 Quinault hatchery coho forecast is 42,746 ocean age-3 recruits, an increase from the 2021 forecast of 24,645.

3.2.4 Queets River

3.2.4.1 Predictor Description

The natural forecast was developed by multiplying the 2021 smolt outmigration of 265,172 by the predicted marine survival rate of 7.5527 percent, which results in an abundance prediction of 20,028 JA3. The model uses run reconstructions developed by the Quinault Department of Fisheries as a response, which includes terminal abundance estimates, pre-terminal landed catch, and all sources of incidental and natural mortality except hooking mortalities associated with releases in mark-selective ocean fisheries. Post Season FRAM includes selective fishery mortality, so the abundance prediction is corrected using the median selective fishery mortality (post season FRAM/QDNR run reconstruction for run years 1992-2017))= 0.11678. The total JA3 forecast is 20,028 + (20,028*0.11678) = 22,367 JA3.

Marine survival is 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 smolt releases from brood year 2019 (645,143) multiplied by a marine survival rate of 3.42 percent. This ocean age-3 marine survival rate is estimated using the average of marine survival over the base years 2001-2003 and 2009-2011.

3.2.4.2 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 2020, the ocean age-3 preseason fall natural forecast was 153 percent of the postseason estimate.

3.2.4.3 Stock Forecasts and Status

The 2022 Queets natural coho forecast is 18,160 ocean age-3 recruits, which is much higher than the 2021 forecast of 3,919. 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 2022 Queets hatchery (Salmon River) coho forecast is 22,214 ocean age-3 recruits, which is higher than the 2021 forecast of 11,780. Approximately 87 percent of the fish released from the Salmon River facility were marked with an adipose fin clip.

3.2.4.4 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} = 18,160 × (1-0.65) = 6,356. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

3.2.5 Hoh River

3.2.5.1 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 2021, the Clearwater produced 38,656 smolts at the rate of 276 smolts/mi^2. Applying that rate to the Hoh watershed of 299 mi^2 yields 82,534 natural coho smolts emigrating from the Hoh River in 2021.

A marine survival estimate to JA3 of 6.98 percent was applied to the total natural smolt production estimate to predict the 2022 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 8.43% JA3 (Jurasin, QDfi) and Strait of Juan de Fuca wild coho to the north with a marine survival estimate of 5.54% JA3 (Litz, WDFW). The average marine survival rate of 6.89% JA3 (5.67% OA3) is within 3% of the OA3 survival of 8.5% predicted in the 2022 Wild Coho Forecasts for other Washington Coast coho stocks (WDFW Fish Science Division).

No hatchery production is projected for the Hoh system for 2022.

3.2.5.2 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 2020, the ocean age-3 preseason natural forecast was 77 percent of the postseason estimate.

3.2.5.3 Stock Forecasts and Status

The 2022 Hoh River natural coho forecast is 4,679 ocean age-3 recruits, an increase compared to the 2021 forecast of 3,013. This ocean abundance results in classification of this stock's status as "Abundant" under the 2019 PST Southern Coho Management Plan (Table III-5).

3.2.5.4 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} = 4,679 × (1-0.65) = 1,638. 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.

3.2.6.1 Predictor Description

The natural coho forecast is based on coho smolt data measured in the Quillayute watershed in 2021 by West Fork Environmental and the Quileute Nation. A total of 236,000 coho smolts (rounded from 235,969) are estimated to have emigrated from the Quillayute River system in 2021.

Smolt abundance from the Dickey River was estimated to be 52,056 wild coho smolts (482 smolts/mi^2). Smolt abundance from the Bogachiel, Calawah, and Sol Duc rivers was estimated to be 183,913 wild coho smolts (353 smolts/mi2).

Total smolts were separated into summer and fall natural coho smolts by the relative number of natural brood year 2019 spawners, 6.81 percent, and 93.19 percent, respectively. Results from this separation yield estimates of 16,000 natural summer coho smolts and 220,000 natural fall coho smolts.

The JA3 natural marine survival estimate is 6.99 percent (5.67 percent OA3) for the Quillayute system natural coho. This estimate was derived by taking the mean of two forecasts for natural stocks: one a forecast for Queets wild coho to the south of 8.43 percent JA3 (Jurasin, QDFi), and one a forecast for Strait wild coho to the north of 5.54 percent JA3 (Litz, WDFW). This estimate is lower than the JA3 rate of 10.47 percent predicted in the WDFW report '2022 Wild Coho Forecasts for Puget Sound, Washington Coast, and Lower Columbia' (WDFW 2022).

An examination of the return rates of both hatchery releases and natural smolts indicate hatchery return rates are slightly below natural returns. Thus, for the hatchery component, a JA3 marine survival rate of 4.761 percent was applied.

Summer Coho

The summer natural coho forecast is based on the estimated total summer coho smolt production (16,000) and a JA3 projected marine survival rate of 6.989 percent.

The summer hatchery production forecast was based on a marine survival estimate of 4.761 percent multiplied by a release of 119,102 smolts from the Sol Duc Hatchery.

Fall Coho

The forecast for the natural component was based on the estimated total fall coho smolt production (220,000) multiplied by an expected marine survival rate of 6.989 percent, the same survival rate used to forecast summer natural returns.

The fall hatchery production forecast was based on a marine survival estimate of 4.761 percent multiplied by a release of 524,312 smolts.

3.2.6.2 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 2020, the ocean age-3 preseason fall natural forecast was 101 percent of the postseason estimate

3.2.6.3 Stock Forecasts and Status

The 2022 Quillayute River summer natural and hatchery coho forecasts are 912 and 4,604 ocean age-3 recruits, respectively; 97.8 percent of the hatchery smolts were marked with an adipose fin clip and coded wire tag. The 2022 forecast abundance of natural summer coho is higher than the 2021 forecast of 291.

The 2022 Quillayute River fall natural and hatchery coho forecasts are 12,479 and 20,268 ocean age-3 recruits, respectively. The 2022 forecast abundance of Quillayute fall natural coho is higher than the 2021 forecast of 7,545. Approximately 86.75 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

3.2.7.1 Predictor Description

The 2022 forecast of natural coho production for these independent streams is based on a prediction of 500 smolts per square mile of watershed drainage, 424 square miles of watershed, and resulting in 212,000 smolts. This is multiplied by an expected marine survival rate of 8.5 percent.

The 2022 hatchery forecast is based on the predicted January age-3 marine survival of 3.48 percent for the brood year 2019 multiplied by a proxy brood year smolt release (4,691) 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 2021. The model uses the North Pacific Gyre Oscillation (NPGO) for the months of January through March as a predictor variable and predicted a JA3 marine survival rate of 3.48 percent

3.2.7.2 Predictor Performance

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

3.2.7.3 Stock Forecasts and Status

The 2022 forecast of natural coho production for these independent streams is 18,020 ocean age-3 recruits, compared to the 2021 preseason forecast of 4,736.

The 2022 hatchery forecast is 133 ocean age-3 recruits, compared to 92 in 2021. All 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 ocean age-3 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 2019 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 2022 total Puget Sound region natural and hatchery coho ocean recruit forecast is 666,317, compared to a 2021 preseason forecast of 614,902. The 2022 natural forecast is 264,013, compared to the 2021

preseason forecast of 243,499. The 2022 hatchery forecast is 402,304, compared to the 2021 preseason forecast of 371,403.

A comparison was made of preseason ocean age-3 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

3.3.1.1 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 2021 coho smolt outmigration from all independent tributaries of the Strait of Juan de Fuca, and a predicted marine survival rate. Marine survival was predicted using a linear regression model with the independent variable being an average of the standardized transformations of two ocean-related variables: the copepod community index, and a sign-transformed value of the NPGO (January-April average). The linear relationship that this model solved for is highly significant ($P<0.0001$) and has an r^2 value of 0.56.

3.3.1.2 Predictor Performance

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates. In 2020, the preseason forecast was 82 percent of the postseason estimate (Table III-4).

3.3.1.3 Stock Forecasts and Status

The 2022 Strait of Juan de Fuca natural ocean age-3 abundance forecast is 7,297 compared to the 2021 preseason forecast of 6,684.

The 2022 Strait of Juan de Fuca hatchery ocean age-3 abundance forecast is 12,728, compared to the 2021 preseason forecast of 12,476.

The ocean abundance forecast for Strait of Juan de Fuca natural coho results in classification of the stock abundance as "Low" under the 2019 PST Southern Coho Management Plan and “Critical” under the FMP. This results in an allowable total exploitation rate of no more than 20 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).

3.3.1.4 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 $S_{OFL} = 7,297 \times (1\text{-}0.60) = 2,919$. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

3.3.2 Nooksack-Samish

3.3.2.1 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.

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

3.3.2.2 Predictor Performance

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

3.3.2.3 Stock Forecasts and Status

The 2022 Nooksack-Samish natural ocean age-3 abundance forecast is 36,046, compared to the 2021 preseason forecast of 35,261.

The 2022 Nooksack-Samish hatchery ocean age-3 abundance forecast is 73,842, compared to the 2021 preseason forecast of 54,569.

3.3.3 Skagit

3.3.3.1 Predictor Description

This natural forecast is based on a prediction of total smolt to ocean age-3 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 2017. The analysis produced a weighted average marine survival of 6.72 percent; this was multiplied by the measured smolt production from the Skagit basin (51,154 Baker natural smolts and 1,144,943 Skagit natural smolts).

The hatchery forecast is based on weighted 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 3.70 percent; this was multiplied by the total number of 2021 smolts released from all regional hatcheries (68,816 Baker marked hatchery smolts, 45,249 Marblemount unmarked hatchery smolts, and 460,893 Marblemount marked hatchery smolts).

3.3.3.2 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 2020, the preseason forecast was 75 percent of the postseason estimate.

3.3.3.3 Stock Forecasts and Status

The 2022 Skagit natural ocean age-3 abundance forecast is 80,378, compared to the 2021 preseason forecast of 58,434.

The 2022 Skagit hatchery ocean age-3 abundance forecast is 21,273, compared to the 2021 preseason forecast of 22,017.

The ocean abundance forecast for Skagit 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 60 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).

3.3.3.4 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} = 80,378 × (1-0.60) = 32,151. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

3.3.4 Stillaguamish

3.3.4.1 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 4.8 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 4.8 percent is most risk-averse for harvest management purposes.

The Stillaguamish Hatchery released 74,252 marked and 1,032 unmarked yearlings in 2021, with a forecasted adult return estimated at 1,910 marked and 27 unmarked based on current a hatchery marine survival estimate of 2.6 percent.

3.3.4.2 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 2020, the preseason forecast was 79 percent of the postseason estimate.

3.3.4.3 Stock Forecasts and Status

The 2022 Stillaguamish natural ocean age-3 abundance forecast is 24,892, compared to the 2021 preseason forecast of 26,824.

The 2022 Stillaguamish hatchery ocean age-3 abundance is 1,937, compared to the 2021 preseason forecast of 4,004.

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).

3.3.4.4 OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Stillaguamish coho, MFMT = 0.50 and the OFL is S_{OFL}= 24,892× (1-0.50) = 12,446. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

3.3.5 Snohomish

3.3.5.1 Predictor Description

The natural forecast is based on production of 2021 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 2021 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 4.2 percent was applied to the total smolt production estimate for the Snohomish watershed of 1,529,000 smolts. The resulting forecast was rounded to the nearest hundred to account for co-manager agreed to precision.

The hatchery forecast is based on 2021 hatchery releases of smolts from the WDFW Wallace River Hatchery, the Everett Net Pens, Eagle Creek and Tulalip Bernie Kai Kai Gobin Hatchery and marine survival rates. For the 2022 forecasts co-managers agreed to use marine survival rates of 4.2 percent in calculating adult returns of Snohomish Hatchery fish and 1.1 percent for Tulalip Bernie Kai Kai Gobin fish.

3.3.5.2 Predictor Performance

Forecast performance can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table III-4). In 2020, the preseason forecast was 82 percent of the postseason estimate.

3.3.5.3 Stock Forecasts and Status

The 2022 Snohomish natural ocean age-3 abundance forecast is 64,200, compared to the 2021 preseason forecast of 60,000.

The 2022 Snohomish hatchery ocean age-3 abundance forecast is 22,559, compared to the 2021 preseason forecast of 29,938.

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).

3.3.5.4 OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Snohomish coho, MFMT = 0.60 and the OFL is S_{OFL}= 64,200 × (1-0.60) = 25,680. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

3.3.6 Hood Canal

3.3.6.1 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 2002-2017. This forecast was then converted to ocean age-3. 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 2022, 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 based on average cohort reconstruction-based December age-2 recruits/smolt for the six most recent available broods from each facility, applied to the 2019 brood smolt releases for each facility and converted to ocean age-3.

3.3.6.2 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 2020, the preseason forecast was 148 percent of the postseason estimate.

3.3.6.3 Stock Forecasts and Status

The 2022 Hood Canal natural ocean age-3 abundance forecast is 20,196, compared to the 2021 preseason forecast of 28,843.

The 2022 Hood Canal hatchery ocean age-3 abundance forecast is 61,418, compared to the 2021 preseason forecast of 55,688

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).

3.3.6.4 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} = 20,196 × (1-0.65) = 7,069. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

3.3.7 South Sound

3.3.7.1 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 2.8 to 4.4 percent and were based on recent 4-year or 5-year average marine survival. The deep South Sound stocks’ marine survival predictions ranged from 2.1 to 8.5 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 ‘2022 Wild Coho Forecasts for Puget Sound, Washington Coast, and Lower Columbia’ (WDFW 2022). The Nisqually River natural forecast was based on a recent 3-year average marine survival. The Puyallup River natural forecast was based on recent 4-year average marine survival.

3.3.7.2 Stock Forecasts and Status

The 2022 South Sound natural ocean age-3 abundance forecast is 31,004 compared to the 2021 preseason forecast of 27,453.

The 2022 South Sound hatchery ocean age-3 abundance forecast is 208,547, compared to the 2021 preseason forecast of 192,711.

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. Hood Canal natural coho were found to meet the criteria for being classified as overfished in the PFMC *Review of 2021 Ocean Salmon Fisheries*, released in February 2022.

Hood Canal, Queets River, and Strait of Juan de Fuca natural coho remain overfished at the current time, and Snohomish natural coho are currently not overfished/rebuilding based on recent three-year geometric mean escapement estimates (2018-2020) detailed in the PFMC *Review of 2021 Ocean Salmon Fisheries* (PFMC 2022).

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 lower than 2021 projections. Table III-6 summarizes projected 2022 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	-	-	404.7	-	-	65.7	-	-	222.4	-	-

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	-	-	4.4	-	-	1,003.5	-	-

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	0.2	40.2	8.1	111.8	-	338.6	499.7	0.08
2021[g/]	2.4	158.6	10.1	251.4	-	665.6	1,126.9	0.14

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	-	-	3.0	-	-	3.9	-	-
2022	12.5	-	-	4.7	-	-	18.2	-	-

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	40.6	0.97
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	-	-	19.0	-	-
2022	120.4	-	-	35.8	-	-

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	-	-	26.8	-	-	28.8	-	-
2022	80.4	-	-	24.9	-	-	20.2	-	-

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	-	-	6.7	-	-
2022	64.2	-	-	7.3	-	-

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	60%	Normal
Stillaguamish	50%	Normal
Snohomish	40%	Low
Hood Canal	45%	Low
Strait of Juan de Fuca	20%	Critical
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	60%	Abundant
Stillaguamish	50%	Abundant
Snohomish	40%	Moderate
Hood Canal	45%	Moderate
Strait of Juan de Fuca	20%	Low
Quillayute Fall[c/]	50%	Abundant
Hoh[c/]	57%	Abundant
Queets[c/]	68%	Abundant
Grays Harbor[c/d/]	73%	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 allow able 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 w ith meeting the escapement goal (or the low er end of the escapement goal range). As Washington Coast stocks are managed to achieve agreed escapment goals, this exploitation rate also becomes an approximation of the maximum allow able rate unless the stock is in the "Low " status. In that case, an ER of up to 20% is allow ed.

d/ Based on projected natural area spaw ners (w ild 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 2022 U.S. forecasts under base period fishing patterns (percent marked).

Area	Fishery	June	July	August	Sept
Canada					
Johnstone Strait	Recreational	--	36%	34%	--
West Coast Vancouver Island	Recreational	47%	39%	38%	39%
North Georgia Strait	Recreational	50%	50%	50%	46%
South Georgia Strait	Recreational	48%	53%	46%	48%
Juan de Fuca Strait	Recreational	49%	49%	51%	48%
Johnstone Strait	Troll	58%	49%	40%	47%
NW Vancouver Island	Troll	47%	43%	43%	43%
SW Vancouver Island	Troll	55%	50%	51%	52%
Georgia Strait	Troll	56%	55%	57%	53%
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	63%	54%	52%	50%
Strait of Juan de Fuca (Area 6)	Recreational	57%	51%	52%	48%
San Juan Island (Area 7)	Recreational	44%	54%	49%	40%
North Puget Sound (Areas 6 & 7A)	Net	--	56%	51%	44%
Council Area					
Neah Bay (Area 4/4B)	Recreational	44%	59%	54%	60%
LaPush (Area 3)	Recreational	57%	62%	65%	54%
Westport (Area 2)	Recreational	72%	69%	66%	60%
Columbia River (Area 1)	Recreational	74%	75%	69%	71%
Tillamook	Recreational	67%	62%	56%	47%
New port	Recreational	61%	57%	55%	43%
Coos Bay	Recreational	53%	50%	39%	24%
Brookings	Recreational	48%	36%	33%	6%
Neah Bay (Area 4/4B)	Troll	55%	55%	56%	56%
LaPush (Area 3)	Troll	54%	57%	54%	54%
Westport (Area 2)	Troll	59%	63%	64%	63%
Columbia River (Area 1)	Troll	72%	71%	68%	58%
Tillamook	Troll	63%	61%	61%	59%
New port	Troll	60%	58%	54%	53%
Coos Bay	Troll	52%	49%	44%	29%
Brookings	Troll	44%	44%	48%	66%
Columbia River					
Buoy 10	Recreational	--	--	--	68%

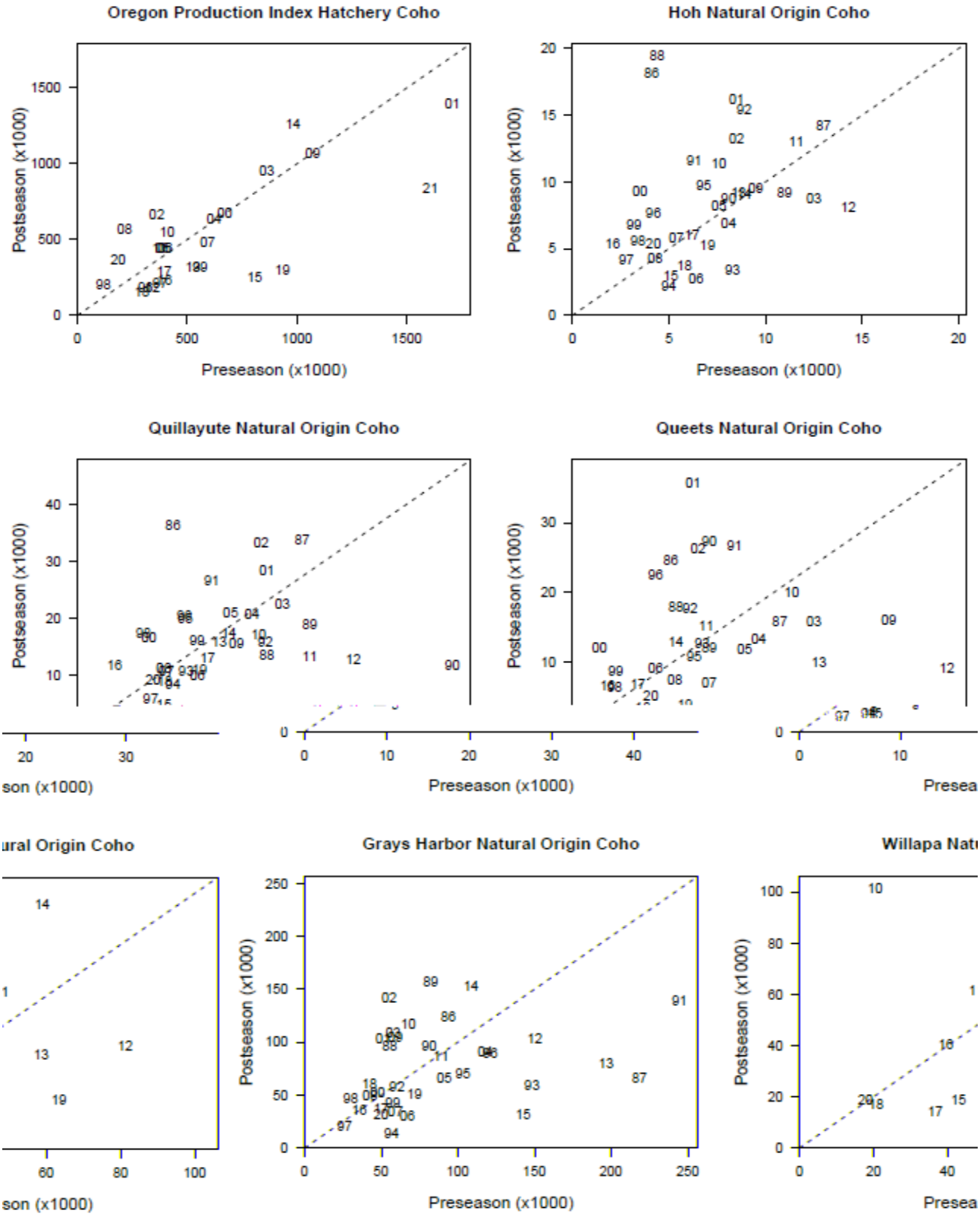

FIGURE III-1a. Selected preseason vs. postseason forecasts for coho stocks with substantial contribution to Council area fisheries.

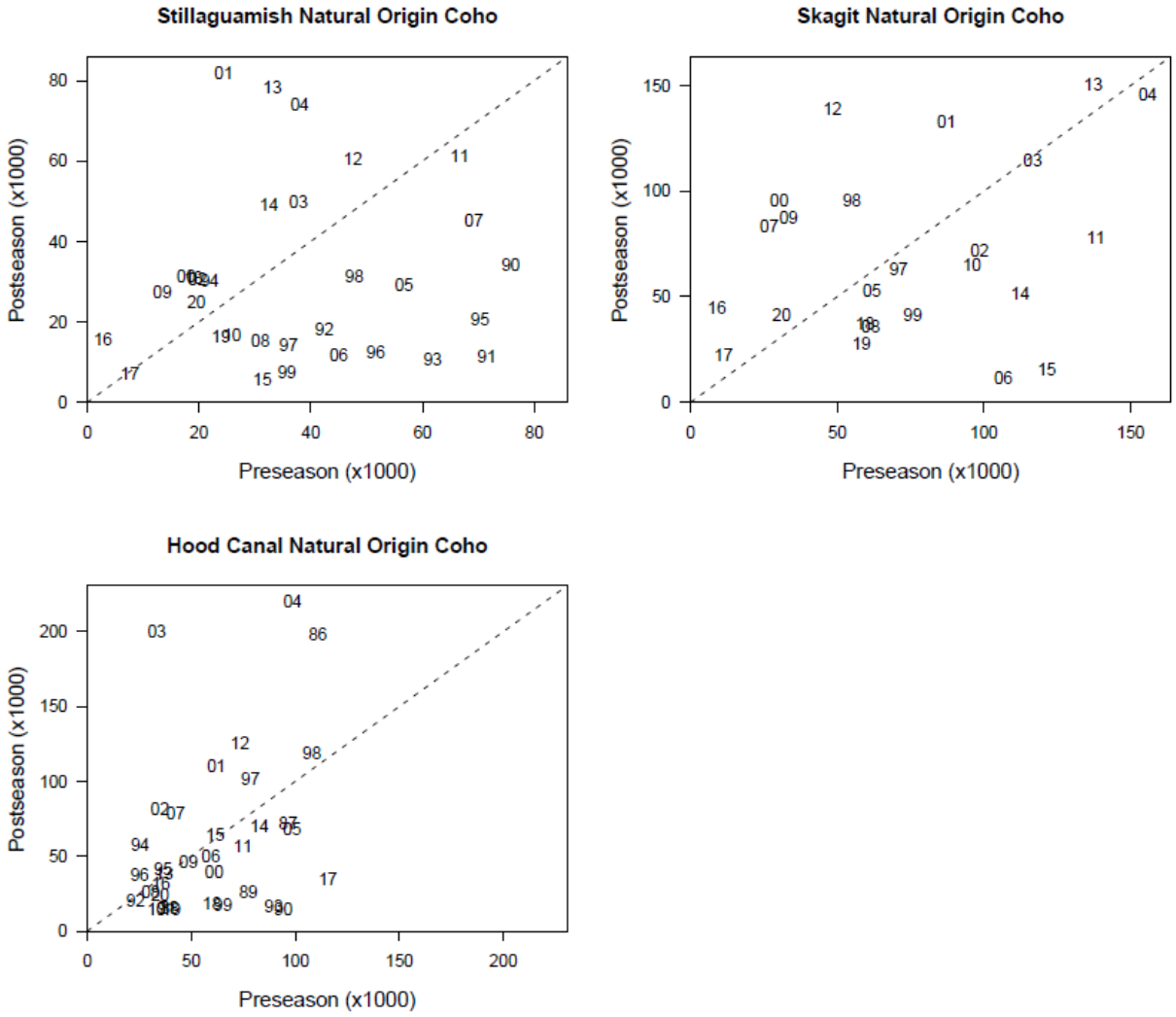

FIGURE III-1b. Selected preseason vs. postseason forecasts for coho stocks with substantial contribution to Council area fisheries.

4 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 2019 pink salmon run size forecasts were 608,388 for Puget Sound and 5.02 million for Fraser River. The actual 2019 run sizes were 2,941,648 in Puget Sound and 8,858,200 in Fraser River. The 2021 pink salmon run size forecasts were 2,925,681 for the Puget Sound and 3,009,000 for the Fraser River (Table IV-1). The actual 2021 run size was 8,105,000 in the Fraser River. The 2021 Puget Sound run size is unavailable.

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	NA	3.01	8.11

a/ Total run size.

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

The No-Action Alternative consists of continuing for the 2022 season the management measures adopted by the Council and approved by the Secretary of Commerce for the 2021 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 2021 preseason management measures and analyses of their projected effects on the biological and socioeconomic environment are presented in Preseason Report III (PFMC 2021d). A description of the 2021 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 2021 Ocean Salmon Fisheries (PFMC 2022).

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

5.1.1 Overview

Table V-4 provides a summary, where information is available, of Salmon FMP stock spawning escapement and exploitation rate projections for 2022 under the No-Action Alternative (2021 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 2021 Ocean Salmon Fisheries (PFMC 2022) 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 2022 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 2022 were updated for Washington and Oregon stocks, but forecasts for Canadian stocks are unchanged from those employed for 2021 planning. Updated forecasts for Canadian stocks are expected to become available in March 2022. To provide information on the effects of changes in abundance forecasts, the final 2021 preseason regulatory package for ocean and inside fisheries was applied to 2022 projections of abundance.

5.1.2 Sacramento River Fall Chinook

Continuation of the 2021 management measures would be expected to result in an escapement of 189,235 hatchery and natural area SRFC adults. This projection is higher than the minimum escapement level specified by the control rule for 2022, which is S_{MSY} (122,000), and the 2022 preseason S_{ACL} (118,937; Tables V-4 and V-5). The geometric mean of the 2020 and 2021 spawning escapement estimates and the 2022 forecast spawning escapement under the No-Action Alternative is greater than the MSST and S_{MSY} (Table V-4). The predicted SRFC exploitation rate under the No-Action Alternative is 52.3 percent, which is below the MFMT (78.0 percent; Table V-4) and the maximum allowable rate specified by the control rule for 2022 (69.2 percent). If the ocean fisheries were closed from January through August 2022 between Cape Falcon and the U.S./Mexico border, and Sacramento Basin fisheries were closed in 2022, the expected number of hatchery and natural area adult spawners would be 387,499.

The 2021 estimate of SRFC escapement was 104,483 hatchery and natural area adults, which exceeds the 2021 postseason S_{ACL} of 96,641 (Table V-5).

5.1.3 Sacramento River Winter Chinook

Continuation of the 2021 management measures would be expected to result in an age-3 impact rate of 14.6 percent for the area south of Point Arena, California. The 2022 forecast age-3 impact rate under the No-Action Alternative is lower than the 2022 maximum allowable rate of 20.0 percent.

5.1.4 Klamath River Fall Chinook

Continuation of the 2021 management measures, which included a river recreational harvest allocation of 15 percent of the non-tribal harvest and a tribal allocation of 50 percent of the overall adult harvest, would be expected to result in 33,829 natural area adult spawners. This projection is lower than the minimum escapement level specified by the control rule for 2022 (38,180) and S_{MSY} (40,700), but greater than the 2022 preseason S_{ACL} (16,290; Tables V-4 and V-5). The geometric mean of the 2020 and 2021 natural area adult spawner escapement estimates and the 2022 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 33.5 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 2021 (25.0 percent). If the ocean fisheries were closed from January through August 2022 between Cape Falcon and Point Sur, and the Klamath Basin fisheries (tribal and recreational) were closed in 2022, the expected number of natural area adult spawners would be 50,751.

The 2021 estimate of KRFC escapement was 30,196 natural area adults, which exceeds the 2021 postseason S_{ACL} of 15,466 (Table V-5).

5.1.5 California Coastal Chinook Stocks

The NMFS ESA consultation standard restricts the KRFC age-4 ocean harvest rate to no more than 16.0 percent to limit impacts on these stocks. The postseason estimate of this rate for 2021 is 27.2 percent. Applying 2021 management measures to the 2022 KRFC abundance results in an age-4 ocean harvest rate forecast of 16.5 percent. If the ocean fisheries were closed from January through August 2022 between Cape Falcon and Point Sur, the expected age-4 ocean harvest rate would be 0.3 percent (132 age-4 KRFC were harvested during the September through November 2021 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 2022 under 2021 fishing seasons.

5.1.7 Columbia River Chinook Stocks

The 2022 forecast for Columbia River spring Chinook originating from below Bonneville dam is greater than the 2021 forecast. The 2022 forecast for Columbia River spring Chinook originating from above Bonneville dam is greater than the 2021 forecast. The 2022 forecasts for tule fall Chinook are greater than the 2021 forecasts, whereas the 2022 forecasts for summer Chinook and bright fall Chinook are less than the 2021 forecasts. Given these differences in forecasts in 2022 compared to 2021, applying 2021 management measures to the forecasted 2022 abundance of Columbia River Chinook may or may not 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 2021 Council area management measures on projected 2022 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 2021 Council regulations and 2021 regulations for non-Council area fisheries. Because of the decrease in forecasts for most hatchery coho stocks in 2022 relative to the forecasts in 2021, this model run shows higher fishery impact rates. Due to the changes in the forecasts, the model run shows fishery impact rate increases for OCN coho, LCN coho, and RK coho. This provides some indication of the fishery impacts and fisheries planning relative to the conservation objectives in 2022. Under this scenario, the expected escapement is 192,400 for OCN coho (Table V-6). For Columbia River hatchery coho stocks, the predicted ocean exploitation rate (excluding Buoy 10) is 22.4 percent on the Columbia River early stock and 24.7 percent on the Columbia River late stock; total predicted exploitation rates are 41.7 percent and 34.5 percent for early and late stock respectively. Predicted ocean escapements (after Buoy 10) into the Columbia River in 2022 show that under 2021 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 2022 fisheries is no greater than 15.0 percent in the revised OCN coho matrix (Table V-8; Appendix A, Table A-4). Under the 2021 fishery management measures and 2022 abundance forecasts, these exploitation rates are predicted to be 13.9 percent for OCN, and 3.3 percent (marine) for RK coho (Table V-7). The 2022 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 the 2021 fishery management measures and 2022 abundance forecasts, the exploitation rate is predicted to be 9.0 percent for marine fisheries (excluding the Buoy 10 fishery) using combined unmarked Columbia River hatchery stocks as the proxy. The LCN coho exploitation rate estimate for the Buoy 10 fishery would be 2.7 percent and the estimated exploitation rate in freshwater fisheries would be 1.8 percent. The total exploitation rate on LCN coho would be 13.5 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 2022 preseason abundance forecasts and 2021 preseason projections for fishing patterns, are presented in Table V-6. The 2022 forecasts for Canadian coho stocks are not available but are assumed to be at 2021 levels for this analysis. More detailed fishery management goals for Council area coho stocks are listed in Appendix A.

The geometric means of 2019 and 2020 spawning escapement estimates and the 2022 forecasted spawning escapement under the No-Action Alternative indicate that Strait of Juan de Fuca natural coho meet the criteria for being at risk of approaching an overfished condition (Table V-4).

Under the 2021 management measures, 2022 exploitation rates are expected to meet FMP conservation objectives applicable for 2022 for all Puget Sound coho stocks. Ocean escapements for Washington Coast natural coho stocks are above FMP spawning escapement conservation objectives. Management objectives for U.S. Puget Sound stocks subject to the PST are identical to FMP objectives and would be met under

2021 regulations for all Puget Sound stocks; all coastal stocks also meet agreed-to PST management objectives under 2021 regulations.

The exploitation rate by U.S. fisheries south of the Canadian border on Interior Fraser (B.C.) coho is projected to be 6.0 percent, which is well below the anticipated 10.0 percent allowable exploitation rate under the 2019 PST Southern Coho Management Plan. The Council area fisheries portion would be 2.6 percent.

5.1.11 Summary

The effects of projected impacts (where available) under the No-Action Alternative (2021 fishery management measures) and 2022 abundance forecasts are as follows:

- SRFC are not at risk of approaching an overfished condition.
- For SRWC, the predicted age-3 impact rate is less than the maximum allowable rate specified by the control rule and thus meets the 2022 objective.
- KRFC meet the criteria for being at risk of approaching an overfished condition.
- The KRFC age-4 ocean harvest rate would not meet the California coastal Chinook ESA consultation standard.
- Willapa Bay, Grays Harbor, Queets, Hoh, Quillayute, Skagit, and Stillaguamish natural coho would achieve S_{MSY} spawning escapement objectives.
- Strait of Juan de Fuca, Hood Canal, and Snohomish natural coho would not achieve S_{MSY} spawning escapement objectives.
- Strait of Juan de Fuca natural coho meet the criteria for being at risk of approaching an overfished condition.
- OCN and LCN coho stocks 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 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 Klamath River fall Chinook exploitation rate is above the control rule defined maximum rate for 2022.
- The projected Klamath River fall Chinook age-4 harvest rate is greater than the 16 percent maximum specified by the California coastal Chinook ESA consultation standard.
- Strait of Juan de Fuca, Hood Canal, and Snohomish natural coho would not achieve S_{MSY} spawning escapement objectives.

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 2022 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. 2021 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted.
(Page 1 of 7)

A. SEASON DESCRIPTIONS

North of Cape Falcon

Supplemental Management Information

1. Overall non-Indian TAC: 58,000 Chinook and 75,000 coho marked with a healed adipose fin clip (marked).
2. Non-Indian commercial troll TAC: 30,750 Chinook and 5,000 marked coho.
3. Trade: commercial troll traded 7,000 marked coho to the recreational fishery for 1,750 Chinook.
4. For fisheries scheduled prior to May 16, 2021: See 2020 management measures, which are subject to inseason action and the 2021 season description described below.

Model Runs: Coho-2140 Chin-3721

U.S./Canada Border to Cape Falcon

- May 16 through the earlier of June 29, or 15,375 Chinook. No more than 5,680 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 4,195 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8).

In the area between the U.S./Canada border and the Queets River the landing and possession limit is 75 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 75 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6).

Open seven days per week (C.1). 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 projected that approximately 75% of the overall Chinook guideline has been landed, or approximately 75% of any of the individual Chinook subarea guidelines have been landed, inseason action will be considered to ensure the guideline is not exceeded.

In 2022, the season will open May 1 consistent with all preseason regulations in place in this area and subareas during May 16-June 30, 2021, 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 2022 meetings.

U.S./Canada Border to Cape Falcon

- July 1 through the earlier of September 30, or 15,375 Chinook or 5,000 coho (C.8).

Landing and possession limit of 20 marked coho per vessel per landing week (Thurs.-Wed.) (C.1).

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

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 9, Grays Harbor Control Zone (C.5).

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

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).

In 2021, vessels may not land any species of fish east of Port Angeles or east of the Megler-Astoria bridge.

For delivery to Washington ports east of the Sekiu River, vessels must notify WDFW at 360-249-1215 prior to crossing the Bonilla-Tatoosh line with area fished, total Chinook, coho and halibut catch aboard, and destination with approximate time of delivery.

In 2022, vessels may not land any species of fish east of the Sekiu River or east of the Megler-Astoria bridge.

(Continued next page)

TABLE 1. 2021 Commercial troll management measures for non-Indian ocean salmon fisheries - **Council Adopted**. (Page 2 of 8)

A. SEASON DESCRIPTIONS

North of Cape Falcon

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

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. 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@state.or.us. 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).

A. SEASON DESCRIPTIONS

South of Cape Falcon

Supplemental Management Information

1. Sacramento River fall Chinook spawning escapement of 133,913 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 50.6%.
3. Klamath River recreational fishery allocation: 1,221 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 8,135 adult Klamath River fall Chinook.
5. CA/OR share of Klamath River fall Chinook ocean impacts: 64.6% / 35.4%
6. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 64.0% / 36.0%.
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. Commercial coho TAC: 10,000 coho marked with a healed adipose fin clip (marked).
9. For fisheries scheduled prior to May 16, 2021, see 2020 management measures, which are subject to inseason action and the 2021 season description described below.

TABLE 1. 2021 Commercial troll management measures for non-Indian ocean salmon fisheries - **Council Adopted**. (Page 3 of 8)

A. SEASON DESCRIPTIONS

South of Cape Falcon

Cape Falcon to Heceta Bank line
- March 20-April 30 (C.9.a).

All salmon except coho, except as described below (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).

In 2022, 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 2021. This opening could be modified following Council review at its March 2022 meeting.

Cape Falcon to Humbug Mt.
- May 1-5, 10-15;
- May 16-21, 26-31;
- June 5-7, 12-14, 19-21, 26-28;
- September 1-October 31 (C.9.a).

All salmon except coho, except as described below (C.4, C.7). Beginning September 1, no more than 75 Chinook allowed per vessel per landing week (Thurs.-Wed.).

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).

- July 5-7, 12-14, 19-21, 26-28;
- August 1-4, 8-10, 15-17 (C.9.a).

All salmon. All retained coho must be marked with a healed adipose fin clip (C.4, C.7). 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. Salmon trollers may take and retain or possess on board a fishing vessel no more than 20 coho per vessel per week (Thurs.-Wed.). 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.

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).

In 2022, 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 2021. This opening could be modified following Council review at its March 2022 meeting.

Humbug Mt. to OR/CA Border (Oregon KMZ)
- March 20-May 5, 10-15;
- May 16-21, 26-31;
- June 1-30, or the earlier of 300 Chinook quota;
- July 1-31, or the earlier of 200 Chinook quota (C.9.a).

June 1-July 31 weekly landing and possession limit of 20 Chinook per vessel 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.

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 and July 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 (June and July), 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@state.or.us, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery.

In 2022, 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 2021. This opening could be modified following Council review at its March 2022 meeting.

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. 2021 Commercial troll management measures for non-Indian ocean salmon fisheries - **Council Adopted**. (Page 4 of 8)

A. SEASON DESCRIPTIONS

South of Cape Falcon

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

- Closed (C.9.b).

In 2022, 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 2022 meetings.

Humboldt South Jetty to Southern KMZ Boundary

- Closed.

Southern KMZ Boundary to Point Arena (Fort Bragg)

- August 1-17;
- September 1-30 (C.9.b).

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 and north of Point Arena (C.6, C.11).

In 2022, 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 2021 (C.2, C.3). This opening could be modified following Council review at its March 2022 meeting.

Pt. Arena to Pigeon Pt. (San Francisco)

- June 16-30;
- July 17-22;
- August 1-17;
- September 1-30 (C.9.b).

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

In 2022, 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 2021 (C.2, C.3). This opening could be modified following Council review at its March or April 2022 meetings.

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

- October 1, 4-8, 11-15.

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 1-12;
- May 20-27;
- June 16-30;
- July 17-22;
- August 1-17 (C.9.b).

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).

In 2022, 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 2021 (C.2, C.3). This opening could be modified following Council review at its March or April 2022 meetings.

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).

TABLE V-I. 2021 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 5 of 8)

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	-	-	-	-	-
Southern KMZ Boundary 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:

a. 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.
b. 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.
c. Spread defined: A single leader connected to an individual lure and/or bait.
d. 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. 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.

TABLE V-I. 2021 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 6 of 8)

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 offshore); 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.

During the 2021 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.

Through May 15, 2021, consistent with regulations adopted in April 2020, 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.

Beginning May 16, 2021 through the end of the 2021 salmon troll fishery, and beginning April 1, 2022, until modified through inseason action or superseded by the 2022 management measures the following applies:

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.

Incidental Pacific halibut catch regulations in the commercial salmon troll fishery adopted for 2021, prior to any 2021 inseason action, will be in effect when incidental Pacific halibut retention opens on April 1, 2022 unless otherwise modified by inseason action at the March 2022 Council meeting.

a. "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.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. Inseason modifications to salmon management areas (establishing a sub-area boundary for example) is allowed if the boundary is described as a landmark in Section C.11 of this document, and if the change would not result in exceeding preseason impact expectations on any stocks.

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.

TABLE V-I. 2021 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 8 of 8)

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

C.11. Latitudes for geographical reference of major landmarks along the west coast that are used in describing salmon management areas or subareas. Majority of information derived from source: 2020 West Coast federal salmon regulations. https://www.govinfo.gov/content/pkg/FR-2020-05-08/pdf/2020-09903.pdf

U.S./Canada Border	49°00'00" N lat.	40°10′ line (near Cape Mendocino, CA)	40°10′00″ N lat.
Cape Flattery, WA	48°23′00″ N lat.	Horse Mountain, CA	40°05′00″ N lat.
Cape Alava, WA	48°10′00″ N lat.	Point Arena, CA	38°57′30″ N lat.
Queets River, WA	47°31′42″ N lat.	Point Reyes, CA	37°59′44″ N lat.
Leadbetter Point, WA	46°38′10″ N lat.	Point San Pedro, CA	37°35′40″ N lat.
Cape Falcon, OR	45°46′00″ N lat.	Pigeon Point, CA	37°11′00″ N lat.
South end Heceta Bank line, OR	43°58′00″ N lat.	Point Sur, CA	36°18′00″ N lat.
Humbug Mountain, OR	42°40′30″ N lat.	Point Conception, CA	34°27′00″ N lat.
Oregon-California border	42°00′00″ N lat.	U.S./Mexico Border	32°30'00″N lat.

TABLE V-2. 2021 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: 58,000 Chinook and 75,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 27,250 Chinook and 70,000 marked coho; all retained coho must be marked. 3. Trade: commercial troll traded 7,000 marked coho to the recreational fishery for 1,750 Chinook. 4. No Area 4B add-on fishery. 5. Buoy 10 fishery opens August 1 with an expected landed catch of 80,000 marked coho in August and September.
U.S./Canada Border to Cape Alava (Neah Bay Subarea) • June 19-July 3 (C.5). Open seven days per week. All salmon, except coho; one salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3). • July 4 through the earlier of September 15, or 5,730 marked coho subarea quota, with a subarea guideline of 5,825 Chinook (C.5). 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; coho minimum size limit 16 inches total length (B). See gear restrictions and definitions (C.2, C.3). Beginning August 1, Chinook non-retention east of the Bonilla-Tatoosh line (C.4.a) during Council managed ocean fishery.
Cape Alava to Queets River (La Push Subarea) • June 19-July 3 (C.5). 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). • July 4 through the earlier of September 15, or 1,430 marked coho subarea quota, with a subarea guideline of 1,300 Chinook (C.5). 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, coho minimum size limit 16 inches total length (B). See gear restrictions and definitions (C.2, C.3).
Queets River to Leadbetter Point (Westport Subarea) • June 19-26 (C.5). Open seven days per week. All salmon, except coho; one salmon per day (C.1). Chinook minimum size limit of 22 inches total length (B). See gear restrictions and definitions (C.2, C.3). • June 27 through the earlier of September 15, or 20,440 marked coho subarea quota, with a subarea guideline of 12,925 Chinook (C.5). 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 (C.1). Chinook minimum size limit of 22 inches total length; coho minimum size limit 16 inches total length (B). See gear restrictions and definitions (C.2, C.3). Grays Harbor Control Zone closed beginning August 9 (C.4.b).
Leadbetter Point to Cape Falcon (Columbia River Subarea) • June 19-26 (C.5). Open seven days per week. All salmon, except coho; one salmon per day (C.1). Chinook minimum size limit of 22 inches total length (B). See gear restrictions and definitions (C.2, C.3). • June 27 through the earlier of September 15, or 42,400 marked coho subarea quota, with a subarea guideline of 7,200 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 (C.1). Chinook minimum size limit of 22 inches total length; coho minimum size limit 16 inches total length (B). See gear restrictions and definitions (C.2, C.3). Columbia Control Zone closed (C.4.c).
For all Recreational fisheries north of Cape Falcon: 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. 2021 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 133,913 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 50.6%.
3. Klamath River recreational fishery allocation: 1,221 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 8,135 adult Klamath River fall Chinook.
5. CA/OR share of Klamath River fall Chinook ocean impacts: 64.6% / 35.4%
6. Overall recreational coho TAC: 120,000 coho marked with a healed adipose fin clip (marked), and 14,000 coho in the non-mark-selective coho fishery.
7. For fisheries scheduled prior to May 16, 2021, see 2020 management measures, which are subject to inseason action and the 2021 season description described below.

A. SEASON DESCRIPTIONS

South of Cape Falcon

Cape Falcon to Humbug Mt.

- March 15-May 15, open for all salmon except coho, except as listed below for mark selective and non-mark selective coho seasons;
- May 16-October 31, open for all salmon except coho, except as listed below for mark selective and non-mark selective coho seasons;
- June 12 - August 28 or 120,000 marked coho quota. Open area extends to the OR/CA Border. Open for all salmon, all retained coho must be marked with a healed adipose fin clip;
- September 10-12, and each Friday, Saturday, and Sunday through the earlier of September 30, or 14,000 non-mark-selective coho quota. Open for all salmon, (C.5, C.6). Open days may be modified inseason.

Two salmon per day (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 non-selective coho quota (C.5).

In 2022, 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 2021 (C.2, C.3). This opening could be modified following Council review at its March 2022 meeting.

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

- June 12-18. Open for all salmon except Chinook, all coho must be marked with a healed adipose fin clip;
- June 19-August 15. Open for all salmon, all coho must be marked with a healed adipose fin clip. Coho retention closes when the Cape Falcon to OR/CA border quota of 120,000 coho is attained.
- August 16-28. Open for all salmon except Chinook, all coho must be marked with a healed adipose fin clip. All salmon fishing closes in this area the earlier of August 28 or the Cape Falcon to OR/CA border quota of 120,000 coho.

Open seven days per week. Two salmon per day (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. 2021 Recreational management measures for non-Indian ocean salmon fisheries - **Council Adopted**. (Page 3 of 5)

A. SEASON DESCRIPTIONS

South of Cape Falcon

OR/CA Border to Southern KMZ Boundary (California KMZ)

- June 29-August 1 (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 closures adjacent to the Smith, Eel, and Klamath Rivers.

In 2022, 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 2021 (C.2, C.3). This opening could be modified following Council review at its March or April 2022 meetings.

Southern KMZ Boundary to Point Arena (Fort Bragg)

- June 29-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 2022, season opens April 2 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 2021 (C.2, C.3). This opening could be modified following Council review at its March 2022 meeting.

Point Arena to Pigeon Point (San Francisco)

- June 26-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 2022, season opens April 2 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 2021 (C.2, C.3). This opening could be modified following Council review at its March 2022 meeting.

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

- April 3-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-September 30 (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 2022, season opens April 2 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 2021 (C.2, C.3). This opening could be modified following Council review at its March 2022 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 Southern KMZ Boundary	20	-	20
Southern KMZ Boundary to Pt. Arena	20	-	20
Pt. Arena to Pigeon Pt.	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

TABLE V-2. 2021 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 4 of 5)

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. *Southern KMZ Boundary 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.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).

TABLE V-2. 2021 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 5 of 5)

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

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.
f Inseason modifications to salmon management areas (establishing a sub-area boundary for example) is allowed if the boundary is described as a landmark in Section C.7 of this document, and if the change 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.

C.7. Latitudes for geographical reference of major landmarks along the west coast that are used in describing salmon management areas or subareas. Majority of information derived from source: 2020 West Coast federal salmon regulations. https://www.govinfo.gov/content/pkg/FR-2020-05-08/pdf/2020-09903.pdf

U.S./Canada Border	49°00'00" N lat.	40°10′ line (near Cape Mendocino, CA)	40°10′00″ N lat
Cape Flattery, WA	48°23′00″ N lat.	Horse Mountain, CA	40°05′00″ N lat.
Cape Alava, WA	48°10′00″ N lat.	Point Arena, CA	38°57′30″ N lat.
Queets River, WA	47°31′42″ N lat.	Point Reyes, CA	37°59′44″ N lat.
Leadbetter Point, WA	46°38′10″ N lat.	Point San Pedro, CA	37°35′40″ N lat.
Cape Falcon, OR	45°46′00″ N lat.	Pigeon Point, CA	37°11′00″ N lat.
South end Heceta Bank line, OR	43°58′00″ N lat.	Point Sur, CA	36°18′00″ N lat.
Humbug Mountain, OR	42°40′30″ N lat.	Point Conception, CA	34°27′00″ N lat.
Oregon-California border	42°00′00″ N lat.	U.S./Mexico Border	32°30'00″ N lat.
Humboldt South Jetty, CA	40°45′53″ N lat.		

TABLE V-3. 2021 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 26,500 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 2022, the season will open May 1, consistent with all preseason regulations in place for Treaty Indian Troll fisheries during May 16-June 30, 2021. All catch in May 2022 applies against the 2022 Treaty Indian Troll fisheries quota. This opening could be modified following Council review at its March and/or April 2022 meetings.

- May 1 through the earlier of June 30 or 20,000 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 20,000 Chinook quota, or 26,500 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.)

TABLE V-3. 2021 Treaty Indian ocean troll management measures for ocean salmon fisheries - Council adopted. (Page 2 of 2)

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

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 2021 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 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**. 2022 spawning escapement and exploitation rate estimates are based on preliminary 2022 preseason abundance forecasts and 2021 Council regulations.

	Estimated Adult Spawning Escapement									Total Exploitation Rate						
	2017	2018	2019	2020	2021[a/]	Forecast 2022[b/]	3-yr Geo Mean	MSST	S_{MSY}	2017	2018	2019	2020	2021[a/]	2022[b/]	MFMT
Chinook																
Sacramento Fall	44,329	105,466	163,767	138,091	104,483	189,235	139,767	91,500	122,000	0.68	0.52	0.68	0.61	0.68	0.52	0.78
Klamath River Fall	19,904	52,352	20,022	26,190	30,196	33,829	**29,908**	30,525	40,700	0.10	0.32	0.43	0.30	0.38	0.34	0.71
Southern Oregon[c/]	91,977	39,507	20,076	30,497	48,870	NA	31,045	20,500	34,992	NA	NA	NA	NA	NA	NA	0.54
Central and Northern OR[d/]	114	92	65	137	85	NA	91	30 fish/mi	60 fish/mi	0.45	0.66	0.50	NA	NA	NA	0.78
Upper River Bright - Fall[d/]	96,096	58,540	77,880	98,401	86,644	73,749	85,671	19,182	39,625	0.49	0.34	0.37	NA	NA	NA	0.86
Upper River - Summer[d/]	56,265	38,816	41,090	70,654	52,076	51,006	57,253	6,072	12,143	0.46	0.54	0.26	NA	NA	NA	0.75
Willapa Bay - Fall[e/]	3,147	2,847	2,894	3,585	NA	NA	3,091	1,696	3,393	0.51	0.61	0.73	NA	NA	NA	0.78
Grays Harbor Fall[d/e/]	17,145	20,741	14,880	20,879	NA	NA	18,609	5,694	13,326	0.48	0.63	0.72	NA	NA	NA	0.78
Grays Harbor Spring	1,384	493	983	2,828	2,573	NA	1,927	700	1,400	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall[d/]	2,822	2,207	2,663	3,459	NA	NA	2,729	1,250	2,500	0.55	0.66	0.64	NA	NA	NA	0.87
Queets - Sp/Su	825	484	322	342	NA	NA	376	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall[d/e/]	1,808	2,478	1,552	2,273	NA	NA	2,060	600	1,200	0.51	0.56	0.79	NA	NA	NA	0.90
Hoh Sp/Su	1,364	793	766	1,248	NA	NA	912	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall[d/e/]	3,604	3,937	7,765	8,672	3,873	NA	6,389	1,500	3,000	0.69	0.72	0.73	NA	NA	NA	0.87
Quillayute - Sp/Su	1,097	990	1,442	935	748	NA	1,003	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa[d/]	1,188	2,179	1,815	2,122	NA	NA	2,032	425	850	0.26	0.54	0.77	NA	NA	NA	0.78
Coho																
Willapa Bay[f/]	11,379	17,228	15,115	16,476	NA	32,947	20,169	8,600	17,200	0.34	0.35	0.39	0.33	NA	0.37	0.74
Grays Harbor[f/]	26,907	49,622	30,468	23,814	NA	95,898	41,130	18,320	24,426	0.32	0.22	0.39	0.29	NA	0.26	0.65
Queets	5,232	2,631	1,700	4,181	NA	14,464	4,685	4,350	5,800	0.23	0.23	0.57	0.22	NA	0.21	0.65
Hoh	4,478	2,463	2,445	2,840	NA	3,414	2,873	1,890	2,520	0.43	0.34	0.57	0.49	NA	0.27	0.65
Quillayute Fall	7,474	6,091	6,852	7,695	8,321	10,740	8,827	4,725	6,300	0.42	0.30	0.37	0.16	NA	0.14	0.59
Juan de Fuca	5,530	5,470	4,625	8,548	NA	6,649	**6,406**	7,000	11,000	0.05	0.08	0.12	0.07	NA	0.09	0.60
Hood Canal	23,871	7,512	7,884	16,832	NA	11,234	11,424	10,750	14,350	0.35	0.57	0.46	0.29	NA	0.45	0.65
Skagit	20,184	19,047	14,246	23,808	NA	53,939	26,350	14,875	25,000	0.09	0.49	0.48	0.43	NA	0.33	0.60
Stillaguamish	6,099	23,937	12,887	21,555	NA	16,768	16,700	6,100	10,000	0.12	0.22	0.20	0.13	NA	0.33	0.50
Snohomish	18,195	58,135	40,314	42,675	NA	43,222	42,051	31,000	50,000	0.21	0.25	0.17	0.11	NA	0.33	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 2021 Exploitation Rate Analysis.

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.

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.

	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	11,312	10,251	20,022	7,458	6,464	15,115
2020	105,723	77,530	138,091	12,018	10,891	26,190	7,399	6,413	16,476
2021	96,641	70,870	104,483	15,466	14,016	30,196	NA	NA	NA
2022	118,937	87,221	189,235	16,290	14,763	33,829	15,439	13,381	32,947

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 2021 Council-adopted regulations to 2021 and 2022 ocean abundance forecasts.[a/]

	Ocean Escapement and ER Estimates Under 2021 Regulations[b/]				
	2021 Abundance Forecasts		2022 Abundance Forecasts		
Stock	Ocean Escapement	Exploitation Rate	Ocean Escapement	Exploitation Rate	2022 FMP Conservation Objective[c/]
Natural Coho Stocks					
Skagit	54.4	34.9%	74.7	33.3%	Exploitation Rate ≤60.0%[d/]
Stillaguamish	59.0	28.6%	63.3	32.9%	Exploitation Rate ≤50.0%[d/]
Snohomish	57.3	28.5%	61.3	33.0%	Exploitation Rate ≤40.0%[d/]
Hood Canal	26.6	43.1%	18.6	44.6%	Exploitation Rate ≤45.0%[d/]
Strait of Juan de Fuca	6.3	9.2%	6.9	9.1%	Exploitation Rate ≤20.0%[d/]
Quillayute Fall	7.3	13.8%	12.0	14.1%	6.3 - 15.8 Spawners
Hoh	2.6	26.9%	4.0	27.5%	2.0 - 5.0 Spawners
Queets	3.4	20.0%	15.7	21.0%	5.8 - 14.5 Spawners
Grays Harbor[f/]	46.8	25.8%	122.5	26.2%	35.4 Spawners
LCN	35.7	10.1%	57.6	13.5%	Exploitation Rate ≤23.0[e/]
OCN	109.4	12.8%	192.4	13.9%	Exploitation Rate ≤15.0%[e/]
R/K	9.4	2.7%	3.5	3.3%	Exploitation Rate ≤13.0%[e/]
Hatchery Coho Stocks					
Columbia Early	797.4	29.8%	394.1	41.7%	6.2 Hatchery Escapement
Columbia Late	452.0	28.3%	289.3	34.5%	14.2 Hatchery Escapement

a/ Quota levels include harvest and hooking mortality estimates used in planning the Council's 2021 ocean fisheries and a coho catch for the Canadian troll fishery off the West Coast of Vancouver Island (WCVI).

b/ 2021 preseason regulations with the following coho quotas: U.S. Canada Border to Cape Falcon: Treaty Indian troll-26,500; non-Indian troll-5,000 selective; recreational-70,000 selective; Cape Falcon to OR/CA border: recreational-120,000 selective and 14,000 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 2022 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 Rogue/Klamath (RK) coho projected harvest mortality and exploitation rates by fishery under Council-adopted 2021 management measures and preliminary 2022 preseason abundance estimates.

	Projected Harvest Mortality and Exploitation Rate					
	LCN		OCN		RK[a/]	
Fishery	Number	Percent	Number	Percent	Number	Percent
SOUTHEAST ALASKA	0	0.0%	0	0.0%	0	0.0%
BRITISH COLUMBIA	246	0.4%	2,135	1.0%	22	0.6%
PUGET SOUND/STRAITS	74	0.1%	60	0.0%	0	0.0%
NORTH OF CAPE FALCON						
Recreational	1,370	2.1%	834	0.4%	0	0.0%
Treaty Indian Troll	673	1.0%	493	0.2%	0	0.0%
Non-Indian Troll	247	0.4%	185	0.1%	0	0.0%
SOUTH OF CAPE FALCON						
Recreational:						
Cape Falcon to Humbug Mt.	2,683	4.1%	17,936	8.0%	20	0.6%
Humbug Mt. to Horse Mt. (KMZ)	47	0.1%	876	0.4%	36	1.0%
Fort Bragg	3	0.0%	180	0.1%	20	0.6%
South of Pt. Arena	3	0.0%	171	0.1%	7	0.2%
Troll:						
Cape Falcon to Humbug Mt.	474	0.7%	1,926	0.9%	5	0.1%
Humbug Mt. to Horse Mt. (KMZ)	4	0.0%	46	0.0%	2	0.1%
Fort Bragg	0	0.0%	60	0.0%	2	0.1%
South of Pt. Arena	16	0.0%	406	0.2%	4	0.1%
BUOY 10	1,787	2.7%	386	0.2%	0	0.0%
ESTUARY/FRESHWATER	1,167	1.8%	5,405	2.4%	NA	NA
TOTAL	8,794	13.5%	31,099	13.9%	118	3.3%

a/ Unmarked hatchery production used as a surrogate for Rogue/Klamath natural stock coho.

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	-	-	-	Med	-	-	Med	-
2024	2021	43,600	83,900	114,900	-	-	-	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.

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APPENDIX A
SUMMARY OF COUNCIL STOCK MANAGEMENT GOALS

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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	NMFS ESA consultation standard/recovery plan: No more than a 13.0% AEQ exploitation rate in ocean fisheries on Rogue/Klamath hatchery coho.	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% ≤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

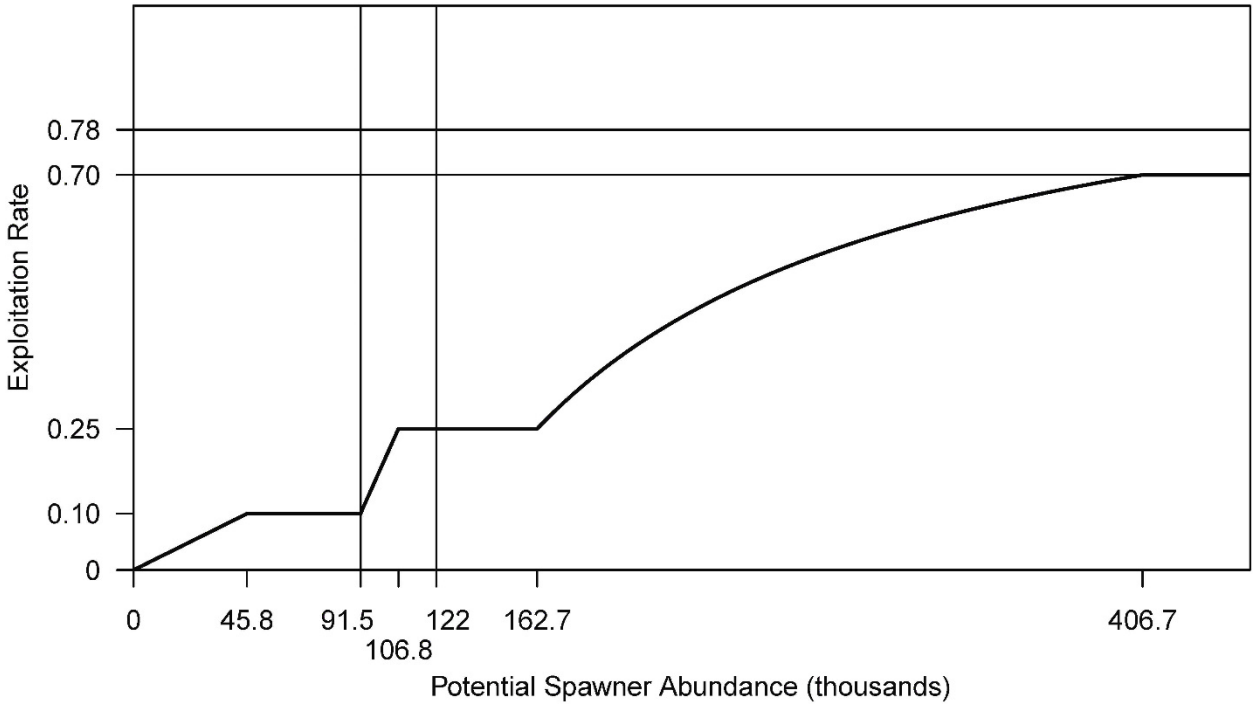

FIGURE A-1. Sacramento River fall Chinook control rule. Potential spawner abundance is the predicted hatchery and natural area adult spawners in the absence of fisheries, which is equivalent to the Sacramento Index. See the salmon FMP, Section 3.3.6, for control rule details.

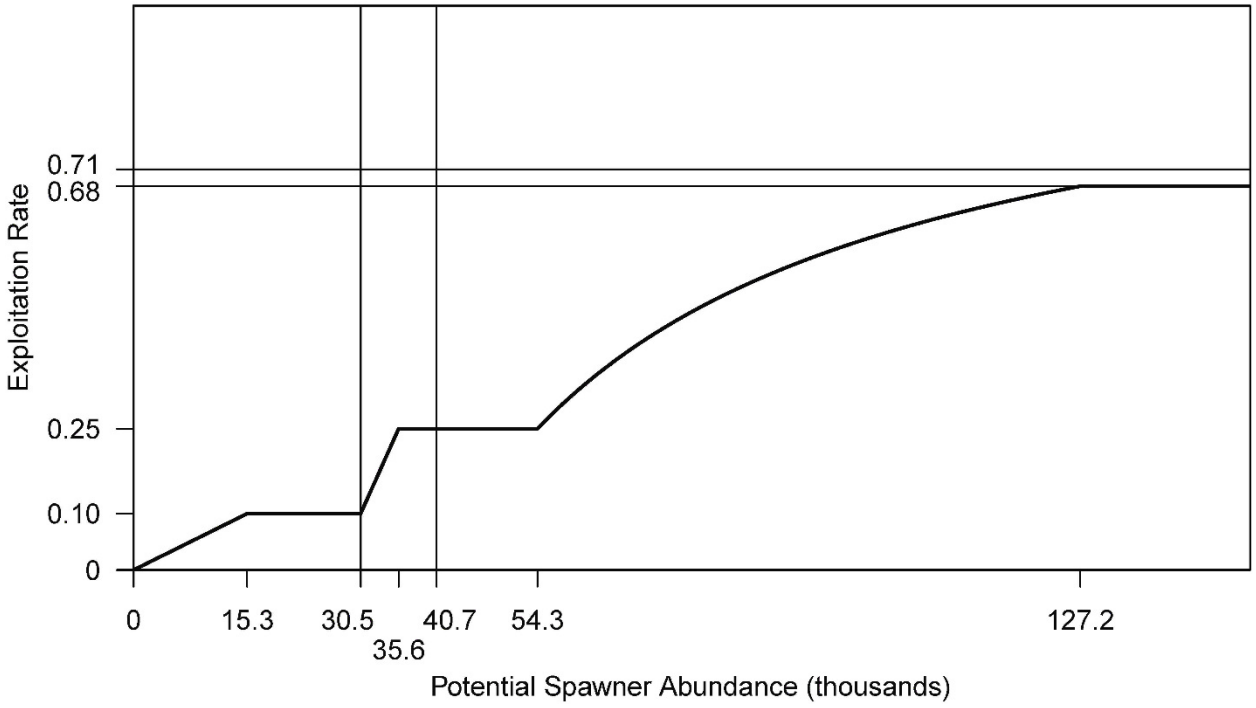

FIGURE A-2. Klamath River fall Chinook control rule. Potential spawner abundance is the predicted natural area adult spawners in the absence of fisheries. See the salmon FMP, Section 3.3.6, for control rule details.

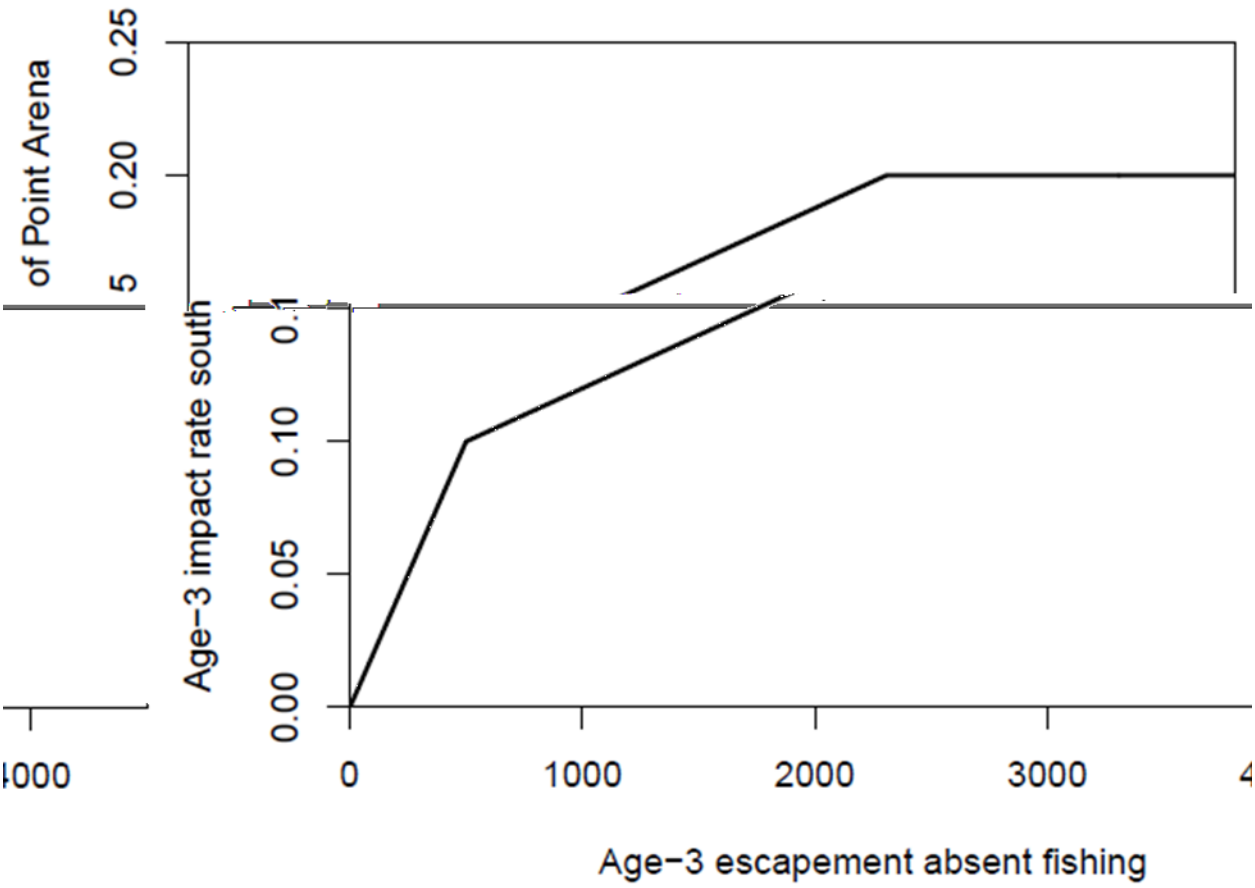

FIGURE A-3. Sacramento River winter Chinook impact rate control rule. The maximum forecast age-3 impact rate for the area south of Point Arena, California, is determined by the forecasted age-3 escapement absent fishing.

APPENDIX B
SALMON HARVEST ALLOCATION SCHEDULES

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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	Add-on	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

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[c/]	5.9	1.0	7.6	8.6	3.4	17.9	0.3	-	0.3	0.4	18.6

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	1.3
2020	369.6	387.7	15.2	14.9	0.3	18.3	16.8	0.5	0.4
2021	841.3	841.3	86.5	83.3	3.2	19.2	18.1	0.4	1.9
2022[k/]	-	1,003.5	57.4	56.4	1.0	18.6	17.6	0.3	1.0

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/]
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	43,620
NORTH CENTRAL													
Salmon	506	672	3,636	297	1,165	3,680	332	1,054	450	103	215	--	517
Siletz	6,902	11,678	33,094	4,495	7,660	19,496	2,216	3,015	5,202	4,064	4,509	--	12,287
Yaquina	10,571	7,618	19,074	6,268	3,553	25,582	2,400	3,730	2,491	4,672	3,452	--	16,119
Beaver Ck.	3,487	1,885	2,389	1,878	2,015	6,564	332	1,709	1,553	494	814	--	2,484
Alsea	8,344	8,353	28,337	8,470	9,283	25,855	6,185	7,375	4,377	5,112	4,915	--	13,060
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
Ind. Tribs.	3,279	2,017	4,487	492	1,929	1,890	856	464	1,646	958	289	--	1,421
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	83,919
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	47,130
Coos	26,572	16,423	10,999	9,414	6,884	38,880	3,030	4,624	2,689	7,292	13,289	--	--
Coquille	15,571	19,437	55,667	5,911	23,637	41,660	3,357	9,494	4,641	5,688	11,841	--	--
Floras Ck.	3,568	3,352	9,217	2,502	1,936	1,022	1,585	942	693	628	904	--	--
Sixes R.	157	140	334	34	567	410	168	120	69	174	155	--	--
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	19,626
Ind. Tribs.	-	224	101	48	33	106	0	0	0	10	23	0	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
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	8,991
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	251,427

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.

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	251.1	67.8	0.4	25.6	-18.9	-74.7	11.4	10.3	-1.2	36.0
2022[b/]	209.0	87.7	-0.1	40.8	-64.1	-126.7	11.0	10.2	-1.4	80.0

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
MODIFICATION OF DATA RANGES USED TO ESTIMATE INPUTS TO THE KLAMATH OCEAN HARVEST MODEL AND SACRAMENTO HARVEST MODEL

In recent years, the Klamath Ocean Harvest Model (KOHM) and the Sacramento Harvest Model (SHM) have under-predicted the Klamath River fall Chinook (KRFC) age-4 ocean harvest rate and the Sacramento River fall Chinook (SRFC) ocean harvest rates, respectively. To be more responsive to fishery trends and improve predictor performance, the Salmon Technical Team (STT) modified the data ranges used to estimate inputs to the KOHM and SHM in 2021. It was anticipated that these data range modifications would be used into the future until a re-evaluation of forecast performance suggested that additional changes were necessary. A description of these data range modifications can be found in Appendix B of PFMC (2021). In brief, the modifications were to (1) reduce the data range used to forecast KRFC contact rates per unit effort to years 2013-forward and (2) reduce the data range used to forecast SRFC harvest rates per unit effort to years 2014-forward. Prior to 2021, the data ranges used to estimate these model parameters were much longer, in some cases beginning in the early 1980s. Hindcasted KRFC age-4 ocean harvest rates and SRFC ocean harvest rates assuming more contemporary data for estimation of the contact/harvest rates per unit effort indicated substantially improved harvest model performance.

The 2021 KRFC age-4 ocean harvest rate and the SRFC ocean harvest rate were again underpredicted (Tables D-1 and D-2), despite the modifications to model inputs made preseason. Given these results, the STT revisited the data ranges used to estimate contact/harvest rates per unit effort made in 2021. To evaluate the performance of alternative data ranges, the KRFC age-4 ocean harvest rate and the SRFC ocean harvest rate was hindcasted for management years 2018-2021 and compared to postseason estimates. Two data range scenarios were used to hindcast ocean harvest rates: (1) the status quo data ranges (2013-2021 for KRFC, 2014-2021 for SRFC), and (2) 2015-2021 (for both KRFC and SRFC). These data range alternatives were applied to both commercial and recreational ocean fisheries. Data ranges with more contemporary start dates than 2015 were considered but ultimately rejected because data informing contact/harvest rates per unit effort became too sparse or nonexistent in certain time/area sectors. Note that the STT also reviewed the data ranges used to predict effort per day for the KOHM and SHM but did not update the data range currently in use due to a lack of consistent trends in under- or over-predicting effort.

For KRFC, estimation of contact rates per unit effort under the 2015-2021 data range scenario resulted in substantially improved preseason versus postseason correspondence in the age-4 ocean harvest rate relative to the status quo data ranges (Table D-1). For SRFC, estimation of harvest rates per unit effort under the 2015-2021 data range scenario resulted in similar or modestly improved preseason versus postseason correspondence relative to the status quo data range scenario (Table D-2).

The hindcasting exercise performed here differs from that performed in Appendix B of PFMC (2021). In Appendix B, hindcasts were performed using one-year-ahead cross validation where data used to estimate contact/harvest rates per unit effort was limited to the specified start year up to the year prior to the management year. For the exercise described here, the contact/harvest rates per unit effort were the same in each management year (e.g., data ranges 2013-2021 and 2015-2021 for KRFC). Such an approach could lead to improved apparent forecast performance relative to a one-year-ahead cross validation exercise where data are excluded for the management year being evaluated. However, the approach employed here has use for making comparisons of relative performance between data range scenarios.

Given the recent history of under-prediction of ocean fishery harvest rates for KRFC and SRFC, and the evidence of improved correspondence between preseason versus postseason rates, the **STT recommends use of data from 2015-forward to estimates contact and harvest rates per unit effort in the KOHM**

and SHM for both commercial and recreational fisheries. Projections of escapement, harvest rates, and other quantities under the no fishing scenario and the scenario with 2022 abundance and 2021 fisheries presented in Chapter V of this report reflect the application of the 2015-forward data range. Reducing the data range to 2015-forward results in increased ocean harvest rates when assuming 2021 regulations. The KOHM-projected age-4 ocean harvest rate increased from 12.7 to 16.5 percent and the SHM projected ocean harvest rate increases from 42.3 to 44.5 percent given the data range modification.

Table D-1. Preseason (pre) versus postseason (post) values of the Klamath River fall Chinook age-4 ocean harvest rate (h_4). Pre versus post on the left-hand side of the table are the values predicted during the Council process each year, and postseason estimates made in 2022. The middle portion of the table indicates predictor performance using the 2013-2021 data range while the right-hand columns describe predictor performance using the 2015-2021 data range.

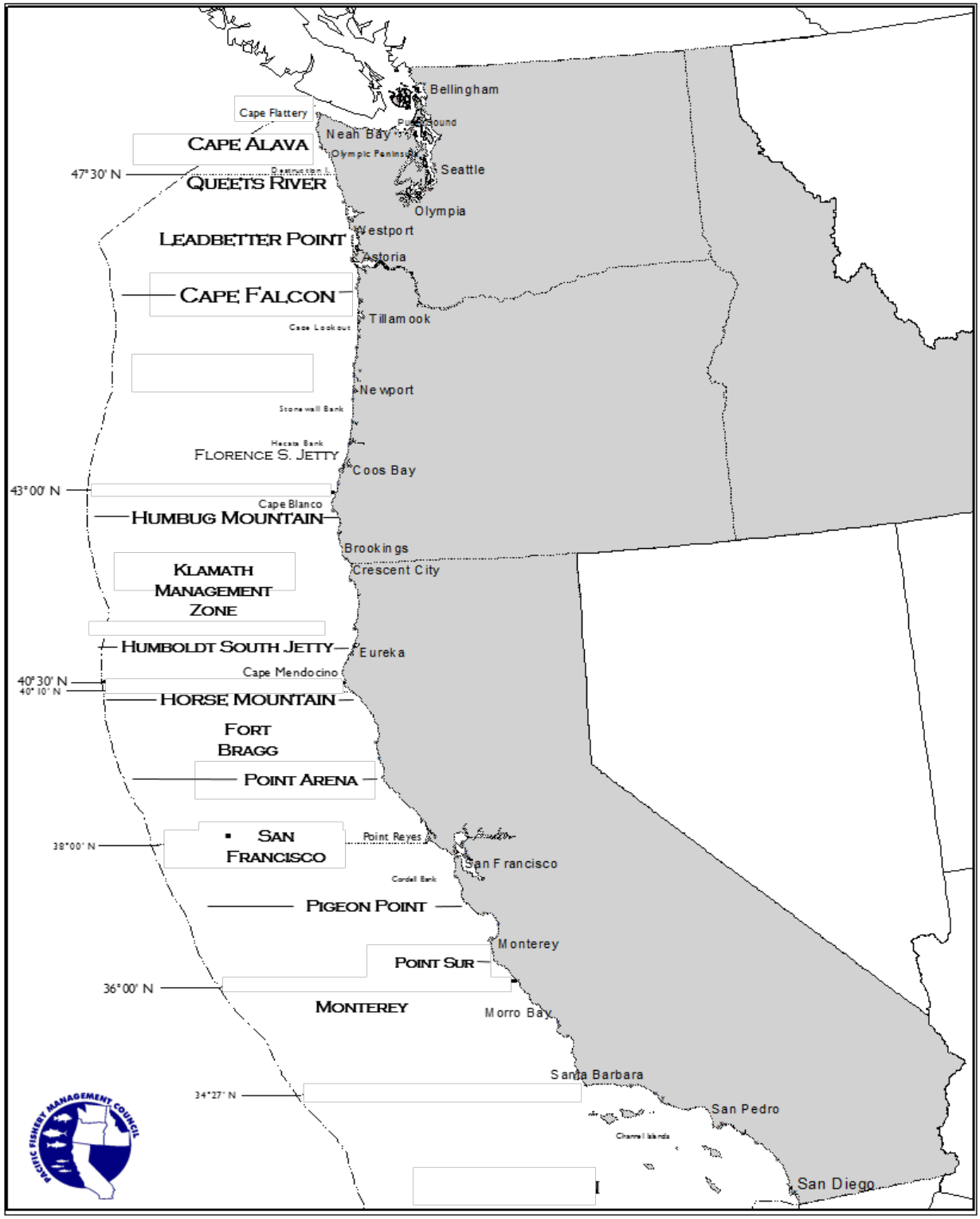
				Status quo (2013-2021)		2015-2021	
Season	pre h_4	post h_4	pre/post	pre h_4	pre/post	pre h_4	pre/post
2018	0.115	0.238	0.48	0.205	0.86	0.236	0.99
2019	0.160	0.356	0.45	0.266	0.75	0.315	0.88
2020	0.088	0.230	0.38	0.211	0.92	0.268	1.17
2021	0.105	0.272	0.39	0.124	0.46	0.160	0.59

Table D-2. Preseason (pre) versus postseason (post) values of the Sacramento River fall Chinook ocean harvest rate (h). Pre versus post on the left-hand side of the table are the values predicted during the Council process each year, and postseason estimates made in 2022. The middle portion of the table indicates performance using the 2014-2021 data range while the right-hand columns describe predictor performance using the 2015-2021 data range.

				Status quo (2014-2021)		2015-2021	
Season	pre h	post h	pre/post	pre h	pre/post	pre h	pre/post
2018	0.291	0.448	0.65	0.416	0.93	0.414	0.93
2019	0.504	0.637	0.79	0.710	1.11	0.730	1.15
2020	0.420	0.566	0.74	0.593	1.05	0.622	1.10
2021	0.425	0.642	0.66	0.451	0.70	0.473	0.74

Reference:

Pacific Fishery Management Council. 2021. Preseason Report II: Proposed Alternatives and Environmental Assessment - Part 2 for 2021 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.



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 2022 OCEAN SALMON FISHERY REGULATIONS

REGULATION IDENTIFIER NUMBER 0648- BK78

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384
(503) 820-2280
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MARCH 2022

PUBLIC HEARINGS ON SALMON ALTERNATIVES

Hearings held on-line
Web link https://meetings.ringcentral.com/join

Washington
Tuesday, March 22, 2022, 7:00 p.m.
Meeting ID: 416 470 064

California
Tuesday, March 22, 2022, 7:00 p.m.
Meeting ID: 118 376 101

Oregon
Wednesday, March 23, 2022, 7:00 p.m.
Meeting ID: 101 861 821

Written public comment on the Alternatives may also be submitted to the PFMC (www.pcouncil.org) Public Comment Electronic Portal (E-Portal). The public comment deadline is 5:00 p.m. Pacific Time, Tuesday, April 5, 2022.

Public comment on the Alternatives will also be accepted during the April Council meeting on Friday, April 8, during the public comment period for Agenda Item D.2.

This document may be cited in the following manner:
Pacific Fishery Management Council. 2022. *Preseason Report II: Proposed Alternatives and Environmental Assessment - Part 2 for 2022 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.

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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, which we refer 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 2022[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 held 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.

This report constitutes the second part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2022 ocean salmon management measures. An EA is used to determine whether an action being considered by a Federal agency has significant impacts. The first part of this EA (Preseason Report I; PFMC 2022a, 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 of the salmon stocks included in the Councils 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 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 will be 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, 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 2022 Council meeting. At this point in the planning cycle, the STT's impact assessments reflect five key assumptions relative to stocks impacted by Canadian and Alaskan fisheries:

[1] The fishery management measures under consideration would cover the period May 16, 2022 through May 15, 2023 (86 FR 26426). For ease of reference, we refer to this time period as 2022.

1) abundance levels for Canadian Chinook and coho stocks identical to 2021 forecasts;
2) for Canadian Chinook fisheries managed under the aggregate abundance-based management (AABM) provisions of the 2019 Pacific Salmon Treaty (PST) Agreement, including Northern British Columbia and West Coast Vancouver Island (WCVI) troll and sport fisheries, 2022 fisheries were modeled using fishing effort scalars from the final 2021 preseason model run;
3) for Canadian Chinook fisheries managed under individual stock-based management (ISBM) regimes, the 2022 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 2018 and 2019 postseason fishing effort scalars from the Fishery Regulation Assessment Model (FRAM);
5) for Southern U.S. inside fisheries for Chinook and inside and coastal terminal fisheries for coho, the 2021 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 will be calibrated by the PSC Chinook Technical Committee to determine the allowable catch ceilings for Canadian 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 will require 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) (referred to in the Salmon FMP as "consultation standards"). Section 5.0 of this document provides greater detail on ESA listed species, and impacts of the 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	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

As the listings occurred, NMFS initiated formal consultations and issued biological opinions (BOs) that consider the impacts resulting from implementation of the Salmon FMP, or from annual management measures, to listed salmonid species. NMFS has also reinitiated consultation on certain ESUs when new information has become 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, (2) conservation objectives for which NMFS conducted Section 7 consultations and arrived at a no-jeopardy conclusion, and (3) NMFS requirements under 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)
6/13/2005	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 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 8, 2022), NMFS summarized existing consultation standards and provided guidance on measures needed to protect species listed under the ESA during the 2022 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 2022 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 2022 management season are presented in Table 5. Some listed 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.

Of the listed Chinook and coho, Council-managed fisheries have substantive impacts on Sacramento River winter Chinook (SRWC), Central Valley spring Chinook, California coastal Chinook (CCC), Snake River fall Chinook ('wild' component, or SRW), lower Columbia River (LCR) fall Chinook, and all of the coho stocks.

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 Southeast Alaska (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 catch ceilings will continue to be determined using the AI from the PSC Chinook Model for Northern British Columbia and WCVI AABM fisheries, the allowable catches for SEAK fisheries will be 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).

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 2022 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 is 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 2022, Puget Sound and Washington coast coho constraints are as follows:

FMP

FMP Stock	Total Exploitation Rate Constraint[a/]	Categorical Status[a/]
Skagit	60%	Normal
Stillaguamish	50%	Normal
Snohomish	40%	Low
Hood Canal	45%	Low
Strait of Juan de Fuca	20%	Critical
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	60%	Abundant
Stillaguamish	50%	Abundant
Snohomish	40%	Moderate
Hood Canal	45%	Moderate
Strait of Juan de Fuca	20%	Low
Quillayute Fall[c/]	50%	Abundant
Hoh[c/]	57%	Abundant
Queets[c/]	68%	Abundant
Grays Harbor[c/d/]	73%	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 2022 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 2022. 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 2022 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 2022 Southern U.S. fisheries to a maximum of 10.0 percent.

7.0 DESCRIPTION OF THE ALTERNATIVES

Detailed information on the proposed 2022 ocean salmon management Alternatives are presented in Tables 1 (non-Indian commercial), 2 (recreational), and 3 (treaty Indian). Notable changes from recent seasons are highlighted below. Fisheries scheduled to occur prior to May 16, 2022, which were adopted as part of the 2021 management measures, may have been modified by inseason action at the March 2022 Council meeting. Any such modifications are incorporated into the 2022 season proposed Alternatives described below. The Alternatives under consideration by the Council cover the period beginning May 16, 2022.

7.1 Commercial

Alternatives for the area north of Cape Falcon reflect a similar total abundance of Chinook and reduced Columbia River hatchery and natural coho compared to 2021 forecasts. In 2022, allowable catch of Chinook will likely be comparable to 2021 due to similar expected impacts in northern fisheries, and an identical total exploitation rate limit on LCR natural tule fall Chinook compared to 2021. Coho catch quotas may be greater than 2021 due to harvestable surplus of Columbia River hatchery coho and an increase in forecasted Washington coastal coho abundance.

Alternative I north of Cape Falcon assigns 66 percent of the troll Chinook quota to the May-June Chinook directed fishery; Alternative II assigns 67 percent 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 all Alternatives, the May-June fishery opens May 1 seven days per week, with sub-quotas in the areas north of the Queets River and in the area south of Leadbetter Point 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 the areas north of the Queets River and in the area south of Leadbetter Point, while Alternative III contains a five day per week (Friday-Tuesday) open period with landing and possession limits in the area north of the Queets River and in the area south of Leadbetter Point. The summer all-salmon fishery in Alternatives I and III opens seven days per week beginning July 1 while Alternative II opens five days per week with 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 2023 on May 1.

Commercial fisheries south of Cape Falcon will be constrained primarily by LCR natural tule Chinook and NMFS guidance for California Coastal Chinook requiring a maximum KRFC age-4 ocean harvest rate of 10 percent. Sacramento River fall Chinook (SRFC) and KRFC were declared overfished in 2018. SRFC are now rebuilt while the status of KRFC remains overfished. All Alternatives were structured to achieve the FMP guidance for KRFC under a *de minimis* fishing regime: a maximum allowable harvest rate of 25.0 percent, which results in an expected natural area escapement of 38,180 adults.

For the area between Cape Falcon and Heceta Bank line the fishery would open on March 15 and run through April, and be open all of September and October in all three Alternatives. In Alternative I, the fishery is open for all salmon except coho from March 15 through June 30 and again from August 1-8. Alternatives II and III have open periods throughout June, July, and August in the Cape Falcon to Heceta Bank line area. Under Alternative II there is a marked coho retention during open days in July that is managed under a 10,000 marked coho quota with a limit of 50 coho per open period and a 1:1 ratio with Chinook.

For the area between Heceta Bank line and Humbug Mountain, fisheries under Alternative I are open all of May and from August 1-8 for all salmon except coho. Alternative II has days in June and July in addition to all of May, with coho retention in the July open period. Alternative III has periodic openings in both May and August. In all three Alternatives the area is fully open in the months of September and October.

In the Oregon portion of the Klamath Management Zone (KMZ) under Alternative I, the season would be open March 15 through April 30 and closed in May. June, July, and August are open and would be managed under monthly quotas of 800, 400, and 250 Chinook, respectively, with weekly landing and possession limits of 50 Chinook from June 1 – August 28. Under Alternative II, the season would be open March 15 through July 31, excluding the month of May. June and July would be managed under monthly quotas of 550 and 200 Chinook respectively, with weekly landing and possession limits of 20 Chinook. Under Alternative III, the fishery would be open March 15 through July, with a brief closed period from May 15 through May 22. June and July would be managed under monthly quotas of 800 and 500 Chinook, respectively, with weekly landing and possession limits of 50 Chinook.

The California portion of the KMZ is closed under all three Alternatives.

In the Fort Bragg area, under Alternative I, the fishery would be open for ten days in July, ten days in August, and the month of September. The fishery under Alternative II would be open for ten days in August and the month of September. The fishery would be closed under Alternative III.

In the San Francisco area, under Alternative I, the fishery would be open concurrently with Alternative I in Fort Bragg through September. Fisheries under Alternative II would consist of eight days in early July, 12 days in early August, and the entire month of September. Alternatives I and II would have a minimum size limit of 27 inches through the end of August, with a 26 inch size limit thereafter. Alternative III would consist of 11 days in early July, 12 days in early August and the month of September. Alternative III would have a minimum size limit of 28 inches through the end of August, with a 26 inch size limit thereafter. The Fall Area Target Zone fishery between Point Reyes and Point San Pedro would be open for 10 days in early October, Monday through Friday, under each of the Alternatives.

In the Monterey area, Alternatives I and III would be open for portions of May, June, July, and August. Alternative II would be limited to portions of May, June, and July. Differences in the number of days open

for each month can be found in Table 1. Alternatives I and II would have a minimum size limit of 27 inches while Alternative III would have a 28 inch minimum size limit.

7.2 Recreational

North of Cape Falcon, in Alternative I, all areas open June 18 for all salmon species seven days per week. The daily bag limit north of the Queets River is two 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 is September 30, with the exception of the area between Cape Alava and the Queets River, which will reopen October 1- 9 with a daily bag limit of one salmon, Chinook only.

In Alternative II, all areas open June 25 for all salmon species, seven days per week. Daily bag limits in all areas are identical to Alternative I. The closing date in all areas is September 30.

In Alternative III, the areas north of the Queets River open June 18 for all salmon species, seven days per week with a daily bag limit identical to Alternative 1. The areas south of the Queets River open June 26, with the area between Leadbetter Point and the Queets River open five days per week (Sunday-Thursday) and the area south of Leadbetter Point open seven days per week, and daily bag limits identical to Alternative I. The closing date in all areas in September 18.

In all Alternatives north of Cape Falcon, all retained coho must be marked with a healed adipose fin clip. In the Westport subarea, the Grays Harbor Control Zone is closed beginning August 8 in all Alternatives.

South of Cape Falcon, for the North and Central Oregon coast Alternatives, Chinook fisheries open March 15 and run through October 31 with the exception of Alternative III. Under Alternative III all of August would be closed to retention of Chinook. Each Alternative includes a mark-selective coho quota fishery in the summer, with different quota sizes and dates. Each Alternative also includes a non-mark-selective coho fishery from Cape Falcon to Humbug Mountain with different quotas and beginning dates in September that is open seven days per week.

In the Oregon KMZ, Alternative I is open for Chinook fishing May 21 through June 27 and is also open for mark-selective coho from June 18 to August 21 or attainment of quota. Alternative II opens July 1 with Chinook retention permitted through August 19. From June 25 through August 21 this area is open for mark-selective coho. Alternative III is open for Chinook fishing from June 25 through July 31.

In the California KMZ, Alternative I opens for May, August, and five days in September. Alternative II allows fishing for the month of May, the first four days in July, and the month of August. Alternative III opens from July 1-24. The minimum size limit is 20 inches for Alternatives I and II, and 24 inches for Alternative III.

In the Fort Bragg area, Alternative I is open from May 1 through November 13, but closed in June. Alternative II is open from May 1 through October 31, but closed July 5-21. Alternative III is open continuously from May 1 through September 30. The minimum size limit is 20 inches for Alternatives I and II, and 24 inches for Alternative III.

Under each of the Alternatives for the San Francisco management area, fishing begins on April 2. Under Alternative I, the season is open through November 13, but closed in June. Under Alternative II, the season is open through October 31, but closed from mid-May through the end of June. Under Alternative III, the season is open from April 2 through April 30, then closed in May and part of June. The fishery re-opens on June 20 and runs continuously through September 30. The minimum size limit is 24 inches for

Alternatives I and II through May 15, and 20 inches thereafter. For Alternative III, the minimum size limit is 24 inches for the entire season.

For the Monterey area, from Pigeon Point to the U.S./Mexico border, the fishery opens on April 2 and runs continuously until October 2 under all three Alternatives. Minimum size limits are 24 inches until May 15, and 20 inches thereafter for Alternatives I and II. For Alternative III, the minimum size limit is 24 inches for the entire season.

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 2022a). 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 2021 Ocean Salmon Fisheries (PFMC 2022a). The current status (2022 ocean abundance forecasts) of the environmental components expected to be affected by the 2022 ocean salmon fisheries regulation Alternatives (FMP salmon stocks) are described in the 2022 Preseason Report I (PFMC 2022b). 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 stocks 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. 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 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 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.

8.1.1.1 North of Cape Falcon

Abundance projections important to Chinook harvest management north of Cape Falcon in 2022 are:

- *Columbia River hatchery tules*. Combined production of Lower River Hatchery (LRH) and Spring Creek Hatchery (SCH) stocks returning to the Columbia River forecasted to be 164,200, which is higher than the 2021 preseason expectation of 119,900. The LRH forecast is 73,000, which is similar than the forecast of 73,100 in 2021. The SCH forecast is 91,200, which is greater than the 2021 forecast of 46,800.

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 stocks for the area north of Cape Falcon include LCR natural tule Chinook, Columbia Lower River Wild (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 of LCR natural tule fall Chinook that range from 38.0 percent to 40.3 percent when combined with preliminary 2022 preseason harvest rates for Columbia River fisheries. In Alternatives I and II the exploitation rates exceed the 38.0 percent NMFS consultation standard maximum for 2022. 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 2022.

- *LRW fall Chinook*. The Alternatives have ocean escapement values ranging from 10,800 to 10,900, which exceeds the ESA consultation standard of 6,900 minimum ocean escapement. LRW Chinook will not constrain ocean fisheries north of Cape Falcon in 2022.

- *SRW fall Chinook*. The Alternatives have ocean exploitation rates ranging from 50.6 percent to 60.0 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. SRW Chinook will not constrain ocean fisheries north of Cape Falcon in 2022.

For Chinook fisheries north of Cape Falcon, Alternative III satisfies NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for relevant Chinook stocks (Table 5). The NMFS ESA consultation standard for LCR natural tule fall Chinook is exceeded in Alternatives I and II.

8.1.1.2 South of Cape Falcon

Status of Chinook stocks important to 2022 Chinook harvest management south of Cape Falcon are:

- *SRFC*. The Sacramento Index forecast is 396,458, which is greater than the 2021 forecast of 270,958.

- *KRFC*. The ocean abundance forecast for this stock is 154,998 age-3, 43,211 age-4, and 1,908 age-5 fish. These compare to the 2021 forecasts of 135,569 age-3, 45,124 age-4, and 815 age-5 fish.

- *SRWC*. The forecast of age-3 escapement absent fishing is 5,971, which is less than the 2021 forecast of 9,063.

Key Chinook salmon management objectives shaping the Alternatives south of Cape Falcon are:

- A KRFC age-4 ocean harvest rate of no greater than 10.0 percent (NMFS guidance).

- A KRFC natural area spawner escapement of at least 38,180 adults, which is produced, in expectation, by a maximum exploitation rate of 25.0 percent (FMP control rule).

- A SRFC hatchery and natural area spawner escapement of at least 180,000 adults (Council guidance).

- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant stocks 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 2022 is 0.25, 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 overfished condition;
- Whether the stock is currently overfished;
- Other considerations as appropriate".

The Salmon Technical Team has assessed each of these circumstances, with the exception of minimal needs for Tribal fisheries.

Potential for low spawner abundance
The potential for critically low natural spawner abundance could be considered moderate. The 2022 minimum natural-area spawner escapement of 38,180 adults is greater than the minimum stock size threshold (MSST; 30,525). A natural-area escapement of 38,180 adults would represent the 25th lowest value over the past 44 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 38,180 adults in 2022. The 720-adult 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 0.14.

Recent spawner abundance
The natural-area adult spawner escapement has been lower than MSST in six of the last ten years and four of the last five years. The 2022 forecast of natural-area spawners in the absence of fishing is 50,906 adults, which is above the maximum sustainable yield spawner escapement (S_{MSY}; 40,700). If fishing seasons are structured such that the maximum allowable exploitation rate of 25 percent is met, the natural-area adult spawner expectation is 38,180, which is larger than the MSST but below S_{MSY}.

Comingled stocks
With regard to co-mingled stocks, Sacramento River fall Chinook have a moderate abundance forecast and is likely to be less constraining to fisheries than KRFC in 2022.

Environmental indicators
Indicators of marine and freshwater conditions provided in the California Current Integrated Ecosystem Assessment (CCIEA) California Current Ecosystem Status Report for 2022 suggest a mixed assessment of marine and freshwater conditions that could affect KRFC. Table J.2.3 in the CCIEA report displays "stoplight" indicators including adult abundance, incubation, freshwater residence, hatchery releases, and marine indicators relevant to KRFC abundance. The number of adult spawners in years 2018 and 2019 (age-4 and age-3 in 2022, respectively) were moderate and low, respectively. Brood year 2018 progeny experienced mostly average conditions during incubation and freshwater residence, while brood year 2019 progeny encountered a mixture of conditions in freshwater but generally poor freshwater residence conditions. Ocean indicators suggested poor conditions for brood year 2018 and mixed conditions for brood year 2019. Overall, stoplight indicators suggest that the KRFC broods that will make up the bulk of the adult abundance in 2022 experienced mixed conditions in marine and freshwater habitats.

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 2022.

Descriptions pertaining to the achievement of key objectives for Chinook salmon management south of Cape Falcon are found below.

- *SRFC*. Council guidance for a minimum of 180,000 hatchery and natural area adult spawners is met by each of the Alternatives.

- *KRFC*. The control rule-defined minimum of 38,180 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 2022 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.

- *SRW fall Chinook*. SRW Chinook will not constrain ocean fisheries south of Cape Falcon in 2022.

Each of the Alternatives for Chinook fisheries south of Cape Falcon satisfies NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for relevant Chinook stocks (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 populations. 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 2022 are:

- *Oregon Production Index (OPI) Hatchery coho.* The forecast for hatchery coho from the Columbia River and the coast south of Cape Falcon of 1,003,500 is lower than the 2021 forecast of 1,607,900. The Columbia River early coho forecast is 592,500 compared to the 2021 forecast of 1,014,000, and the Columbia River late coho forecast is 404,700 compared to the 2021 forecast of 576,000.
- *OCN coho.* The OCN forecast is 222,400 compared to the 2021 forecast of 125,000.
- *LCN coho.* The LCN forecast is 65,700 compared to the 2021 forecast of 39,200.
- *Puget Sound coho.* Among Puget Sound natural stocks, Strait of Juan de Fuca coho are in the critical category. Snohomish, and Hood Canal coho are in the low category, and Skagit and 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 most Washington coastal coho stocks are higher compared to 2021. 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 stocks include Central California Coast coho (south of the Oregon/California border), SONCC coho, OCN coho, and LCN coho. The maximum allowable exploitation rates for 2022 are: (1) a combined marine/freshwater exploitation rate not to exceed 15.0 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 2022; these stocks contribute to fisheries off Washington. Forecasts for some Puget Sound and Interior Fraser coho stocks in 2022 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 2022 projected marine impacts are combined with 2021 modeled impacts for mainstem Columbia River fisheries. In-river fisheries have yet to be shaped for 2022. Marine exploitation rates projected for the 2022 Alternatives range from 14.2 percent to 11.1 percent.
- *Queets natural coho.* The FMP MSY adult spawner objective for Queets natural coho is 5,800; projected ocean escapement values for the 2022 Alternatives range from 15,000 to 15,700. The preseason ocean age 3 forecast for Queets natural coho is 18,200.
- *Interior Fraser coho*. The Southern U.S. exploitation rate is less than the 10.0 percent limit required by the PST Southern Coho Management Plan in all Alternatives when 2022 projected marine impacts are combined with the 2021 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 are less than the maximum allowed under the FMP matrix in all Alternatives when 2022 projected marine impacts are combined with the 2021 preseason modeled impacts for Puget Sound fisheries. Snohomish coho, recently designated as overfished, currently meets the criteria for 'not overfished/rebuilding' status. As part of the rebuilding plan, a buffered S_{MSY} is in place, which increases the abundance breakpoint between low/normal status. For 2022, the abundance forecast is below the low/normal breakpoint, limiting the total exploitation rate to 40 percent. 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.

All of the Alternatives for coho fisheries satisfy NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for relevant coho stocks other than those listed above (Table 5).

8.1.3 Pink Salmon

Pink salmon runs occur in odd-numbered years in waters under Council jurisdiction and will not be an important management consideration in 2022.

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 actual PST limits on Canadian 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 2022 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 (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 Alternatives I and II when combined with projections for Canadian AABM Chinook fisheries and preliminary 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 2021 Ocean Salmon Fisheries (PFMC 2022b) 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 exvessel 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 2021 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 2021 fishery indicate the expected short-term impact of the Alternative compared with taking no action, (i.e., if 2021 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, they are likely to indicate losses to the community's businesses and individuals that depend on that 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.

Exvessel 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, 2021 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 in the California KMZ region), Fort Bragg region and south of Pigeon Point (Monterey region); and (5) caught south of Pigeon Point to landing ports in the San Francisco 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 as this fishery is not expected to be prosecuted in 2022. These total harvest estimates combined with the prior year's average Chinook weights per fish and exvessel 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 2021 was approximately two percent above the prior year and three percent above the recent five-year average; while coastwide average Chinook exvessel prices in 2021 were six percent above the prior year but five percent below the recent five-year average in inflation-adjusted terms. If this year's actual average weight 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 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 as this fishery is not expected to be prosecuted in 2022. 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, overall coastwide community personal income impacts from commercial salmon fisheries are projected to be 26 percent below last year's (2021) level and slightly above the recent (2017-2021) inflation-adjusted average. Coastwide income impacts from recreational fishing are projected to be 63 percent above last year's level and 82 percent above the 2017-2021 inflation-adjusted average.

Commercial fishery income impacts north of Cape Falcon are projected to be 106 percent above last year and 96 percent above the 2017-2021 inflation-adjusted average.

South of Cape Falcon, overall commercial fishery income impacts are projected to fall below last year's level by 38 percent and below the 2017-2021 inflation-adjusted average by 13 percent. A mix of

commercial fishery income impacts are projected for areas south of Cape Falcon, with areas between Cape Falcon and Humbug Mountain and between Humbug Mountain and the Oregon/California border projected to see increases of 190 percent and 76 percent, respectively, compared with last year. However, all areas in California would see projected decreases ranging from 16 percent to 69 percent compared with last year. While areas between the Oregon/California border and 40º10' N. Lat. (California KMZ) would be closed to commercial fishing, deliveries from catch areas to the south are projected to result in income impacts in ports in the region 16 percent lower compared with last year, but 22 percent above the 2017-2021 inflation-adjusted average. The greatest decrease compared with last year in percentage terms (69 percent) is projected for the area between Point Arena and Pigeon Point. Areas south of Cape Falcon would see projected changes in commercial fishery income impacts compared to the 2017-2021 inflation-adjusted average ranging from an increase of 232 percent (Cape Falcon to Humbug Mountain) to a decrease of 59 percent (Point Arena to Pigeon Point).

Income impacts from recreational fisheries north of Cape Falcon are projected to be 191 percent above last year and 224 percent above the 2017-2021 inflation-adjusted average.

Overall recreational fishery income impacts south of Cape Falcon are projected to be 14 percent above last year and 27 percent above the 2017-2021 inflation-adjusted average. Recreational income impacts are projected be above last year's levels and the 2017-2021 inflation-adjusted average in all four areas in California, but below last year' levels in the areas between Cape Falcon and Humbug Mountain and between Humbug Mountain and the Oregon/California border by 17 percent and by 61 percent, respectively. Projected increases in recreational fishery income impacts compared with last year for areas in California range from eight percent for the area south of Pigeon Point to 353 percent for areas between the Oregon/California border and 40º10' N. Lat. (California KMZ).

Under Alternative I overall coastwide income impacts for combined non-Indian commercial and recreational ocean salmon fisheries are projected to be 16 percent above last year's level and 42 percent above the 2017-2021 inflation-adjusted average. Combined income impacts north of Cape Falcon are projected to be 168 percent above last year's level and 186 percent above the 2017-2021 inflation-adjusted average. In aggregate, combined income impacts south of Cape Falcon are projected to be 17 percent below last year's level but six percent above the 2017-2021 inflation-adjusted average. Combined income impacts are projected to be below last year's levels in four of the six areas south of Cape Falcon, ranging from decreases of nine percent for areas between Humbug Mountain and Oregon/California border, to 38 percent between Point Arena and Pigeon Point. Increases in combined income impacts compared with last year are projected for Cape Falcon to Humbug Mountain (51 percent) and Oregon/California border and 40º10' N. Lat. (California KMZ) (123 percent). Compared with the 2017-2021 inflation-adjusted average, reductions are projected for the areas between Humbug Mountain and the Oregon/California border and between Point Arena and Pigeon Point, but all other areas south of Cape Falcon are projected to see increases ranging from 35 percent south of Pigeon Point to 106 percent (Cape Falcon to Humbug Mountain).

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 2021 allocation of 40,000 Chinook and 26,500 coho.

8.2.2 Alternative II

Under Alternative II, overall coastwide community personal income impacts from commercial salmon fisheries are projected to be 30 percent below last year's (2021) level and five percent below the recent (2017-2021) inflation-adjusted average. Coastwide income impacts from recreational fishing are projected to be 51 percent above last year's level and 69 percent above the 2017-2021 inflation-adjusted average.

Commercial fishery income impacts north of Cape Falcon are projected to be 88 percent above last year and 79 percent above the 2017-2021 inflation-adjusted average.

South of Cape Falcon, overall commercial fishery income impacts are projected to fall below last year's level by 41 percent and below the 2017-2021 inflation-adjusted average by 17 percent. Compared with last year's levels, all areas north of Oregon/California border are projected to see increases in commercial fishery income impacts and all areas to the south of the boarder are projected to see decreases. The areas between Cape Falcon and Humbug Mountain and between Humbug Mountain and the Oregon/California border are projected to see increases compared with last year of 120 percent and 10 percent, respectively. Decreases in commercial fisheries income impacts are projected for all four areas in California, ranging from reductions of 19 percent south of Pigeon Point to 80 percent for areas between 40º10' N. Lat. and Point Arena. Although areas between the Oregon/California border and 40º10' N. Lat. (California KMZ) would be closed to commercial fishing, deliveries from catch areas to the south are projected to result in decreases in income impacts to ports in the region of 54 percent compared with last year and 33 percent compared with the 2017-2021 inflation-adjusted average.

All areas south of Cape Falcon except areas between Cape Falcon and Humbug Mountain and areas south of Pigeon Point are projected to see reductions in commercial fishery income impacts compared to the 2017-2021 inflation-adjusted average, ranging from decreases of four percent (Humbug Mountain to the Oregon/California border) to 44 percent (Point Arena to Pigeon Point). For the south of Cape Falcon areas projected to have increases in commercial fishery income impacts compared to the 2017-2021 inflation-adjusted averages, the projected increases are two percent (south of Pigeon Point) and 151 percent (Cape Falcon to Humbug Mountain).

Projected income impacts from recreational fisheries north of Cape Falcon are 158 percent above last year and 187 percent above the 2017-2021 inflation-adjusted average.

Overall recreational fishery income impacts south of Cape Falcon are projected to be 10 percent above last year and 23 percent above the 2017-2021 inflation-adjusted average. Recreational income impacts are projected be above last year's level in five of the six areas south of Cape Falcon, with projected increases ranging from six percent in areas between Humbug Mountain and the Oregon/California border to 385 percent between the Oregon/California border and 40º10' N. Lat. (California KMZ). A decrease of 22 percent compared with last year is projected between for areas between Cape Falcon and Humbug Mountain.

Recreational income impacts are projected to be above the 2017-2021 inflation-adjusted average in all areas south of Cape Falcon, with increases ranging from less than one percent for areas between Point Arena and Pigeon Point to 161 percent for areas between the Oregon/California border and 40º10' N. Lat. (California KMZ).

Under Alternative II overall coastwide income impacts for combined non-Indian commercial and recreational salmon fisheries are projected to be eight percent above last year's level and 33 percent above the 2017-2021 inflation-adjusted average. Combined income impacts north of Cape Falcon are projected to be 139 percent above last year's level and 155 percent above the 2017-2021 inflation-adjusted average. In aggregate, combined income impacts south of Cape Falcon are projected to be 20 percent below last year's level but two percent above the 2017-2021 inflation-adjusted average. Combined income impacts are projected to be below last year's levels in three of the six areas south of Cape Falcon, ranging from reductions of four percent south of Pigeon Point to 53 percent between 40º10' N. Lat. and Point Arena. The other three areas south of Cape Falcon are projected to see increases compared with last year in combined income impacts ranging from seven percent (Humbug Mountain and the Oregon/California border) to 112 percent (Oregon/California border to 40º10' N. Lat.). Compared with the 2017-2021 inflation-adjusted

average all areas are projected to see increases in combined income impacts, except a reduction of 25 percent is projected in the area between Point Arena and Pigeon Point.

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 2021 allocation of 40,000 Chinook and 26,500 coho.

8.2.3 Alternative III

Under Alternative III, overall coastwide community personal income impacts from commercial salmon fisheries are projected to be 26 percent below last year's (2021) level and one percent below the recent (2017-2021) inflation-adjusted average. Coastwide income impacts from recreational fishing are projected to be 34 percent above last year's level and 50 percent above the 2017-2021 inflation-adjusted average.

Commercial fishery income impacts north of Cape Falcon are projected to be 66 percent above last year and 58 percent above the 2017-2021 inflation-adjusted average.

South of Cape Falcon, overall commercial fishery income impacts are projected to fall below last year's level by 35 percent and below the 2017-2021 inflation-adjusted average by nine percent. All areas north of Oregon/California border are projected to see increases in commercial fishery income impacts compared with last year's levels. Decreases in commercial fisheries income impacts are projected for all four areas in California, ranging from reductions of 11 percent south of Pigeon Point to 93 percent for areas between 40º10' N. Lat. and Point Arena. Although areas between the Oregon/California border and 40º10' N. Lat. (California KMZ) would be closed to commercial fishing, deliveries from catch areas to the south are projected to result in income impacts in ports in the region that are 71 percent lower than last year and 58 percent below the 2017-2021 inflation-adjusted average. The areas between Cape Falcon and Humbug Mountain and between Humbug Mountain and the Oregon/California border are projected to see increases compared with last year of 151 percent and 128 percent, respectively. These two areas are also projected to see increases compared with the 2017-2021 inflation-adjusted average of 187 percent and 99 percent, respectively.

All areas in California except areas south of Pigeon Point would see projected reductions in commercial fishery income impacts compared with the 2017-2021 inflation-adjusted average, ranging from decreases of 37 percent (Point Arena to Pigeon Point) to 79 percent (40º10' N. Lat. and Point Arena). The area south of Pigeon Point would see a projected increase in commercial fishery income impacts compared to the 2017-2021 inflation-adjusted average of 12 percent.

Income impacts from recreational fisheries north of Cape Falcon are projected to be 123 percent above last year and 149 percent above the 2017-2021 inflation-adjusted average.

Overall recreational fishery income impacts south of Cape Falcon are projected to be slightly below last year's level but 11 percent above the 2017-2021 inflation-adjusted average. Recreational income impacts are projected be above last year's level in four of the six areas south of Cape Falcon, with projected increases ranging from seven percent for areas south of Pigeon Point to 93 percent for areas between the Oregon/California border and 40º10' N. Lat. (California KMZ) and between 40º10' N. Lat. and Point Arena. Decreases in recreational income impacts compared with last year of 47 percent and 37 percent are projected for areas between Cape Falcon and Humbug Mountain and between Humbug Mountain and the Oregon/California border, respectively.

Recreational income impacts are projected be above the 2017-2021 inflation-adjusted average in three of the six areas south of Cape Falcon, with increases ranging from four percent for areas between the

Oregon/California border and 40º10' N. Lat. (California KMZ) to 130 percent for areas between 40º10' N. Lat. and Point Arena. Reductions in recreational income impacts compared with the 2017-2021 inflation-adjusted average are projected for the remaining three areas south of Cape Falcon, ranging from three percent for areas between Point Arena and Pigeon Point to 23 percent for areas between Humbug Mountain and the Oregon/California border.

Under Alternative III overall coastwide income impacts for combined non-Indian commercial and recreational salmon fisheries are projected to be two percent above last year's level and 25 percent above the 2017-2021 inflation-adjusted average. Combined income impacts north of Cape Falcon are projected to be 108 percent above last year's level and 122 percent above the 2017-2021 inflation-adjusted average. In aggregate, combined income impacts south of Cape Falcon are projected to be 21 percent below last year's level but slightly above the 2017-2021 inflation-adjusted average. Combined income impacts are projected to be below last year's levels in four of the six areas south of Cape Falcon, ranging from reductions of one percent south of Pigeon Point to 55 percent between 40º10' N. Lat. and Point Arena. Combined income impacts are projected to be below the 2017-2021 inflation-adjusted average in two areas, i.e., between the Oregon/California border and 40º10' N. Lat. (California KMZ) (20 percent) and between Point Arena and Pigeon Point (22 percent).

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 2021 allocation of 40,000 Chinook and 26,500 coho.

8.2.4 Summary of Impacts on the Socioeconomic Environment

The commercial salmon fishery Alternatives are projected to generate coastwide income impacts below last year's (2021) levels, ranging from reductions of 26 percent under Alternatives I and III to 30 percent under Alternative II. These levels also represent projected changes relative to the recent (2017-2021) inflation-adjusted averages ranging from a slight increase under Alternative I, a slight decrease under Alternative III to a reduction of five percent under Alternative II.

North of Cape Falcon, commercial salmon fisheries income impacts are projected to be above last year and the 2017-2021 inflation-adjusted average under all three Alternatives. With respect to the area south of Cape Falcon, compared with last year, all areas in California would see decreases under all three Alternatives, while the areas between Cape Falcon and Humbug Mountain and between Humbug Mountain and the Oregon/California border would see projected increases under all three Alternatives. The area from the Oregon/California border to 40º10' N. Lat. (California KMZ) would be closed to commercial fishing under all three Alternatives, although some landings to ports in the region from catch areas to the south is expected.

Compared with the other Alternatives, projections for Alternative I show the least negative overall, coastwide commercial fisheries impacts, and the most positive or least negative commercial fisheries income impacts for four of the seven management areas: North of Cape Falcon, Cape Falcon to Humbug Mountain, Oregon/California border to 40º10' N. Lat. (California KMZ), and 40º10' N. Lat. to Point Arena. Projections for Alternative II include the most negative commercial fisheries income impacts coastwide and overall south of Cape Falcon, and also the least positive commercial fisheries income impacts for two of the seven management areas: Cape Falcon to Humbug Mountain, and Humbug Mountain to the Oregon/California border. Projections for Alternative III include the least negative commercial fisheries income impacts overall south of Cape Falcon, and the most positive or least negative commercial fisheries income impacts for three areas: Humbug Mountain to the Oregon/California border, Point Arena to Pigeon Point and south of Pigeon Point.

Total coastwide income impacts from recreational salmon fisheries are projected to be above last year's (2021) levels by 34 percent under Alternative III, by 51 percent under Alternative II and by 63 percent under Alternative I. Compared with the 2017-2021 inflation-adjusted average, coastwide recreational fishery income impacts are projected to increase under all three Alternatives: by 50 percent under Alternative III, 69 percent under Alternative II and by 82 percent under Alternative I. Compared with last year, five management areas would see projected increases in recreational fishery income impacts under all three Alternatives: north of Cape Falcon, the Oregon/California border to 40º10' N. Lat. (California KMZ), 40º10' N. Lat. to Point Arena, Point Arena to Pigeon Point, and south of Pigeon Point. Cape Falcon to Humbug Mountain is the only area projected to see decreases in recreational fisheries income impacts compared with last year under all three Alternatives. Humbug Mountain to the Oregon/California border would see decreases under Alternatives I and III, but an increase under Alternative II (6 percent relative to last year).

Compared with the 2017-2021 inflation-adjusted average, six of the seven areas are projected to see increases in recreational fishery income impacts under Alternative I (i.e., all areas except Humbug Mountain to the Oregon/California border), and all seven areas are projected to see increases in recreational fishery income impacts under Alternative II. Under Alternative III, four of seven areas would see projected increases in recreational fishery income impacts relative to the 2017-2021 inflation-adjusted average: north of Cape Falcon, the Oregon/California border to 40º10' N. Lat. (California KMZ), 40º10' N. Lat. to Point Arena, and south of Pigeon Point.

Total coastwide income impacts from combined non-Indian commercial and recreational salmon fisheries are projected to be above last year's (2021) levels under all three Alternatives: by two percent under Alternative III, eight percent under Alternative II and by 16 percent under Alternative I. Three of the seven management areas (40º10' N. Lat. to Point Arena, Point Arena to Pigeon Point, and south of Pigeon Point) plus the region south of Cape Falcon overall are projected to see decreases in combined commercial and recreational salmon fishery income impacts compared with last year under all three Alternatives. The areas north of Cape Falcon and between Cape Falcon and Humbug Mountain are projected to see increases compared with last year in combined coastwide income impacts under all three Alternatives. The area from Humbug Mountain to the Oregon/California border is projected to see decreases compared with last year under Alternative I but increases under Alternative II and III. The area from the Oregon/California border to 40º10' N. Lat. is projected to see decreases compared with last year under Alternative III but increases under Alternative I and II.

Combined coastwide income impacts are projected to be above the 2017-2021 inflation-adjusted average under all three Alternatives: by 25 percent under Alternative III, 33 percent under Alternative II and by 42 percent under Alternative I. Only one of the seven management areas (Point Arena to Pigeon Point) is projected to see a decrease in combined commercial and recreational salmon fishery income impacts compared with the 2017-2021 inflation-adjusted average under all three Alternatives. Regarding other areas showing projected decreases relative to the 2017-2021 inflation-adjusted average, under Alternative I Point Arena to Pigeon Point would be joined by Humbug Mountain to the Oregon/California border, and under Alternative III Point Arena to Pigeon Point would be joined by Oregon/California border to 40º10' N. Lat. (California KMZ) in showing projected decreases in combined commercial and recreational salmon fishery income impacts compared with the 2017-2021 inflation-adjusted average.

Under the three 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 2021 actual allocation of 40,000 Chinook and 26,500 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 2022 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 2022 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 2022 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 2022 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 2022 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 the most current 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 abundance threshold. Based on these developments, the Council is following the process outlined in Amendment 21 to the FMP and will review this information prior to determining whether an update to the threshold is necessary. Given the time needed for these reviews, an update to the threshold for 2022 planning is unlikely.

As mentioned above, the annual management measures for Council salmon fisheries are developed to be consistent with all ESA BOs. In 2022, the projected pre-fishing Chinook abundance in the north of Cape Falcon area is 1,316,100, which is greater than the threshold value of 966,000, as identified in Amendment 21 of the FMP (Table 5).[2]

[2] This pre-fishing abundance is also above the preliminary assessments of thresholds associated with the new information under consideration by the Council consistent with Amendment 21 (Agenda Item D.4.a, Supplemental STT Report 2 and Agenda Item D.3.b Supplemental NMFS Presentation 1, March 2022.

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.

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 2022 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 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" 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 2022 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 2022a) 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 2022 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 15-22, 2021:	**Pacific Fishery Management Council meeting**, via webinar.
January 21, 2022:	**Pacific Fishery Management Council meeting**, via webinar.
January 18-21, 2022:	**Salmon Technical Team meeting (Review preparation)**, on-line.
February 10:	California Fish and Game Commission meeting, on-line.
February 22-25:	**Salmon Technical Team meeting(Preseason Report I preparation)**, on-line.
March 2:	California Department of Fish and Wildlife public meeting, on-line.
February 28:	Oregon Ocean Salmon public meeting, on-line.
March 4 :	Washington Department of Fish and Wildlife public meeting, on-line.
March 8-14:	**Pacific Fishery Management Council meeting**, hybrid meeting in San Jose, CA and via webinar.
March 16:	North of Falcon 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, on-line.
March 18:	Oregon Fish and Wildlife Commission meeting, on-line.
March 22-23:	**Public hearings on management options,** on-line meetings with focused discussions in Washington; Oregon; California.
March 30	North of Falcon, Puget Sound forum meeting, on-line.
April 1	North of Falcon, Ocean fisheries and Columbia River fisheries meeting, on-line.
April 8-13:	**Pacific Fishery Management Council meeting**, Hybrid meeting in Seattle, WA and via webinar.
April 20-21:	California Fish and Game Commission meeting, on-line.
April 22	Oregon Fish and Wildlife Commission meeting, on-line.

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

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PFMC. 2022a. Review of 2021 ocean salmon fisheries. Pacific Fishery Management Council, Portland, Oregon.

PFMC. 2022b. Preseason Report I: Stock abundance analysis and environmental assessment part 1 for 2022 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. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council adopted. **(**Page 1 of 14)

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-2214, Chinook 1322	Model #: Coho-2215, Chinook 1422	Model #: Coho-2216, Chinook 1522
1. Overall non-Indian TAC: 65,000 Chinook and 210,000 coho marked with a healed adipose fin clip (marked).	1. Overall non-Indian TAC: 60,000 Chinook and 185,000 coho marked with a healed adipose fin clip (marked).	1. Overall non-Indian TAC: 53,000 Chinook and 160,000 coho marked with a healed adipose fin clip (marked).
2. Non-Indian commercial troll TAC: 32,500 Chinook and 33,600 marked coho.	2. Non-Indian commercial troll TAC: 30,000 Chinook and 29,600 marked coho.	2. Non-Indian commercial troll TAC: 26,500 Chinook and 25,600 marked coho.
3. Trade: May be considered at the April Council meeting.	3. Trade: Same as Alternative 1.	3. Trade: Same as Alternative 1.
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.	4. Same as Alternative 1.	4. Same as Alternative 1.

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 2 of 14)		
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-2214, Chinook 1322	Model #: Coho-2215, Chinook 1422	Model #: Coho-2216, Chinook 1522
U.S./Canada Border to Cape Falcon • May 1-15. See 2021 management measures, which are subject to inseason action and the 2022 season described below. • May 16 through the earlier of June 29, or 21,500 Chinook. No more than 7,210 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 5,790 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 100 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 100 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 30, 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** • May 1-15. See 2021 management measures, which are subject to inseason action and the 2022 season described below. • May 16 through the earlier of June 29, or 20,000 Chinook. No more than 6,710 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 5,380 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8). Same as Alternative 1 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.) (C.1, C.6). In the area between Leadbetter Pt. and Cape Falcon landing and possession limit of 60 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6). Same as Alternative 1 Same as Alternative 1 In 2023, same as Alternative 1	**U.S./Canada Border to Cape Falcon** • May 1-15. See 2021 management measures, which are subject to inseason action and the 2022 season described below. • May 16 through the earlier of June 29, or 13,250 Chinook. No more than 4,450 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 3,560 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8). Open five days per week (Fri.-Tues.) (C.1). 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.) (C.1, C.6). In the area between Leadbetter Pt. and Cape Falcon the landing and possession limit is 50 Chinook per vessel per open period (Fri-Tues.) (C.1, C.6). Same as Alternative 1 Same as Alternative 1 In 2023, same as Alternative 1

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 3 of 14)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
U.S./Canada Border to Cape Falcon • July 1 through the earlier of September 30, or 11,000 Chinook or 33,600 coho (C.8).	**U.S./Canada Border to Cape Falcon** • July 1 through the earlier of September 30, or 10,000 Chinook or 29,600 coho (C.8).	**U.S./Canada Border to Cape Falcon** • July 1 through the earlier of September 30, or 13,250 Chinook or 25,600 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 1, except open five days per week (Fri.-Tues.) (C.1).	Same as Alternative 1
Landing and possession limit of 150 marked coho per vessel per landing week (Thurs.-Wed.) (C.1).	Landing and possession limit of 100 marked coho per vessel per landing week (Thurs.-Wed.) (C.1).	Landing and possession limit of 50 marked coho per vessel per open period (Fri.-Tues.) (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.	Same as Alternative 1	Same as Alternative 1 **In 2022**, vessels may not land any species of fish east of Port Angeles.
Vessels may not land fish east of the Sekiu River or east of the Megler-Astoria bridge.	Same as Alternative 1	For delivery to Washington ports east of the Sekiu River, vessels must notify WDFW at 360-249-1215 prior to crossing the Bonilla-Tatoosh line with area fished, total Chinook, coho and halibut catch aboard, and destination with approximate time of delivery. **In 2023**, vessels may not land any species of fish east of the Sekiu River.

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 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 N. of Cape Falcon and being delivered by boat to Garibaldi must meet the minimum legal length of 28" 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).

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 4 of 14)		
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 199,881 hatchery and natural area adults.	1. Sacramento River fall Chinook spawning escapement of 199,662 hatchery and natural area adults.	1. Sacramento River fall Chinook spawning escapement of 197,756 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 49.6%.	2. Sacramento Index exploitation rate of 49.6%.	2. Sacramento Index exploitation rate of 50.1%.
3. Klamath River recreational fishery allocation: 2,152 adult Klamath River fall Chinook.	3. Klamath River recreational fishery allocation: 2,125 adult Klamath River fall Chinook.	3. Klamath River recreational fishery allocation 2,546 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 9,415 adult Klamath River fall Chinook.	4. Klamath tribal allocation: 9,375 adult Klamath River fall Chinook.	4. Klamath tribal allocation: 9,224 adult Klamath River fall Chinook.
5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 64.9% / 35.1%.	5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 63.6% / 36.4%.	5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 61.2% / 38.8%.
6. Overall commercial troll coho TAC: NA.	6. Overall commercial troll coho TAC: 10,000 coho marked with a healed adipose fin clip (marked),	6. Overall commercial troll coho TAC: NA.
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.	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.	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.

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 5 of 14)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Cape Falcon to Heceta Bank Line • March 15-May 15; • May 16-31; • June 1-30; • July 15-31; • August 1-8; • September 1-October 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.).	**Cape Falcon to Heceta Bank Line** • March 15-May 15; • May 16-31; • June 1-15; 21-27 • July 22-31; • September 1-October 31 (C.9.a). Same as Alternative 1 Beginning September 1, no more than 75 Chinook allowed per vessel per landing week (Thurs.-Wed.). • July 22 through the earlier of July 31, or Cape Falcon to Humbug Mt. quota of 10,000 marked coho. All salmon, all retained coho must be marked with a healed adipose fin clip (C.4, C.7). 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. Salmon trollers may take and retain or possess on board a fishing vessel no more than 50 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. 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).	**Cape Falcon to Heceta Bank Line** • March 15-April 30; • May 23-31; • June 15-30; • July 6-10, 19-30; • August 2-11; • September 1-October 31 (C.9.a). Same as Alternative 1 Beginning September 1, no more than 75 Chinook allowed per vessel per landing week (Thurs.-Wed.).
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.	In 2023, Same as Alternative 1	In 2023, Same as Alternative 1

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 6 of 14)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Heceta Bank Line – Humbug Mt. • May 1-15; • May 16-31; • August 1-8; • September 1-October 31 (C.9.a).	**Heceta Bank Line – Humbug Mt.** • May 1-15; • May 16-31; • June 1-15; 21-27 • July 22-31; • September 1-October 31 (C.9.a).	**Heceta Bank Line – Humbug Mt.** • May 1-14; • August 2-11; • September 1-October 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).	Same as Alternative 1	Same as Alternative 1
Beginning September 1, no more than 100 Chinook allowed per vessel per landing week (Thurs.-Wed.).	Beginning September 1, no more than 75 Chinook allowed per vessel per landing week (Thurs.-Wed.). • July 22 through the earlier of July 31, or Cape Falcon to Humbug Mt. quota of 10,000 marked coho. All salmon, all retained coho must be marked with a healed adipose fin clip (C.4, C.7). 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. Salmon trollers may take and retain or possess on board a fishing vessel no more than 50 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. 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 September 1, no more than 75 Chinook allowed per vessel per landing week (Thurs.-Wed.).
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.	In 2023, Same as Alternative 1	In 2023, Same as Alternative 1

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – **Council adopted**. (Page 7 of 14)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
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).	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • March 15-April 30; • June 1-30, or the earlier of 550 Chinook quota; • July 1-31, or the earlier of 200 Chinook quota (C.9.a).	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • March 15-May 14; • May 23-31; • June 1-30, or the earlier of 800 Chinook quota; • July 1-31, or the earlier of 500 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.	Same as Alternative 1	Same as Alternative 1
June 1-August 28 weekly landing and possession limit of 50 Chinook per vessel per week (Thurs.-Wed.).	June 1-July 31 weekly landing and possession limit of 20 Chinook per vessel per week (Thurs.-Wed.).	June 1-July 31 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).	Same as Alternative 1	Same as Alternative 1
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.	All vessels fishing in this area during June and July, 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.	Same as Alternative 1
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.	Same as Alternative 1	Same as Alternative 1
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.	In 2023, same as Alternative 1	In 2023, same as Alternative 1

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 8 of 14)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
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. 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.	**OR/CA Border to Humboldt South Jetty (California KMZ)** • Closed In 2023, same as Alternative 1	**OR/CA Border to Humboldt South Jetty (California KMZ)** • Closed In 2023, same as Alternative 1
Humboldt South Jetty to Latitude 40°10' N. • Closed.	**Humboldt South Jetty to Latitude 40°10' N.** • Closed.	**Humboldt South Jetty to Latitude 40°10' N.** • Closed.
Latitude 40°10' N. to Point Arena (Fort Bragg) • July 1-10; • August 1-10; • September 1-30 (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.	**Latitude 40°10' N. to Point Arena (Fort Bragg)** • August 1-10; • September 1-30 (C.9.b). Same as Alternative 1 Same as Alternative 1 In 2023, same as Alternative 1	**Latitude 40°10' N. to Point Arena (Fort Bragg)** • Closed In 2023, same as Alternative 1
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 Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 9 of 14)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Pt. Arena to Pigeon Pt. (San Francisco) • July 1-10; • August 1-10; • September 1-30 (C.9.b).	**Pt. Arena to Pigeon Pt. (San Francisco)** • July 1-8; • August 1-12; • September 1-30 (C.9.b).	**Pt. Arena to Pigeon Pt. (San Francisco)** • July 1-11; • August 1-12; • 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).	Same as Alternative 1	Open seven days per week. All salmon except coho (C.4, C.7). Chinook minimum size limit of 28 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).	Same as Alternative 1	Same as Alternative 1
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.	In 2023, Same as Alternative 1	In 2023, Same as Alternative 1
Point Reyes to Point San Pedro (Fall Area Target Zone) • October 3-7, 10-14.	**Point Reyes to Point San Pedro (Fall Area Target Zone)** • Same as Alternative 1	**Point Reyes to Point San Pedro (Fall Area Target Zone)** • Same as Alternative 1
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).	Same as Alternative 1	Same as Alternative 1

TABLE 1. 2022 Commercial troll management Alternatives for non-Indian ocean salmon fisheries – Council adopted. (Page 10 of 14)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Pigeon Point to U.S./Mexico Border (Monterey) • May 1-15; • June 1-12; • July 1-10; • August 1-10 (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). 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.	**Pigeon Point to U.S./Mexico Border (Monterey)** • May 1-9; • May 23-31; • June 1-15; • July 1-8 (C.9.b). Same as Alternative 1 In 2023, same as Alternative 1	**Pigeon Point to U.S./Mexico Border (Monterey)** • May 1-12; • May 20-27; • June 1-15; • July 1-11; • August 1-12; (C.9.b). 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). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). All salmon must be landed in California (C.6). In 2023, same as Alternative 1

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 (Alt. 1 and Alt. 2)	27	20.5	-	-	27
Pt. Arena to Pigeon Pt. through August (Alt. 3)	28	21.5	-	-	28
Pt. Arena to Pigeon Pt. September-October	26	19.5	-	-	26
Pigeon Pt. to U.S./Mexico Border (Alt 1 and Alt. 2)	27	20.5	-	-	27
Pigeon Pt. to U.S./Mexico Border (Alt. 3)	28	21.5	-	-	28

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. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

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. *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.;
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 Halibut Harvest: License applications for incidental harvest for halibut during commercial salmon fishing must be obtained from IPHC.

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.

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 the Council adopted the following options for public review:

Option I - May 16, 2022 until the end of the 2022 salmon troll season, and April 1-May 15, 2023 , 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).
Option II - May 16, 2022 until the end of the 2022 salmon troll season, and April 1-May 15, 2023 , 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 30 halibut may be possessed or landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).
Option III - May 16, 2022 until the end of the 2022 salmon troll season, and April 1-May 15, 2023 , 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 25 halibut may be possessed or landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

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.

a. "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. At the March 2022 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2022.
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. NMFS may close fisheries through inseason action on the recommendation of the affected state(s) of Washington, Oregon or California where the recommendation to close is informed by an evaluation of actions or orders promulgated or issued by jurisdictions in these areas to address public health concerns related to COVID-19 concluding that these actions would likely make access to the fishery impracticable (e.g., restrictions on activities or closure of harbors, launch ramps and other forms of access) or would make information essential to manage and implement the fishery unavailable. NMFS should open fisheries closed on this basis through inseason action upon notice from the affected State(s) that said actions or orders making access to the fishery impracticable have been lifted and information essential to manage and implement the fishery would be available.

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. Source: 2018 West Coast federal salmon regulations.
https://www.govinfo.gov/content/pkg/FR-2018-05-01/pdf/2018-09164.pdf.

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.	Helliwell line	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.
Florence South Jetty, OR	44°00′54″ N lat.	Point San Pedro, CA	37°35′40″ N lat.
South end Heceta Bank line, OR	44°00′54″ N lat.	Pigeon Point, CA	37°11′00″ N lat.
Humbug Mountain, OR	43°58′00″ N lat.	Point Sur, CA	36°18′00″ N lat.
Oregon-California border	42°00′00″ N lat.	Point Conception, CA	34°27′00″ N lat.

TABLE 2. 2022 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council adopted. **(**Page 1 of 10)

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: 65,000 Chinook and 210,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 32,500 Chinook and 176,400 marked coho; all retained coho must be marked. 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. 4. Trade: 5. No Area 4B add-on fishery. 6. Buoy 10 fishery opens August 1 with an expected landed catch of 45,000 marked coho in August and September. 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: 60,000 Chinook and 185,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 30,000 Chinook and 155,400 marked coho; all retained coho must be marked. 3.Same as Alternative 1. 4. Trade: 5. Same as Alternative 1. 6. Buoy 10 fishery opens August 1 with an expected landed catch of 55,000 marked coho in August and September. 7. Same as Alternative I.	1. Overall non-Indian TAC: 53,000 Chinook and 160,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 26,500 Chinook and 134,400 marked coho; all retained coho must be marked. 3. Same as Alternative 1. 4. Trade: 5. Same as Alternative 1. 6. Buoy 10 fishery opens August 1 with an expected landed catch of 65,000 marked coho in August and September. 7. Same as Alternative I.
U.S./Canada Border to Cape Alava (Neah Bay) • June 18 through earlier of September 30, or 18,350 marked coho subarea quota, with a subarea guideline of 7,350 Chinook (C.5). 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). Beginning August 1, Chinook non-retention east of the Bonilla-Tatoosh line (C.4.a) during Council managed ocean fishery. See gear restrictions and definitions (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).	**U.S./Canada Border to Cape Alava (Neah Bay**) • June 25 through earlier of September 30, or 16,160 marked coho subarea quota, with a subarea guideline of 6,790 Chinook (C.5). Same as Alternative 1 Same as Alternative 1	**U.S./Canada Border to Cape Alava (Neah Bay**) • June 18 through earlier of September 18, or 13,980 marked coho subarea quota, with a subarea guideline of 6,000 Chinook (C.5). Same as Alternative 1 Same as Alternative 1

TABLE 2. 2022 Recreational management Alternatives for non-Indian ocean salmon fisheries – Council Adopted. (Page 2 of 10)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Cape Alava to Queets River (La Push Subarea) • June 18 through earlier of September 30, or 4,590 marked coho subarea quota, with a subarea guideline of 1,225 Chinook (C.5). 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). 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). • October 1 through earlier of October 9, or 125 Chinook quota (C.5) in the area north of 47°50'00 N. lat. and south of 48°00'00" N. lat. Open seven days per week. Chinook only, 1 chinook per day 1 (C.1).	**Cape Alava to Queets River (La Push Subarea)** • June 25 through earlier of September 30, or 4,040 marked coho subarea quota, with a subarea guideline of 1,240 Chinook (C.5). Same as Alternative 1 Same as Alternative 1	**Cape Alava to Queets River (La Push Subarea)** • June 18 through earlier of September 18, or 3,490 marked coho subarea quota, with a subarea guideline of 1,100 Chinook (C.5). Same as Alternative 1 Same as Alternative 1
Queets River to Leadbetter Point (Westport Subarea) • June 18 through earlier of September 30, or 65,260 marked coho subarea quota, with a subarea guideline of 14,530 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 (C.1). Chinook minimum size limit of 22 inches total length (B). See gear restrictions and definitions (C.2, C.3). 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).	**Queets River to Leadbetter Point (Westport Subarea)** • June 25 through earlier of September 30, or 57,500 marked coho subarea quota, with a subarea guideline of 13,410 Chinook (C.5). Same as Alternative 1 Same as Alternative 1	**Queets River to Leadbetter Point (Westport Subarea)** • June 26 through earlier of September 18, or 49,730 marked coho subarea quota, with a subarea guideline of 11,840 Chinook (C.5). 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 (C.1). Chinook minimum size limit of 22 inches total length (B). Same as Alternative 1

TABLE 2. 2022 Recreational management Alternatives for non-Indian ocean salmon fisheries – Council Adopted. (Page 3 of 10)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Leadbetter Point to Cape Falcon (Columbia River Subarea) • June 18 through earlier of September 30, or 88,200 marked coho subarea quota, with a subarea guideline of 9,270 Chinook (C.5).	**Leadbetter Point to Cape Falcon (Columbia River Subarea)** • June 25 through earlier of September 30, or 77,700 marked coho subarea quota, with a subarea guideline of 8,560 Chinook (C.5).	**Leadbetter Point to Cape Falcon (Columbia River Subarea)** • June 26 through earlier of September 18, or 67,200 marked coho subarea quota, with a subarea guideline of 7,560 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 (C.1). Chinook minimum size limit of 22 inches total length (B).	Same as Alternative 1	Same as Alternative 1
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 1	Same as Alternative 1

TABLE 2. 2022 Recreational management Alternatives for non-Indian ocean salmon fisheries – Council Adopted. (Page 4 of 10)

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**
8. Sacramento River fall Chinook spawning escapement of 199,881 hatchery and natural area adults. 9. Sacramento Index exploitation rate of 49.6%. 10. Klamath River recreational fishery allocation: 2,152 adult Klamath River fall Chinook. 11. Klamath tribal allocation: 9,415 adult Klamath River fall Chinook. 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. 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.	8. Sacramento River fall Chinook spawning escapement of 199,662 hatchery and natural area adults. 9. Sacramento Index exploitation rate of 49.6%. 10. Klamath River recreational fishery allocation: 2,125 adult Klamath River fall Chinook. 11. Klamath tribal allocation: 9,375 adult Klamath River fall Chinook. 5. Overall recreational coho TAC: 97,000 coho marked with a healed adipose fin clip (marked), and 18,000 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.	8. Sacramento River fall Chinook spawning escapement of 197,756 hatchery and natural area adults. 9. Sacramento Index exploitation rate of 50.1%. 10. Klamath River recreational fishery allocation 2,546 adult Klamath River fall Chinook. 11. Klamath tribal allocation: 9,224 adult Klamath River fall Chinook. 5. Overall recreational coho TAC: 95,000 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.
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 Humbug Mt.** • Same as Alternative 1 Same as Alternative 1 In 2023, same as Alternative 1	**Cape Falcon to Humbug Mt.** • March 15-May 15; • May 16-July 31; • September 1-October 31 (C.6) Same as Alternative 1 In 2023, same as Alternative 1
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 Alternatives for non-Indian ocean salmon fisheries – Council Adopted. (Page 5 of 10)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
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. All salmon, 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 non-selective coho quota from Cape Falcon to Humbug Mountain (C.5).	**Cape Falcon to OR/CA Border.** All-salmon mark-selective coho fishery: • June 25 through the earlier of August 21, or 97,000 marked coho quota (C.6). Same as Alternative 1 Same as Alternative 1	**Cape Falcon to Humbug Mt.** All-salmon mark-selective coho fishery: • June 25 through the earlier of August 31, or 95,000 marked coho quota (C.6). Open seven days per week. All salmon through July 31, then all salmon, EXCEPT closed to Chinook retention in August. 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). Same as Alternative 1
Cape Falcon to Humbug Mt. Non-mark-selective coho fishery: • September 3 through the earlier of September 30, or 20,000 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).	**Cape Falcon to Humbug Mt.** Non-mark-selective coho fishery: • September 6 through the earlier of September 30, or 18,000 non-mark-selective coho quota (C.6). Open days may be modified inseason. Same as Alternative 1	**Cape Falcon to Humbug Mt.** Non-mark-selective coho fishery: • September 10 through the earlier of September 30, or 17,000 non-mark-selective coho quota (C.6). Open days may be modified inseason. Same as Alternative 1
Humbug Mt. to OR/CA Border (Oregon KMZ) • May 21-June 27 (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).	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • July 1-August 19 (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 25-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).	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • June 25-July 31 (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).
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 Alternatives for non-Indian ocean salmon fisheries – Council Adopted. (Page 6 of 10)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
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.	**OR/CA Border to latitude 40°10' N. (California KMZ)** • May 1-15; • May 16-31; • July 1- 4; • August 1-31 (C.6). Same as Alternative 1 Same as Alternative 1 In 2023, same as Alternative 1	**OR/CA Border to latitude 40°10' N. (California KMZ)** • July 1-24 (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). Same as Alternative 1 In 2023, same as Alternative 1
Latitude 40°10' N. to Point Arena (Fort Bragg) • May 1-15; • May 16-31; • July 1-November 13 (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.	**Latitude 40°10' N. to Point Arena (Fort Bragg)** • May 1-15; • May 16-July 4; • July 22-October 31 (C.6). Same as Alternative 1 In 2023, same as Alternative 1	**Latitude 40°10' N. to Point Arena (Fort Bragg)** • May 1-September 30 (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). In 2023, same as Alternative 1

TABLE 2. 2022 Recreational management Alternatives for non-Indian ocean salmon fisheries – Council Adopted. (Page 7 of 10)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Point Arena to Pigeon Point (San Francisco) • April 2-May 15 (C.6).	**Point Arena to Pigeon Point (San Francisco)** • April 2-May 15 (C.6).	**Point Arena to Pigeon Point (San Francisco)** • April 2-30; • June 20-September 30 (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).	Same as Alternative 1	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; • July 1-November 13 (C.6).	• July 1-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).	Same as Alternative 1	
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.	In 2023, same as Alternative 1	In 2023, same as Alternative 1

TABLE 2. 2022 Recreational management Alternatives for non-Indian ocean salmon fisheries – Council Adopted. (Page 8 of 10)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
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.	**Pigeon Point to U.S./Mexico Border (Monterey)** • April 2-May 15; • 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 of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2023, same as Alternative 1	**Pigeon Point to U.S./Mexico Border (Monterey)** • April 2-May 15 (C.6). Same as Alternative 1 • May 16-October 2 (C.6). Same as Alternative 1 In 2023, same as Alternative 1.

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 . (Alt 1 and 2)	20	-	20
OR/CA Border to Pt. Arena . (Alt 3)	24	-	24
Pt. Arena to Pigeon Pt. (Alt. 3)	24	-	24
Pt. Arena to Pigeon Pt. through May 15 (Alt. 1 and Alt. 2)	24	-	24
Pt. Arena to Pigeon Pt. beginning May 16 (Alt. 1 and Alt. 2)	20	-	20
Pigeon Pt. to U.S./Mexico Border (Alt 2, and through May 15 in Alt 1 and Alt 3)	24	-	24
Pigeon Pt. to U.S./Mexico Border (beginning May 16 in Alt 1 and Alt 3)	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., California, 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.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 off shore); 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 3. 2022 Treaty Indian troll management Alternatives for ocean salmon fisheries – Council 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. 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 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.	1. Overall Treaty-Indian TAC: 40,000 Chinook and 52,000 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 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.	. Overall Treaty-Indian TAC: 30,000 Chinook and 42,000 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 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 25,000 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 25,000 Chinook quota, or 62,00 coho quota. All Salmon. See size limit (B) and other restrictions (C).	• May 1 through the earlier of June 30 or 20,000 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 20,000 Chinook quota or 52,000 coho quota All salmon. See size limit (B) and other restrictions (C).	• May 1 through the earlier of June 30 or 15,000 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 15,000 Chinook quota or 42,000 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 2022 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. 2022 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)	21,500	20,000	13,250	-	-	-
U.S./Canada Border to Cape Falcon (All Species)	11,000	10,000	13,250	33,600	29,600	25,600
Subtotal Non-Indian Commercial Troll	32,500	30,000	26,500	33,600	29,600	25,600
RECREATIONAL						
U.S./Canada Border to Cape Alava[b/]	7,350 *	6,790 *	6,000 *	18,350	16,160	13,980
Cape Alava to Queets River[b/]	1,350 *	1,240 *	1,100 *	4,590	4,040	3,490
Queets River to Leadbetter Pt.[b/]	14,530 *	13,410 *	11,840 *	65,260	57,500	49,730
Leadbetter Pt. to Cape Falcon[b/c/]	9,270 *	8,560 *	7,560 *	88,200	77,700	67,200
Subtotal Recreational	32,500	30,000	26,500	176,400	155,400	134,400
TOTAL NORTH OF CAPE FALCON	115,000	100,000	83,000	272,000	237,000	202,000
SOUTH OF CAPE FALCON						
COMMERCIAL TROLL[a/]						
Cape Falcon to Humbug Mt.	-	-	-	-	10,000	-
Humbug Mt. to OR/CA Border	1,450	750	1,300	-	-	-
OR/CA Border to Humboldt South Jetty	-	-	-	-	-	-
Subtotal Commercial Troll	1,450	750	1,300	-	10,000	-
RECREATIONAL						
Cape Falcon to OR/CA Border	-	-	-	120,000 [d/]	115,000 [e/]	112,000 [f/]
TOTAL SOUTH OF CAPE FALCON	1,450	750	1,300	120,000	125,000	112,000

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 - 45,000 marked coho; Alternative II - 55,000 marked coho; Alternative III - 65,000 marked coho.

d/ The quota consists of both mark-selective and non-mark-selective coho quotas: 100,000 and 20,000 respectively.

e/ The quota consists of both mark-selective and non-mark-selective coho quotas: 97,000 and 18,000 respectively.

f/ The quota consists of both mark-selective and non-mark-selective coho quotas: 95,000 and 17,000 respectively.

TABLE 5. 2022 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	2022 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
CHINOOK					**CHINOOK**
Columbia Upriver Brights	228.7	230.9	232.1	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	78.3	79.1	79.5	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	72.4	73.5	74.0	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 [c/] (threatened)	**40.3%**	**38.8%**	38.0%	≤ 38.0%	Total adult equivalent fishery exploitation rate (2022 NMFS ESA guidance).
Columbia Lower River Wild [e/] (threatened)	10.8	10.9	10.9	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	89.3	91.9	93.0	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	55.6	56.7	57.6	29.0	Aggregate escapement to mouth of Columbia River.
Snake River Fall (threatened) SRFI	60.0%	53.5%	50.6%	≤ 70.0%	Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard).
Klamath River Fall	38.180	38.180	38.180	≥ 38.180	2022 minimum natural area adult escapement (FMP control rule).
Federally recognized tribal harvest	50.0%	50.0%	50.0%	50.0%	Equals 9.4, 9.4, and 9.2 (thousand) adult fish for Yurok and Hoopa Valley tribal fisheries.
Exploitation (spawner reduction) rate	25.0%	25.0%	25.0%	≤ 25.0%	FMP control rule.
Adult river mouth return	66.8	66.9	67.0	NA	Total adults in thousands.
Age-4 ocean harvest rate	10.0%	10.0%	9.9%	≤ 10.0%	NMFS guidance.
KMZ sport fishery share	6.1%	7.1%	5.9%		
River recreational fishery share	22.9%	25.1%	27.6%	NA	Equals 2.2, 2.4, and 2.5 (thousand) adult fish for recreational inriver fisheries.
Sacramento River Winter (endangered)	14.9%	12.5%	14.0%	≤ 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 2022 ESA Guidance).
Sacramento River Fall	199.9	202.6	197.8	≥ 180.000	2022 minimum hatchery and natural area adult escapement (Council Guidance).
Sacramento Index Exploitation Rate	49.6%	48.9%	50.1%	≤ 69.2%	FMP control rule.
Ocean commercial impacts	92.4	93.2	100.3		Includes fall (Sept-Dec) 2021 impacts (5.7 thousand SRFC).
Ocean recreational impacts	71.6	67.7	66.2		Includes fall (Sept-Dec) 2021 impacts (3.3 thousand SRFC).
River recreational impacts	32.5	33.0	32.2		
SRKW Prey Abundance					
North of Falcon	1,316.1	1,316.1	1,316.1	≥ 966.0	Oct 1 starting abundance of age 3+ Chinook from U.S./Canada Border to Cape Falcon
Oregon Coast	1,114.1	1,114.1	1,114.0	NA	Oct 1 starting abundance of age 3+ Chinook from Cape Falcon to Horse Mt.
California Coast	515.6	515.6	515.5	NA	Oct 1 starting abundance of age 3+ Chinook south of Horse Mt.
Southwest WCVI	686.1	686.1	686.1	NA	Oct 1 starting abundance of age 3+ Chinook off Southwest Vancouver Island
Salish Sea	588.6	588.6	588.6	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 2022 ocean fishery Alternatives - Council Adopted[a/] (Page 2 of 3).

Key Stock/Criteria	PROJECTED Alt I	Alt II	Alt III	2022 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
COHO	**COHO**				**COHO**
Interior Fraser (Thompson River)	9.7%(6.2%)	8.8%(5.3%)	7.8%(4.3%)	≤ 10.0%	2022 Southern U.S. exploitation rate ceiling; PSC coho agreement.
Skagit	33.4%(5.8%)	32.7%(4.9%)	32.0%(4.1%)	≤ 60.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Stillaguamish	33.2%(4.2%)	32.7%(3.5%)	32.3%(2.9%)	≤ 50.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Snohomish	33.3%(4.2%)	32.8%(3.5%)	32.3%(2.9%)	≤ 40.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Hood Canal	44.7%(6.2%)	44.1%(5.3%)	43.5%(4.3%)	≤ 45.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Strait of Juan de Fuca	10.6%(5.1%)	9.8%(4.3%)	9.1%(3.6%)	≤ 20.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Quillayute Fall	11.5	11.6	11.8	6.3	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
	17.7%	16.9%	16.0%	≤ 50%	PST total exploitation rate constraint for 2022.[d/f/]
Hoh	3.8	3.9	4.0	2.0	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
	31.7%	30.0%	27.9%	≤ 57%	PST total exploitation rate constraint for 2022.[d/f/]
Queets Wild	15.0	15.3	15.7	5.8	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
	24.7%	23.2%	21.3%	≤ 65%	FMP total exploitation rate constraint (MFMT).[d/f/]
Grays Harbor	118.0	119.1	120.5	35.4	FMP MSP natural area adult spawner estimate. Value depicted is ocean escapement.
	29.0%	28.3%	27.4%	≤ 65%	FMP total exploitation rate constraint (MFMT).[d/f/]
Willapa Bay	43.2	43.6	44.5	17.2	FMP MSY natural area adult spawner estimate. Value depicted is ocean escapement.
Lower Columbia River Natural (threatened)	14.2%	12.9%	11.1%	≤23.0%	Total marine and mainstem Columbia R. fishery exploitation rate (2022 NMFS ESA guidance). Value depicted is marine ER before Buoy 10.
Upper Columbia[c/]	65%	66%	68%	≥ 50%	Minimum percentage of the run to Bonneville Dam.
Columbia River Hatchery Early	393.0	391.0	400.7	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	240.1	250.0	264.9	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	14.4%	13.8%	14.9%	≤ 15.0%	Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard).
Southern Oregon/Northern California Coast (threatened)					
Trinity Natural	14.1%	14.0%	13.7%	≤ 16.0%	total exploitation rate ceiling
Klamath Natural	8.7%	8.6%	8.3%	≤ 15.0%	total exploitation rate ceiling
Rogue Natural	7.8%	7.7%	7.4%	≤ 15.0%	total exploitation rate ceiling
Other Natural	2.9%	2.8%	2.5%	≤ 15.0%	total exploitation rate ceiling

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2022 ocean fishery Alternatives - Council Adopted[a/] (Page 3 of 3).

a/ Coho projections in the table assume post-season 2018 and 2020 fishery scalars for Canadian fisheries. Model results for Chinook in this table used 2022 allowable catches for SEAK, 2021 preseason effort scalars for NBC and WCVI AABM fisheries, recent 2-yr average catches for BC ISBM fisheries, and 2021 preseason catches for Puget Sound fisheries. Assumptions for these fisheries will be changed prior to the April meeting as 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 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. 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 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 2022 ocean salmon fishery management Alternatives - Council adopted. (Page 1 of 2)

Area and Fishery	2022 Catch Projection			2022 Bycatch Mortality[a/] Projection			2022 Bycatch Projection[b/]			Observed in 2021	
	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	8.2	0.8
Non-Indian Commercial Troll	32.5	30.0	26.5	13.9	12.9	10.6	49.9	46.1	37.8	19.3	7.8
Recreational	32.5	30.0	26.5	3.9	3.6	3.2	18.0	16.7	14.7	17.8	2.2
CAPE FALCON TO HUMBUG MT.[c/]											
Commercial Troll	49.1	34.8	42.5	11.3	8.0	9.8	32.5	23.1	28.2	16.9	4.9
Recreational	11.8	11.8	1.3	1.3	1.3	2.6	4.8	4.7	13.3	5.5	0.6
HUMBUG MT. TO OR/CA BORDER											
Commercial Troll	1.5	0.8	2.6	0.3	0.2	0.6	1.0	0.5	1.7	0.4	0.1
Recreational	2.3	1.1	0.6	0.5	0.2	0.1	2.4	0.9	0.3	0.9	0.4 [d/]
OR/CA BORDER TO to LAT 40°10' N.											
Commercial Troll	-	-	-	-	-	-	-	-	-	0.0	-
Recreational	2.2	2.6	2.9	0.2	0.3	0.3	0.9	1.0	1.2	0.6	0.3 [d/]
LAT 40°10' N. TO PT. ARENA											
Commercial Troll	23.2	7.4		5.4	1.7		15.4	4.9		43.7	17.0 [d/]
Recreational	10.0	8.5	11.5	1.1	1.0	1.3	4.0	3.4	4.6	3.7	0.4 [d/]
PT. ARENA TO PIGEON PT.											
Commercial Troll	24.5	36.1	41.2	5.7	8.3	9.5	16.2	23.9	27.3	104.9	21.5 [d/]
Recreational	50.6	46.9	46.2	5.8	5.3	5.2	18.7	17.4	17.1	34.0	3.9 [d/]
SOUTH OF PIGEON PT.											
Commercial Troll	36.3	43.1	47.2	8.4	9.9	10.9	24.1	28.5	31.3	52.8	8.7 [d/]
Recreational	20.7	20.7	20.7	2.4	2.4	2.4	7.7	7.7	7.7	17.0	1.8 [d/]
TOTAL OCEAN FISHERIES											
Commercial Troll	217.1	192.1	190.0	50.1	45.2	44.5	151.9	137.3	134.0	246.3	60.9
Recreational	130.2	121.6	109.8	15.3	14.1	15.1	56.5	51.9	58.8	79.5	9.4
INSIDE FISHERIES:											
Area 4B	-	-	-	-	-	-	-	-	-	-	-
Buoy 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	20.8	3.0 [d/]

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2022 ocean salmon fishery management Alternatives - Council adopted. (Page 2 of 2).

Area and Fishery	2022 Catch Projection			2022 Bycatch Mortality[a/] Projection			2022 Bycatch Projection[b/]			Observed in 2021	
	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	6.8	5.6	4.2	26.4	1.3
Non-Indian Commercial Troll	33.6	29.6	25.6	14.9	13.2	10.7	47.8	42.5	34.0	3.5	2.0
Recreational	176.4	155.4	134.4	31.4	27.6	23.5	133.5	117.3	99.7	64.2	15.6
SOUTH OF CAPE FALCON											
Commercial Troll	0.0	10.0	0.0	10.0	9.7	8.3	38.6	34.6	31.7	2.1	3.2
Recreational[e/]	120.0	115.0	112.0	27.1	26.5	25.1	126.6	125.1	116.6	79.0	24.1
TOTAL OCEAN FISHERIES											
Commercial Troll	95.6	91.6	67.6	29.0	26.3	21.6	93.3	82.7	69.9	32.0	6.5
Recreational	296.4	270.4	246.4	58.5	54.1	48.6	260.1	242.4	216.3	143.2	39.7
INSIDE FISHERIES:											
Area 4B	-	-	-	-	-	-	-	-	-	-	-
Buoy 10	45.0	55.0	65.0	8.5	10.4	12.0	36.9	45.0	51.8	7.1	1.7 [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 2022 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%	2.8%	2.9%	2.9%
BRITISH COLUMBIA	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	12.1%	12.3%	12.5%
PUGET SOUND/STRAIT	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.4%	0.4%	0.4%
NORTH OF CAPE FALCON									
Treaty Indian Ocean Troll	2.6%	2.2%	1.8%	0.6%	0.5%	0.4%	2.8%	2.2%	1.7%
Recreational	5.3%	4.6%	3.9%	0.9%	0.8%	0.7%	3.8%	3.5%	3.1%
Non-Indian Troll	1.4%	1.2%	1.0%	0.3%	0.2%	0.2%	5.0%	4.6%	4.1%
SOUTH OF CAPE FALCON									
Recreational:							0.6%	0.5%	0.4%
Cape Falcon to Humbug Mt.	3.9%	3.7%	3.5%	8.4%	7.8%	7.3%	-	-	-
Humbug Mt. to OR/CA border (KMZ)	0.1%	0.0%	0.1%	0.2%	0.2%	0.2%	-	-	-
OR/CA border to Latitude 40°10' N. (KMZ)	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	-	-	-
Fort Bragg	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	-	-	-
South of Pt. Arena	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	-	-	-
Troll:							2.7%	1.9%	2.4%
Cape Falcon to Humbug Mt.	0.6%	0.8%	0.5%	0.6%	0.8%	0.5%	-	-	-
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%	0.1%	0.0%	0.0%	-	-	-
South of Pt. Arena	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	-	-	-
BUOY 10	1.6%	1.9%	2.2%	0.1%	0.1%	0.1%	10.1%	10.4%	10.5%
ESTUARY/FRESHWATER	NA	NA	NA	2.4%	2.4%	4.6%			
TOTAL[a/]	14.2%	12.9%	11.1%	14.4%	13.8%	14.9%	**40.3%**	**38.8%**	38.0%

TABLE 7. Expected coastwide exploitation rates by fishery for 2022 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	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
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.	0.6%	0.5%	0.5%	0.6%	0.5%	0.5%	0.6%	0.5%	0.5%	0.6%	0.5%	0.5%
Humbug Mt. to OR/CA border (KMZ)	0.4%	0.3%	0.4%	0.4%	0.3%	0.4%	0.4%	0.3%	0.4%	0.4%	0.3%	0.4%
OR/CA border to Latitude 40°10' N. (KMZ)	0.7%	0.7%	0.2%	0.7%	0.7%	0.2%	0.7%	0.7%	0.2%	0.7%	0.7%	0.2%
Fort Bragg	0.4%	0.6%	0.7%	0.4%	0.6%	0.7%	0.4%	0.6%	0.7%	0.4%	0.6%	0.7%
South of Pt. Arena	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Troll:												
Cape Falcon to Humbug Mt.	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Humbug Mt. to OR/CA border (KMZ)	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%
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	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%
South of Pt. Arena	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
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	11.2%	11.2%	11.2%	5.8%	5.8%	5.8%	4.9%	4.9%	4.9%	0.0%	0.0%	0.0%
TOTAL	14.1%	14.0%	13.7%	8.7%	8.6%	8.3%	7.8%	7.7%	7.4%	2.9%	2.8%	2.5%

a/ Totals do not include Buoy 10 and estuary/freshwater for LCN; estuary/freshwater catch is included in the total for OCN and SONCC populations. For 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 2022 fisheries under base period fishing patterns (percent marked).

Area	Fishery	June	July	August	Sept
Canada					
Johnstone Strait	Recreational	--	36%	34%	--
West Coast Vancouver Island	Recreational	47%	39%	38%	39%
North Georgia Strait	Recreational	50%	50%	50%	46%
South Georgia Strait	Recreational	48%	53%	46%	48%
Juan de Fuca Strait	Recreational	49%	49%	51%	48%
Johnstone Strait	Troll	58%	49%	40%	47%
NW Vancouver Island	Troll	47%	43%	43%	43%
SW Vancouver Island	Troll	55%	50%	51%	52%
Georgia Strait	Troll	56%	55%	57%	53%
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	63%	54%	52%	50%
Strait of Juan de Fuca (Area 6)	Recreational	57%	51%	52%	48%
San Juan Island (Area 7)	Recreational	44%	54%	49%	40%
North Puget Sound (Areas 6 & 7A)	Net	--	56%	51%	44%
Council Area					
Neah Bay (Area 4/4B)	Recreational	44%	59%	54%	60%
LaPush (Area 3)	Recreational	57%	62%	65%	54%
Westport (Area 2)	Recreational	72%	69%	66%	60%
Columbia River (Area 1)	Recreational	74%	75%	69%	71%
Tillamook	Recreational	67%	62%	56%	47%
New port	Recreational	61%	57%	55%	43%
Coos Bay	Recreational	53%	50%	39%	24%
Brookings	Recreational	48%	36%	33%	6%
Neah Bay (Area 4/4B)	Troll	55%	55%	56%	56%
LaPush (Area 3)	Troll	54%	57%	54%	54%
Westport (Area 2)	Troll	59%	63%	64%	63%
Columbia River (Area 1)	Troll	72%	71%	68%	58%
Tillamook	Troll	63%	61%	61%	59%
New port	Troll	60%	58%	54%	53%
Coos Bay	Troll	52%	49%	44%	29%
Brookings	Troll	44%	44%	48%	66%
Columbia River					
Buoy 10	Recreational	--	--	--	68%

TABLE 9. Preliminary projected exvessel value under Council-adopted 2022 non-Indian commercial troll regulatory Alternatives compared to 2021 and the 2017-2021 average (in inflation-adjusted dollars).

		Exvessel Value (thousands of dollars)[a/]				
Management Area	Alternative	2022 Projected[b/]	2021 Actual	Percent Change from 2021	2017-2021 Average	Percent Change From 2017-2021 Average
North of Cape Falcon	I	4,138	2,019	+105%	2,234	+85%
	II	3,786		+87%		+69%
	III	3,331		+65%		+49%
Cape Falcon to Humbug Mt.	I	5,745	1,993	+188%	1,893	+203%
	II	4,317		+117%		+128%
	III	4,973		+149%		+163%
Humbug Mt. to OR/CA Border	I	200	56	+257%	166	+21%
	II	106		+88%		-36%
	III	353		+531%		+113%
OR/CA Border to 40º10' N. Lat.	I	0	0	-	218	-100%
	II	0		-		-100%
	III	0		-		-100%
40º10' N. Lat. to Pt. Arena	I	1,770	3,264	-46%	1,039	+70%
	II	560		-83%		-46%
	III	0		-100%		-100%
Pt. Arena to Pigeon Pt.	I	2,312	9,718	-76%	8,024	-71%
	II	3,409		-65%		-58%
	III	3,892		-60%		-51%
South of Pigeon Pt.	I	4,015	5,722	-30%	3,931	+2%
	II	4,759		-17%		+21%
	III	5,221		-9%		+33%
Total South of Cape Falcon	I	14,042	20,753	-32%	15,271	-8%
	II	13,152		-37%		-14%
	III	14,439		-30%		-5%
West Coast Total	I	18,180	22,772	-20%	17,505	+4%
	II	16,937		-26%		-3%
	III	17,771		-22%		+2%

a/ Values are inflation-adjusted to 2021 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 2021 average weights and exvessel prices.

TABLE 10. Preliminary projected angler trips and coastal community income impacts generated under Council-adopted 2022 recreational ocean salmon fishery regulatory Alternatives compared to 2021 and the 2017-2021 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	2021 Actual	2017-2021 Avg.	Estimates Based on the Options	2021 Actual	2017-2021 Avg.	Compared to 2021	Compared to 2017-2021 Avg.
North of Cape Falcon[b/]	I	182.6	62.8	59.3	28,401	9,777	8,762	+191%	+224%
	II	161.8			25,176			+158%	+187%
	III	140.4			21,837			+123%	+149%
Cape Falcon to Humbug Mt.	I	66.1	79.9	56.7	5,479	6,624	4,414	-17%	+24%
	II	62.6			5,189			-22%	+18%
	III	42.3			3,505			-47%	-21%
Humbug Mt. to OR/CA Border	I	2.3	5.9	5.1	161	410	335	-61%	-52%
	II	6.2			433			+6%	+29%
	III	3.7			259			-37%	-23%
OR/CA Border to 40º10' N. Lat.	I	10.1	2.2	4.5	1,350	298	555	+353%	+143%
	II	10.8			1,447			+385%	+161%
	III	4.3			577			+93%	+4%
40º10' N. Lat. to Pt. Arena	I	12.9	8.6	7.2	2,116	1,413	1,186	+50%	+78%
	II	13.1			2,139			+51%	+80%
	III	16.7			2,726			+93%	+130%
Pt. Arena to Pigeon Pt.	I	56.3	45.4	53.7	14,672	11,838	13,514	+24%	+9%
	II	52.0			13,574			+15%	+0%
	III	50.3			13,118			+11%	-3%
South of Pigeon Pt.	I	34.3	31.9	19.1	5,168	4,807	2,720	+8%	+90%
	II	34.2			5,156			+7%	+90%
	III	34.1			5,141			+7%	+89%
Total South of Cape Falcon	I	182.0	173.9	146.2	28,947	25,390	22,724	+14%	+27%
	II	178.9			27,937			+10%	+23%
	III	151.4			25,327			-0%	+11%
West Coast Total	I	364.5	236.8	205.5	57,348	35,167	31,486	+63%	+82%
	II	340.8			53,114			+51%	+69%
	III	291.7			47,164			+34%	+50%

a/ Income impacts are not comparable to the exvessel values shown in Table 9. All dollar values are expressed in inflation-adjusted 2021 dollars.
b/ Does not include Buoy 10 fishery.

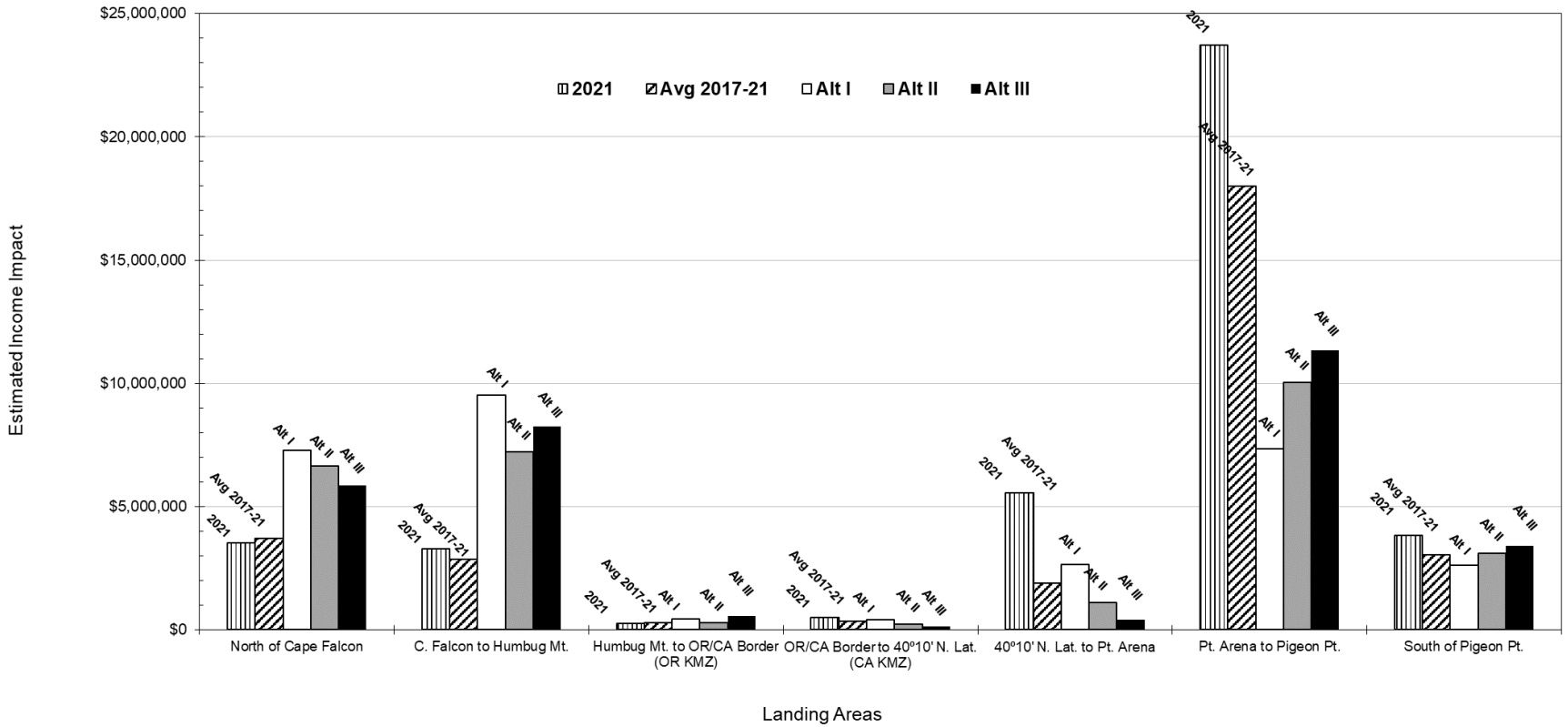


FIGURE 1. Projected community income impacts associated with landings projected under the Council adopted 2022 commercial fishery Alternatives compared to 2021 and the 2017-2021 average (in inflation-adjusted dollars).

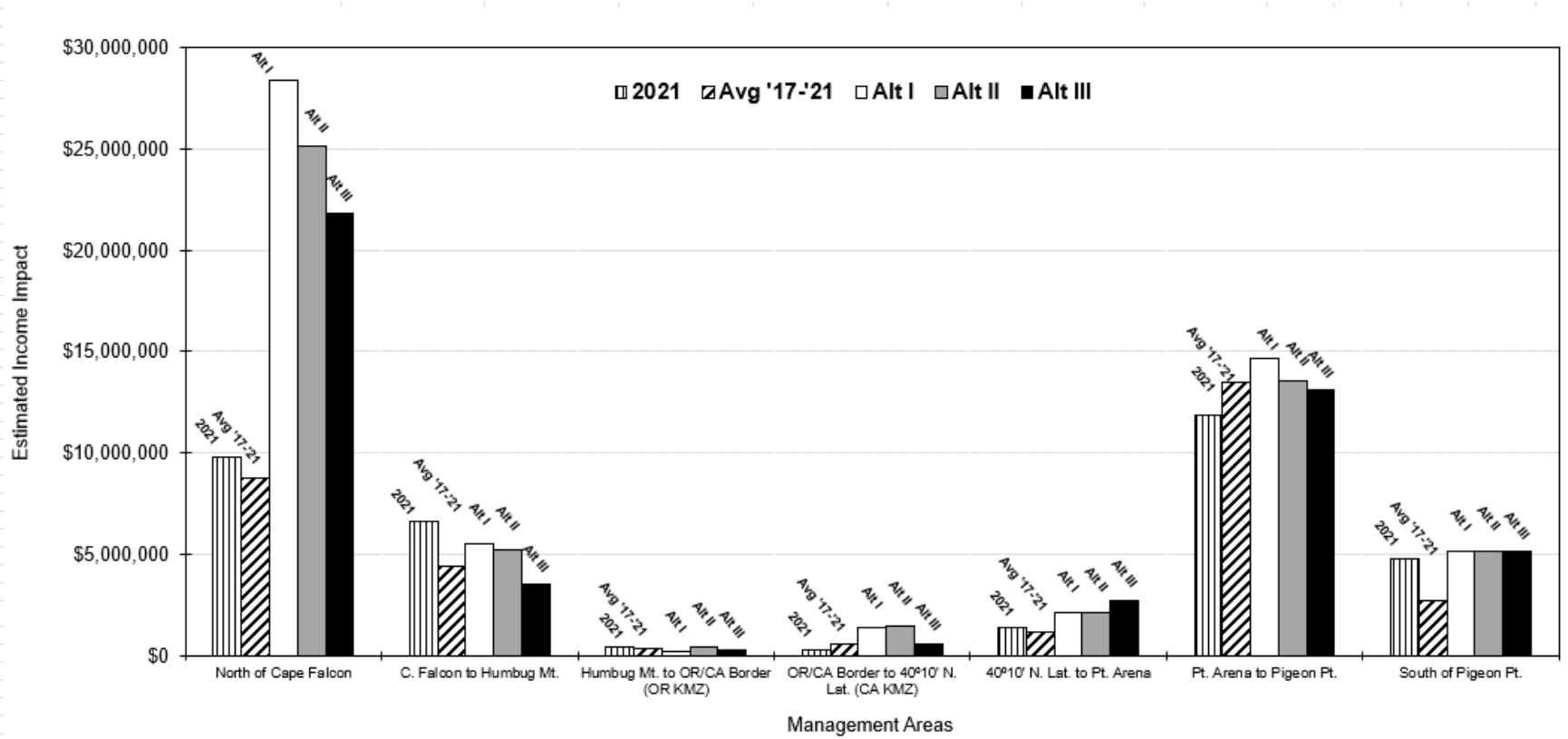


FIGURE 2. Projected community income impacts associated with angler effort projected under the Council adopted 2022 recreational fishery Alternatives compared to 2021 and the 2017-2021 average (in inflation-adjusted dollars).

APPENDIX A: PROJECTED IMPACTS FOR AGE-3 SACRAMENTO RIVER WINTER CHINOOK, ADULT 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 14.9 Total

Port Area	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF			0.16	0.12	0.19	0.07			0.54
MO	0.31	0.95	0.27	0.25					1.78
Total	0.31	0.95	0.43	0.37	0.19	0.07	0.00	0.00	2.32

Alternative II 12.5 Total

Port Area	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF			0.25	0.26	0.19	0.07			0.78
MO	0.37	1.21	0.25						1.83
Total	0.37	1.21	0.50	0.26	0.19	0.07	0.00	0.00	2.60

Alternative III 14.0 Total

Port Area	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF			0.28	0.20	0.20	0.07			0.75
MO	0.41	1.13	0.28	0.25					2.06
Total	0.41	1.13	0.57	0.44	0.20	0.07	0.00	0.00	2.81

Recreational

Alternative I

Port Area	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.28	0.84		2.14	0.72	0.12	0.19	0.04		4.33
MO	1.27	1.26	1.66	2.89	1.06	0.07				8.21
Total	1.55	2.10	1.66	5.03	1.78	0.19	0.19	0.04	0.00	12.55

Alternative II

Port Area	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.28	0.18		2.18	0.74	0.12	0.20			3.70
MO	1.27	0.58	1.04	2.28	0.96	0.07				6.19
Total	1.55	0.75	1.04	4.46	1.70	0.19	0.20	0.00	0.00	9.89

Alternative III

Port Area	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.28		0.32	1.64	0.64	0.11				2.99
MO	1.27	1.26	1.67	2.90	1.06	0.07				8.24
Total	1.55	1.26	1.99	4.54	1.70	0.19	0.00	0.00	0.00	11.23

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

38,180 natural area spawners, 25.0% spawner reduction rate, 10.0% age-4 ocean harvest rate

Port	Fall 2021		Summer 2022						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0	23	23	9	230	772	570	1,627	1,627
CO	11	0			40			193	233	244
KO			0	0		105	71	64	240	240
KC										
FB	193						612	939	1,551	1,744
SF	0	0					903	358	1,261	1,261
MO					338	271	91	48	748	748
Total	204	0	23	23	386	607	2,449	2,172	5,660	5,864

Alternative II

38,180 natural area spawners, 25.0% spawner reduction rate, 10.5% age-4 ocean harvest rate

Port	Fall 2021		Summer 2022						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0	23	23	9	62	239		356	356
CO	11	0			40	913	520		1,473	1,484
KO			0	0		72	36		108	108
KC										
FB	193							510	510	703
SF	0	0					1,355	780	2,135	2,135
MO					405	339	81		825	825
Total	204	0	23	23	454	1,387	2,230	1,290	5,407	5,611

Alternative III

38,180 natural area spawners, 25.0% spawner reduction rate, 9.9% age-4 ocean harvest rate

Port	Fall 2021		Summer 2022						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0	23	23	3	122	769	705	1,645	1,645
CO	11	0			42			237	279	290
KO			0	0	140	105	89		334	334
KC										
FB	193									193
SF	0	0					1,783	684	2,467	2,467
MO					422	312	111	56	901	901
Total	204	0	23	23	606	540	2,751	1,682	5,625	5,829

Recreational

Alternative I

Port	Fall 2021			Summer 2022						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0		0	14	0	0	3	153	170	170
CO	0	0		0	0	0	0	9	396	405	405
KO						12	192	4	36	244	244
KC						113			152	265	265
FB	0	0				38		255	59	352	352
SF	0	0			0	31		449	120	600	600
MO	0				0	0	0	0	0	0	0
Total	0	0	0	0	14	194	192	720	917	2,037	2,037

Alternative II

Port	Fall 2021			Summer 2022						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0		0	14	0	0	3	153	170	170
CO	0	0		0	0	0	0	9	395	404	404
KO							8	22	180	210	210
KC						113		60	151	324	324
FB	0	0				38	58	114	59	269	269
SF	0	0			0	14		446	119	579	579
MO	0				0	0	0	0	0	0	0
Total	0	0	0	0	14	165	65	655	1,057	1,956	1,956

Alternative III

Port	Fall 2021			Summer 2022						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0		0	14	0	0	3	38	55	55
CO	0	0		0	0	0	0	9	80	89	89
KO							42	22		64	64
KC								352		352	352
FB	0	0				35	56	249	58	398	398
SF	0	0			0		119	438	117	674	674
MO	0				0	0	0	0	0	0	0
Total	0	0	0	0	14	35	217	1,073	293	1,632	1,632

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. Sacramento River fall Chinook ocean impacts in numbers of fish by fishery and Alternative.

Commercial

Alternative I 164,039 Total

Port	Fall 2021		Summer 2022						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	8	3,348	3,157	3,310	5,318	5,794	1,101	22,028	22,036
CO	0	0			3,417			586	4,003	4,003
KO			0	0		320	200	70	590	590
KC										
FB	1,166						6,313	6,619	12,932	14,098
SF	3,844	682					8,635	4,796	13,431	17,957
MO					20,638	10,857	1,873	385	33,753	33,753
Total	5,010	690	3,348	3,157	27,365	16,496	22,814	13,558	86,738	92,438

Alternative II 160,831 Total

Port	Fall 2021		Summer 2022						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	8	3,348	3,157	3,310	1,443	1,825		13,083	13,091
CO	0	0			3,417	2,762	476		6,655	6,655
KO			0	0		220	100		320	320
KC										
FB	1,166							3,646	3,646	4,812
SF	3,844	682					13,172	10,533	23,705	28,231
MO					24,765	13,572	1,709		40,046	40,046
Total	5,010	690	3,348	3,157	31,492	17,997	17,282	14,178	87,454	93,154

Alternative III 166,508 Total

Port	Fall 2021		Summer 2022						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	8	3,348	3,157	969	2,836	5,794	1,376	17,480	17,488
CO	0	0			3,559			733	4,292	4,292
KO			0	0	207	320	250		777	777
KC										
FB	1,166							1,166		
SF	3,844	682					18,112	10,035	28,147	32,673
MO					27,517	13,572	2,350	463	43,902	43,902
Total	5,010	690	3,348	3,157	32,252	16,728	26,505	12,607	94,597	100,297

Recreational

Alternative I

Port	Fall 2021			Summer 2022						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	45	0		11	0	8	160	478	193	850	895
CO	0	0		0	15	22	194	407	107	745	745
KO						48	232	66	28	374	374
KC						3,133			1,802	4,935	4,935
FB	0	574				666		3,677	1,674	6,017	6,591
SF	2,083	463			3,475	6,285		17,831	8,994	36,585	39,131
MO	94	0			9,948	2,418	2,308	3,440	721	18,835	18,929
Total	2,222	1,037		11	13,439	12,580	2,894	25,899	13,519	68,342	71,601

Alternative II

Port	Fall 2021			Summer 2022						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	45	0		11	0	8	87	478	193	777	822
CO	0	0		0	15	22	121	407	107	672	672
KO							7	473	181	661	661
KC						3,133		244	1,802	5,179	5,179
FB	0	574				666	950	1,660	1,674	4,950	5,524
SF	2,083	463			3,475	3,041		17,831	8,994	33,341	35,887
MO	94	0			9,948	2,418	2,308	3,440	721	18,835	18,929
Total	2,222	1,037		11	13,439	9,288	3,474	24,533	13,673	64,418	67,677

Alternative III

Port	Fall 2021			Summer 2022						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	45	0		11	0	11	0	8	87	478	621	666
CO	0	0		0	15	22	121	407	107	745	17	582	582
KO							51	473		524	524
KC										1,463	1,463
FB	0	574				666	950	3,677	1,674	6,967	7,541
SF	2,083	463			3,475		3,660	17,831	8,994	33,960	36,506
MO	94	0			9,948	2,418	2,308	3,440	721	18,835	18,929
Total	2,222	1,037		11	13,439	3,114	7,177	27,769	11,442	62,952	66,211

NO	Cape Falcon to S. End of Heceta Bank	FB	Southern KMZ Boundary to Pt. Arena (Fort Bragg)
CO	S. End of Heceta Bank to Humbug Mt.	SF	Pt. Arena to Pigeon Pt. (San Francisco)
KO	Humbug Mt. to OR/CA Border (Oregon KMZ)	MO	Pigeon Pt. to U.S./Mexico Border (Monterey)
KC	OR/CA Border to latitude 40°10′ N. (California KMZ)		

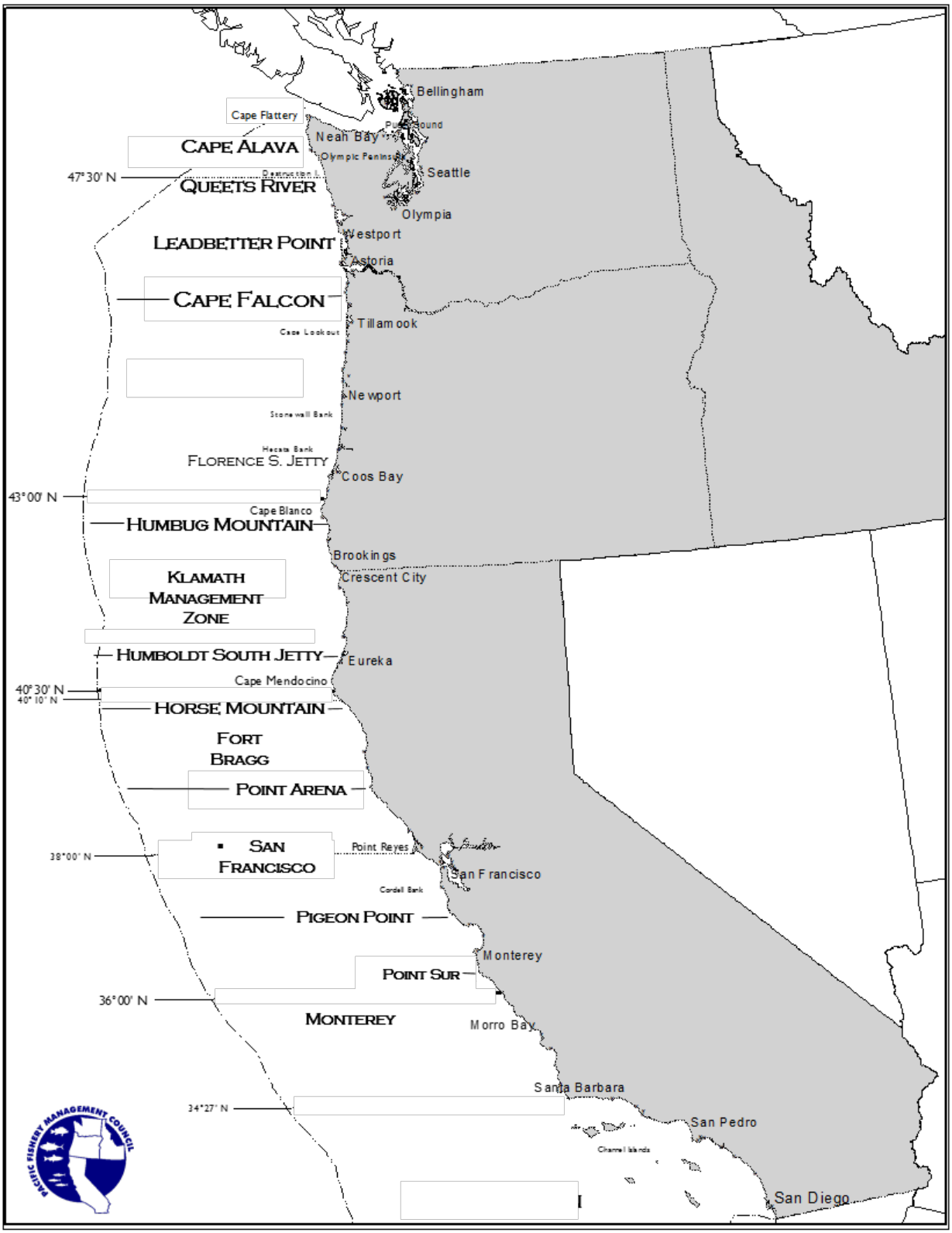
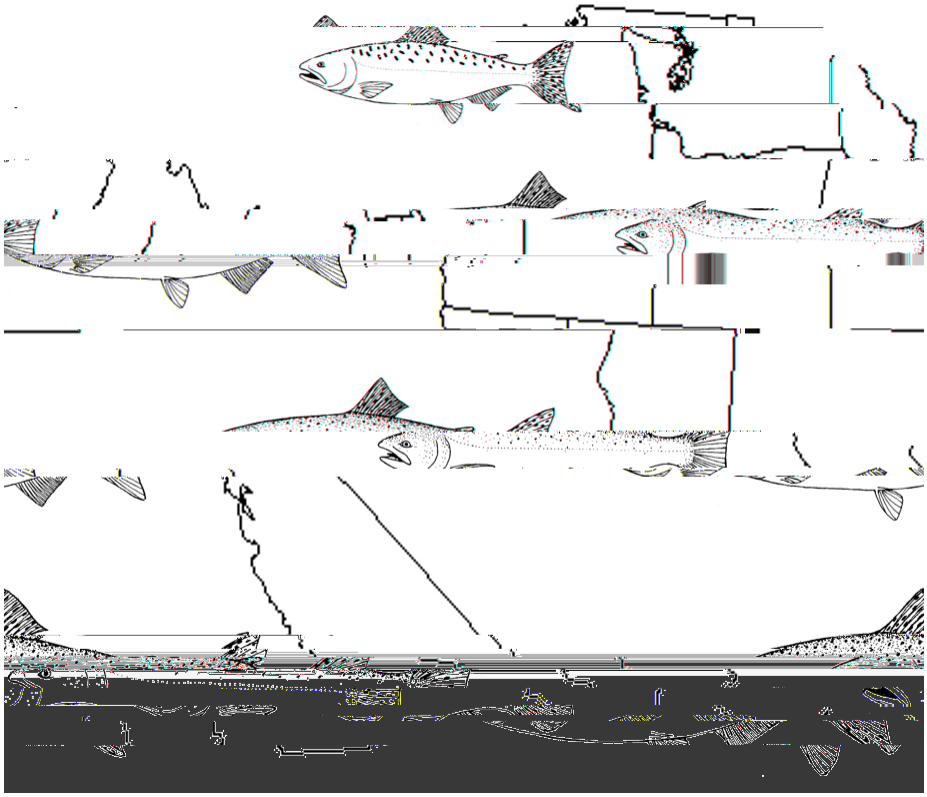


FIGURE 3. Map of Pacific West Coast with major salmon ports and management boundaries. This map is for reference only and is not intended for use in navigation or fishery regulation.

PRESEASON REPORT III

COUNCIL ADOPTED MANAGEMENT MEASURES
AND
ENVIRONMENTAL ASSESSMENT PART 3
FOR
2022 OCEAN SALMON FISHERY REGULATIONS

REGULATION IDENTIFIER NUMBER 0648-BK78



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APRIL 2022

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The Salmon Technical Team and the Council staff express their thanks for the expert assistance provided by Ms. Erica Weyland, Ms. Ranelle Reber, and Ms. Danielle Williams, Washington Department of Fish and Wildlife; Mr. Craig Foster and Mr. Eric Schindler, Oregon Department of Fish and Wildlife; Ms. Grace Easterbrook and Dr. Pete McHugh, California Department of Fish and Wildlife; Dr. Ed Waters, economist on contract with Pacific Fishery Management Council; and numerous other tribal and agency personnel in completing this report.

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

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LIST OF TABLES

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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 2022[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 2022 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 2022b, 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 this EA (Preseason Report II; PFMC 2022c), 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, 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 2022 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 of the applicable conservation objectives in the FMP.

The Sacramento River fall Chinook (SRKC), Klamath River fall Chinook (KRFC), Queets natural coho, Strait of Juan de Fuca natural coho and Snohomish natural coho salmon stocks met the criteria for overfished status in 2018, and the Council adopted rebuilding plans for these stocks in 2019. In 2021 Sacramento River fall Chinook met the criteria for rebuilt status and Snohomish natural coho continued to meet the criteria for rebuilding status. Klamath River fall Chinook, Queets natural coho, and Strait of Juan de Fuca natural coho remain overfished based on this current assessment.

In the 2021 Review of Ocean Salmon Fisheries (2021 Review, PFMC 2022a, incorporated herein by reference), based on information available at the time, the STT reported that Hood Canal natural coho met the criteria for overfished status, as the geometric mean for the three most recent years of spawning escapement (2018-2020) was less than the minimum stock size threshold (MSST) of 10,750. Since the publication of the 2021 Review, new information has become available, including a 2021 spawning escapement estimate (reviewed and agreed to by the co-managers). This new information increases the three-year geometric mean spawning escapement (2019-2021) to a level that is greater than both the MSST and S_{MSY} for this stock, therefore, Hood Canal natural coho no longer meet the criteria of overfished status as originally reported in the 2021 Review (see Section 7.1 and Table 12 details).

[1] The fishery management measures under consideration would cover the period May 16, 2022, through May 15, 2023 (86 FR 26426). For ease of reference, we refer to this time period as 2022.

2.0 SELECTION OF FINAL MANAGEMENT MEASURES

The following figures and tables describe the Council-adopted management measures covering the period from May 16, 2022 through May 15, 2023 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 2022 seasons are constrained primarily by: (1) California Coastal Chinook and lower Columbia River natural tule 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 species, and obligations under the PST.

Inseason actions that are anticipated for the 2022-2023 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, 2023, if necessary to meet 2023 management objectives.
8. Closing or postponing California recreational fisheries scheduled to open April 2 or May 1, 2023, or commercial fisheries scheduled to open April 16 or May 1, 2023, if necessary to meet 2023 management objectives.
9. Closing or postponing commercial fisheries north of Cape Falcon scheduled to open May 1, 2023, if necessary to meet 2023 management objectives.

10. 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, although neither are likely for 2022. Washington may also establish limited recreational salmon fisheries in state marine waters if additional impacts on critical coho and/or Chinook stocks can be accommodated within management constraints. California will not establish any additional state marine water salmon fisheries in 2022.

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 adopting 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 ACLs, 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 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) (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 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, 2022 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 the following 17 Evolutionarily Significant Units (ESUs) of salmon under the ESA:

			Federal Register Notice			
Species	ESU	Status	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

As the listings occurred, NMFS initiated formal consultations and issued biological opinions (BiOps) that consider the impacts resulting from implementation of the Salmon FMP, or from annual management measures, to ESA-listed species. NMFS has also reinitiated consultation on certain ESUs when new information has become available on the status of the species or on the impacts of the Salmon FMP on the species. The consultation standards referred to in this document are derived from those consultations and include: (1) reasonable and prudent alternatives, (2) conservation objectives for which NMFS conducted Section 7 consultations and arrived at a no-jeopardy conclusion, and (3) NMFS requirements under Section 4(d) determinations. A list of current BiOps in effect, the species they apply to, and their duration follows:

Date BiOp or Memo Signed	Evolutionarily Significant Unit covered and effective period
	Salmonid Species
3/8/1996	Snake River spring/summer and fall Chinook and sockeye (until reinitiated)
4/28/1999	Oregon Coastal natural coho, Central California coastal coho (until reinitiated)
4/28/2000	Central Valley spring Chinook (until reinitiated)
9/14/2002	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)
4/27/2012	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)
5/19/2021	Puget Sound Chinook and Puget Sound Steelhead (until reinitiated)
May 2022	California coastal Chinook (reinitiated in 2022; 7(a)(2) and 7(d) memo)
May 2022	Southern Oregon/ Northern California coastal coho (reinitiated in December 2021)
	Non-salmonid Species
4/30/2007	North American Green Sturgeon – Southern DPS (until reinitiated)
4/30/2011	Puget Sound/Georgia Basin Rockfish (until reinitiated)
4/30/2011	Pacific Eulachon – Southern DPS (until reinitiated)
4/21/2021	Southern Resident Killer Whales (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 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 8, 2022), NMFS summarized existing consultation standards and provided guidance on measures needed to protect species listed under the ESA during the 2022 fishing season. The letter summarized the measures analyzed and/or recommended in the relevant NMFS BiOps on the effects of fisheries managed under the salmon FMP on listed salmon and specified limits applicable for the 2022 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 2022 management season are presented in Table 5. Some listed 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.

Of the listed Chinook and coho ESUs, Council-managed fisheries 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 of the coho stocks.

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)	

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 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 catch ceilings will continue to be determined using the abundance indices (AIs) from the PSC Chinook Model for Northern British Columbia (NBC) and WCVI AABM fisheries, the allowable catches for SEAK fisheries will be 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 PST Agreement for specifics).

For the 2022 fishing season, the SEAK early winter power troll CPUE was 7.02, which corresponds to an all gear catch limit of 266,585 Chinook. The annual calibration of the PSC Chinook Model produced AIs of 1.17 for the NBC AABM fishery and 0.88 for the WCVI AABM fishery. These AIs correspond to catch limits of 142,800 and 100,700 Chinook 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 considered 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 across 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 2022 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 is 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 2022, Puget Sound and Washington coast coho constraints are as follows:

FMP

FMP Stock	Total Exploitation Rate Constraint[a/]	Categorical Status[a/]
Skagit	60%	Normal
Stillaguamish	50%	Normal
Snohomish	40%	Low
Hood Canal	45%	Low
Strait of Juan de Fuca	20%	Critical
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	60%	Abundant
Stillaguamish	50%	Abundant
Snohomish	40%	Moderate
Hood Canal	45%	Moderate
Strait of Juan de Fuca	20%	Low
Quillayute Fall[c/]	50%	Abundant
Hoh[c/]	58%	Abundant
Queets[c/]	68%	Abundant
Grays Harbor[c/d/]	73%	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 2022 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 2022. 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 2022 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 2022 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 2022 are:

- *Columbia River hatchery tules*. Combined production of Lower River Hatchery (LRH) and Spring Creek Hatchery (SCH) stocks returning to the Columbia River forecasted to be 164,200, which is higher than the 2021 preseason expectation of 119,900. The LRH forecast is 73,000, which is similar to the forecast of 73,100 in 2021. The SCH forecast is 91,200, which is higher than the 2021 forecast of 46,800.

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 fall Chinook (natural component and referred to 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 projected exploitation rate in the adopted management measures is 38.0 percent and meets the 38.0 percent maximum for 2022.
- *LRW fall Chinook.* The adopted management measures have a projected ocean escapement of 10,900 adults, 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 adopted management measures have an ocean exploitation rate that is 53.1 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), except Hoko Fall Chinook spawning escapement is projected to be at a level below the FMP escapement goal.

The Hoko summer fall-run Chinook salmon stock is managed in Council area and in northern fisheries, subject to the provisions of the Council's Salmon FMP and the PST. Under the FMP, Hoko Chinook salmon are managed for a spawning escapement of 850 naturally spawning adults. The forecast of Hoko Chinook salmon in 2022 is for an escapement of 940 adult Chinook in the absence of fishing. With the

incorporation of Alaskan and Canadian fisheries that are expected to occur within the limits identified in the PST, the spawning escapement is projected to be at a level below the escapement goal. The Washington Department of Fish and Wildlife (WDFW) and the Washington treaty tribes support the Council-adopted management measures that result in a projected escapement for Hoko Chinook of 735 adult spawners. Section 3.3.6.2 of the FMP notes that "some de minimis level of fishing impacts are allowed by the provisions of the PST" at low abundance levels. For Chinook salmon, this is referring to the ISBM obligations under the PST, specifically the stock-specific exploitation rate limits when stocks are not meeting their management objectives (see Section 5.1). Under the provisions of the PST, Hoko Chinook salmon are managed to an exploitation rate limit of 10 percent in southern U.S. fisheries. As reported in Table 5, the model results project a southern U.S. exploitation rate on Hoko Chinook of 2.1 percent, of which 1.9 percent is occurring in Council area fisheries, well below the 10 percent PST limit. This represents a level of fishery impact in Council area fisheries that is below the levels defined as de minimis for other Chinook salmon stocks in the FMP (e.g., Klamath River fall-run Chinook salmon at 25 percent and Sacramento River winter-run Chinook salmon at 20 percent). Salmon fishery impacts on Hoko Chinook salmon associated with the fisheries adopted by the Council in 2022 are consistent with limits required by the PST and provisions of the Pacific Coast Salmon FMP.

6.2 South of Cape Falcon

Status of Chinook stocks important to 2022 Chinook harvest management south of Cape Falcon are:

- *LCR natural tule fall Chinook*. Combined production of LRH and SCH stocks returning to the Columbia River forecasted to be 164,200, which is higher than the 2021 preseason expectation of 119,900. The LRH forecast is 73,000, which is similar than the forecast of 73,100 in 2021. The SCH forecast is 91,200, which is greater than the 2021 forecast of 46,800.
- *SRFC*. The Sacramento Index forecast is 396,458, which is greater than the 2021 forecast of 270,958. SRFC were classified as overfished in 2018, and the Council adopted a rebuilding plan in 2019. In 2021, SRFC was reported to have met the criteria for rebuilt status.
- *KRFC*. The ocean abundance forecast for this stock is 154,998 age-3, 43,211 age-4, and 1,908 age-5 fish. These compare to the 2021 forecasts of 135,569 age-3, 45,124 age-4, and 815 age-5 fish. KRFC were classified as overfished in 2018, and the Council adopted a rebuilding plan in 2019. In 2022, KRFC remain classified as overfished.
- *SRWC*. The forecast of age-3 escapement absent fishing is 5,971, which is less than the 2021 forecast of 9,063.

6.2.1 Objectives

Key Chinook salmon management objectives shaping management measures south of Cape Falcon are:

- A KRFC age-4 ocean harvest rate of no greater than 10.0 percent (NMFS guidance).
- A KRFC natural area spawner escapement of at least 38,180 adults, which is produced, in expectation, by a maximum exploitation rate of 25.0 percent (FMP control rule).
- A SRFC hatchery and natural area spawner escapement of at least 180,000 adults (Council guidance).
- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant stocks for the area south of Cape Falcon include SRWC, California coastal Chinook, SRW fall Chinook, and LCR natural tule fall Chinook.

The maximum allowable exploitation rate for KRFC in 2022 is 0.25, 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 overfished condition;
- Whether the stock is currently overfished;
- Other considerations as appropriate".

The Salmon Technical Team has assessed each of these circumstances, with the exception of minimal needs for Tribal fisheries.

Potential for low spawner abundance
The potential for critically low natural spawner abundance could be considered moderate. The 2022 minimum natural-area spawner escapement of 38,180 adults is greater than the minimum stock size threshold (MSST; 30,525). A natural-area escapement of 38,180 adults would represent the 25th lowest value over the past 44 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 38,180 adults in 2022. The 720-adult 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 0.14.

Recent spawner abundance
The natural-area adult spawner escapement has been lower than MSST in six of the last ten years and four of the last five years. The 2022 forecast of natural-area spawners in the absence of fishing is 50,906 adults, which is above the maximum sustainable yield spawner escapement (S_{MSY}; 40,700). If fishing seasons are structured such that the maximum allowable exploitation rate of 25 percent is met, the natural-area adult spawner expectation is 38,180, which is larger than the MSST but below S_{MSY}.

Comingled stocks
With regard to co-mingled stocks, Sacramento River fall Chinook have a moderate abundance forecast and is likely to be less constraining to fisheries than KRFC in 2022.

Environmental indicators
Indicators of marine and freshwater conditions provided in the California Current Integrated Ecosystem Assessment (CCIEA) California Current Ecosystem Status Report for 2022 suggest a mixed assessment of marine and freshwater conditions that could affect KRFC. Table J.2.3 in the CCIEA report displays "stoplight" indicators including adult abundance, incubation, freshwater residence, hatchery releases, and marine indicators relevant to KRFC abundance. The number of adult spawners in years 2018 and 2019 (age-4 and age-3 in 2022, respectively) were moderate and low, respectively. Brood year 2018 progeny experienced mostly average conditions during incubation and freshwater residence, while brood year 2019

progeny encountered a mixture of conditions in freshwater but generally poor freshwater residence conditions. Ocean indicators suggested poor conditions for brood year 2018 and mixed conditions for brood year 2019. Overall, stoplight indicators suggest that the KRFC broods that will make up the bulk of the adult abundance in 2022 experienced mixed conditions in marine and freshwater habitats.

Approaching an overfished condition
The KRFC stock does not currently meet 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 2022.

The Council-adopted 2022 seasons for Chinook fisheries south of Cape Falcon satisfies NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for relevant Chinook stocks (Table 5).

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 escapement is 38,180, which is equivalent to the 2022 control rule-defined minimum natural area adult spawners.
- *SRFC*. The adopted management measures have a projected escapement of 198,694, which exceeds the Council guidance for a minimum of 180,000 hatchery and natural area adult spawners.
- *SRWC.* The adopted management measures result in a projected age-3 impact rate of 15.2 percent, which is consistent with the ESA consultation standard that (1) limits the age-3 impact rate in 2022 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 10.0 percent, which is consistent with the 2022 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 53.1 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 2022.

The adopted management measures for Chinook fisheries south of Cape Falcon satisfy NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for relevant Chinook stocks (Table 5).

7.0 COHO SALMON MANAGEMENT

Abundance projections relevant to coho harvest management in Council area fisheries are:

- *Oregon Production Index (OPI) Hatchery coho.* The forecast for hatchery coho from the Columbia River and the coast south of Cape Falcon of 1,003,500 is lower than the 2021 forecast of 1,607,900. The Columbia River early coho forecast is 592,500 compared to the 2021 forecast of 1,014,000, and the Columbia River late coho forecast is 404,700 compared to the 2021 forecast of 576,000.
- *Oregon Coast coho (natural component, referred to as OCN coho).* The OCN forecast is 222,400 compared to the 2021 forecast of 125,000.
- *Lower Columbia coho (natural component, referred to as LCN coho).* The LCN forecast is 65,700 compared to the 2021 forecast of 39,200.
- *Puget Sound coho.* Among Puget Sound natural stocks, Strait of Juan de Fuca coho are in the critical category. Snohomish, and Hood Canal coho are in the low category, and Skagit and 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 most Washington coastal coho stocks are higher compared to 2021. 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 2021 Council area fisheries are:

- NMFS consultation standards and annual guidance for ESA listed species as provided in Section 5.0 above. Relevant ESUs include Central California Coast coho (south of Punta Gorda, California), Southern Oregon/Northern California coast (SONCC) coho, OCN coho, and LCN coho. The maximum allowable exploitation rates for 2022 are: (1) a combined marine/freshwater exploitation rate not to exceed 15.0 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 5.2 above. The forecasts for Washington coastal coho stocks are abundant in 2022; these stocks contribute to fisheries off Washington. Forecasts for some Puget Sound and Interior Fraser coho stocks in 2022 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.
- 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. Queets natural coho and Strait of Juan de Fuca natural coho remain 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}. For Snohomish natural coho the objective is to manage for an escapement goal of 55,000 adult natural spawners (10% greater than 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/incidental take rates under the adopted management measures.

- *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 13.8 percent and a mainstem Columbia River exploitation rate of 3.7 percent.
- *OCN coho.* The adopted management measures satisfy the maximum 15.0 percent exploitation rate for combined marine and freshwater fisheries, with a marine exploitation rate of 11.4 percent and a freshwater exploitation rate of 3.5 percent.
- *Washington coastal natural coho.* The adopted management measures provide ocean escapement numbers of 11,636, 3,922, 15,214, and 118,886 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 37.4 percent, 53.6 percent, 36.3 percent, and 49.6 percent for Quillayute fall, Hoh, Queets, and Grays Harbor natural coho, respectively, which comply with the PST Southern Coho Management Plan (Section 5.2 and Table 12).
- *Interior Fraser coho.* The Southern U.S. exploitation rates in the adopted management measures total 9.5 percent, which complies with the 10.0 percent maximum required by the PST Southern Coho Management Plan.
- *Snohomish coho.* Currently meets the criteria for not overfished/rebuilding. The adopted management measures comply with the objective in the Rebuilding Plan.
- *Strait of Juan de Fuca coho.* Currently meets the criteria for overfished. The adopted management measures comply with the objective in the Rebuilding Plan.
- *Queets coho.* Currently meets the criteria for overfished. The adopted management measures comply with the objective in the Rebuilding Plan.
- *Hood Canal natural coho*. In the 2021 Review of Ocean Salmon Fisheries, Hood Canal natural coho was identified as meeting the criteria for overfished status, as the geometric mean for the three most recent years of spawning escapement (2018-2020) was 9,990, which is less than the MSST of 10,750. Since the publication of the 2021 Review of Ocean Salmon Fisheries (PFMC 2022a), new information has become available, including a 2021 spawning escapement estimate for Hood Canal natural coho of 33,299, which has been thoroughly reviewed and agreed to by the relevant Washington state and tribal co-managers. Based on this new information, the resulting most recent three-year geometric mean (2019-2021) is 16,410, which is above S_{msy} and the MSST, indicating that the Hood Canal natural coho stock does not meet the criteria for overfished status.

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 runs occur in odd-numbered years in waters under Council jurisdiction and will not be an important management consideration in 2022.

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 2022 Chinook total allowable catch (TAC) is slightly below 2021 due to lower abundances of Columbia River Chinook. The 2022 coho TAC is increased compared to last year due to higher abundance forecasts for coastal Washington coho stocks but was constrained by low forecasts for Thompson and Puget Sound natural coho.

Fisheries south of Cape Falcon are constrained by LCR natural tule Chinook, California coastal Chinook, and KRFC. The adopted management measures reflect NMFS guidance for California coastal Chinook to limit the projected KRFC age-4 ocean harvest rate to a maximum of 10 percent. KRFC are being managed under the *de minimis* portion of its harvest control rule, which in 2022 specifies a maximum allowable exploitation rate of 25.0 percent and a minimum escapement of 38,180 natural area adult spawners. Fisheries were also structured to meet Council guidance for a minimum SRFC escapement of 180,000 hatchery and natural-area adults.

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 27,000 is decreased compared to the 30,750 Chinook quota in 2021. The non-Indian commercial coho quota of 32,000 is substantially increased relative to the 2021 quota of 5,000 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) landing and possession limits of 80 Chinook are in effect in the area between the U.S./Canada border and the Queets River and in the area between Leadbetter Point and Cape Falcon. In 2023, 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, 2022.

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.

The Oregon coast between Cape Falcon and the Heceta Bank line will be open for a portion of March through April. Chinook fisheries between Cape Falcon and the Heceta Bank line will be open portions of May through August. July and August include the retention of marked coho during the open days or attainment of quota. From the Heceta Bank line to Humbug Mountain, Chinook fisheries will be open for portions of May and August with marked coho retention in August open days or until quota is met. Chinook fisheries between Cape Falcon and Humbug Mountain will open again for a portion of September and all of October with weekly landing and possession limits in place.

For the Oregon portion of the Klamath Management Zone (KMZ), from Humbug Mountain to the Oregon/California border, the season will be open for a portion of March through April, followed by monthly quotas in June, July, and August. The summer quota fisheries have weekly landing and possession

limits. The California portion of the KMZ, from the Oregon/California border to Latitude 40°10' N, will be closed in 2022.

The Fort Bragg management area, from Latitude 40°10' N to Point Arena will be open for two five-day periods in July, and one opener in August for 10 days with a minimum size limit of 27 inches. The San Francisco management area, from Point Arena to Pigeon Point, will also be open for two short periods in July and one in August, plus the full month of September. The minimum size limit is 27 inches total length through August, then 26 inches thereafter. There will be a fall area target zone fishery between Point Reyes and Point San Pedro for two short openers in early October, open Monday through Friday.

The Monterey management area (south of Pigeon Point) will be open for three short periods in May, 12 days in early June, two five-day openings in July, and 10 days in early August under a 27 inch minimum size limit. The July and August fisheries will run concurrently with those in San Francisco and Fort Bragg.

9.2 Recreational

North of Cape Falcon, the recreational Chinook quota of 27,000 is slightly decreased from the 2021 quota of 27,250 Chinook. The recreational coho quota of 168,000 is substantially increased relative to the 2021 quota of 70,000 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 18 through the earlier of September 30 or when Chinook subarea guidelines or coho subarea quotas are attained. The daily bag limit is two salmon in both subareas.

The Columbia River subarea will open June 25 and the Westport subarea will open July 2. Both subareas will open seven days per week for all salmon species 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, no more than one of which may be a Chinook.

For the Oregon coast south of Cape Falcon to Humbug Mountain, the Chinook fishery opened March 15 and will run uninterrupted through October. Coho fisheries consist of a mark-selective coho quota from Cape Falcon to the Oregon/California Border beginning on June 18 and a non-mark-selective coho quota beginning on September 3 in the area from Cape Falcon to Humbug Mountain.

For the Oregon KMZ, the Chinook fishery will run from June 25 through August 21. In addition, this area will be open for mark-selective coho from June 18 to August 21 or attainment of quota. In the California KMZ, the season begins with open fisheries for the month of May. After a closure, the fishery will re-open on August 1 and remain open through Labor Day. The minimum size limit will be 24 inches in the Oregon KMZ and 20 inches in the California KMZ.

The Fort Bragg management area, from Latitude 40°10' N to Point Arena, will open on May 1 and run through the fourth of July. After a closure, the area will re-open on July 22 and remain open through Labor Day. The minimum size limit will be 20 inches.

The San Francisco management area, from Point Arena to Pigeon Point, opens on April 2 and runs continuously through the end of May. After a closure, the fishery will re-open on June 23 and run through the end of October. The minimum size limit will be 24 inches through May 15, and 20 inches thereafter.

South of Pigeon Point, the Monterey management area, the season will be open from April 2 through October 2. The minimum size limit will be 24 inches through May 15, and 20 inches thereafter.

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 20,000. The summer fishery opens on July 1 and runs through September 15 with a sub-quota of 20,000 Chinook and 52,000 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 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 a reduction in income impacts associated with commercial or recreational fishing activity may not necessarily indicate a net loss for a community, it is likely to indicate losses to businesses and individuals in communities that depend on that activity for livelihood, depending on the availability of substitute activities. Unless otherwise noted, the economic effects of the commercial and recreational fisheries summarized below are compared in terms of estimated community income impacts.

Total economic effects may vary from what is indicated by the short-term impacts 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, 2021 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 in the California KMZ region), Fort Bragg region, and south of Pigeon Point (Monterey region); and (5) caught south of Pigeon Point to landing ports in the San Francisco 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 as this fishery is not expected to be prosecuted in 2022. Estimated total harvest combined

with the prior year's average Chinook weights per fish 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 2021 was approximately two percent above the prior year and three percent above the recent five-year average, while coastwide average Chinook exvessel prices in 2021 were six percent above the prior year but five percent below the recent five-year average in inflation-adjusted terms. If this year's actual average weight 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 biological impacts. STT estimates for south of Cape Falcon use multi-year averages to predict effort for the coming year, as compared to last 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 as these fisheries are not expected to be prosecuted in 2022.

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 the 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 impact 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 2021 fishery, but information is also provided comparing projections to 2017-2021 averages. When referencing impacts of the action from a NEPA perspective, either a comparison to the baseline will be provided or the generic term "impacts" will be used. An overall summary of impacts from the action 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 action, comparisons to 2021 and 2017-2021 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 but will impact communities with an approximately 29 percent reduction in the estimated total coastwide commercial fisheries income impacts compared to last year (Figure 3 and Table 11). Regionally the picture is mixed, with income impacts from commercial salmon fisheries under the Proposed Action projected to be above last year's level in all three regions north of the Oregon/California border, but below last year's levels in all four regions south of the Oregon/California border. With respect to the 2017-2021 inflation-adjusted average, income impacts from commercial salmon fisheries under the Proposed Action are projected to be four percent lower overall coastwide, and below the 2017-2021 inflation-adjusted average in the two regions south of Point Arena, but above the 2017-2021 inflation-adjusted average in all five regions north of Point Arena (Figure 3 and Table 11).

Projected coastwide income impacts from expenditures by recreational salmon anglers under the Proposed Action are within the range analyzed under the Alternatives and overall will impact communities with about a 51 percent increase in the estimated total coastwide recreational fisheries income impacts compared to last year's activity (Table 11 and Figure 4). Regionally the picture is somewhat mixed, with recreational fisheries income impacts under the Proposed Action projected to be below last year's level in communities between Cape Falcon and Humbug Mountain, but above last year's level in all six other regions of the coast. Compared with the 2017-2021 inflation-adjusted average, coastwide recreational fisheries income impacts under the Proposed Action are projected to be 68 percent higher overall, and above the 2017-2021 inflation-adjusted average in all seven regions coastwide (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 the 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 making it easier to avoid fishing in inclement weather, improve marketing opportunities, and extend the period during which consumers have access to fresh, wild caught salmon. Notification mechanisms by phone 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 greater opportunities for Chinook and ocean coho opportunity compared with 2021 (Table 3 and Table 6). The Klamath River tribal share under the Proposed Action is 9,434 adult KRFC, a sixteen percent decrease from the 2021 allocation of 8,135 adult KRFC. 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 2022 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 2021. Although not true for all regions, relative to No Action (as represented by the 2021 values) the Proposed Action would provide lower overall coastwide income impacts from commercial fishing but increased income impacts from recreational fishing (Table 11).

As stated in Preseason Report II (PFMC, 2022c), 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. 2022a. Review of 2021 ocean salmon fisheries. Pacific Fishery Management Council, Portland, Oregon.

PFMC. 2022b. Preseason Report I: Stock abundance analysis and environmental assessment part 1 for 2022 ocean salmon fishery regulations. Pacific Fishery Management Council, Portland, Oregon.

PFMC. 2022c. Preseason Report II: Proposed alternatives and environmental assessment part 2 for 2022 ocean salmon fishery regulations. Pacific Fishery Management Council, Portland, Oregon.

TABLE 1. 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.

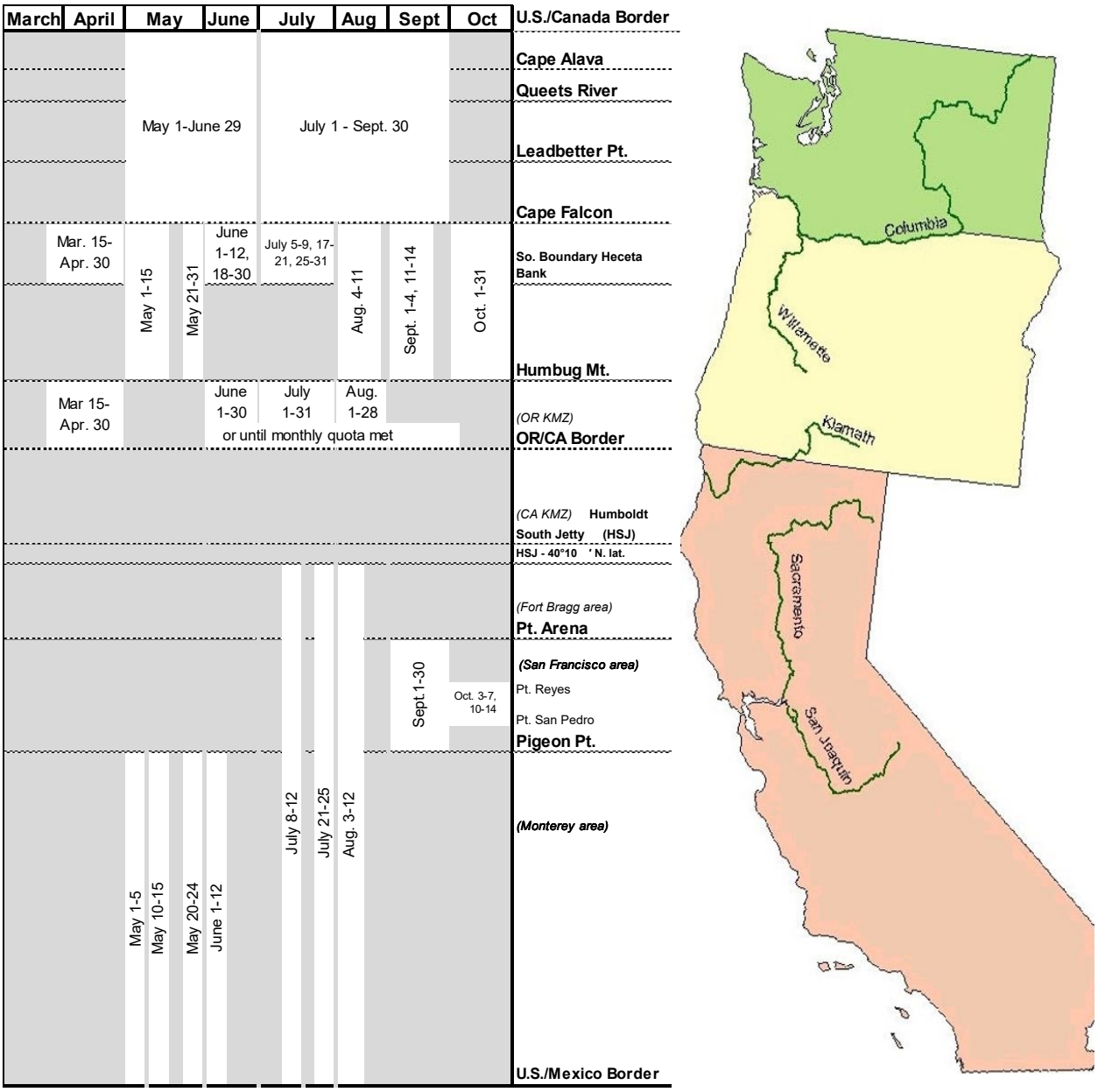

FIGURE 1. 2022 non-Indian commercial salmon seasons – Council adopted.

TABLE 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).
2. Recreational TAC: 27,000 Chinook and 168,000 marked coho; all retained coho must be marked.
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)

- June 18 through earlier of September 30, or 17,470 marked coho subarea quota, with a subarea guideline of 6,110 Chinook (C.5).

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).

Beginning August 1, Chinook non-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 18 through earlier of September 30, or 4,370 marked coho subarea quota, with a subarea guideline of 995 Chinook (C.5).

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).

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).

- 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.

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)

- July 2 through earlier of September 30, or 62,160 marked coho subarea quota, with a subarea guideline of 12,070 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 (C.1). See gear restrictions and definitions (C.2, C.3). Chinook minimum size limit of 22 inches total length (B).

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)

- June 25 through earlier of September 30, or 84,000 marked coho subarea quota, with a subarea guideline of 7,700 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 (C.1). See gear restrictions and definitions (C.2, C.3). Chinook minimum size limit of 22 inches total length (B).

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).

TABLE 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.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.

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

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.

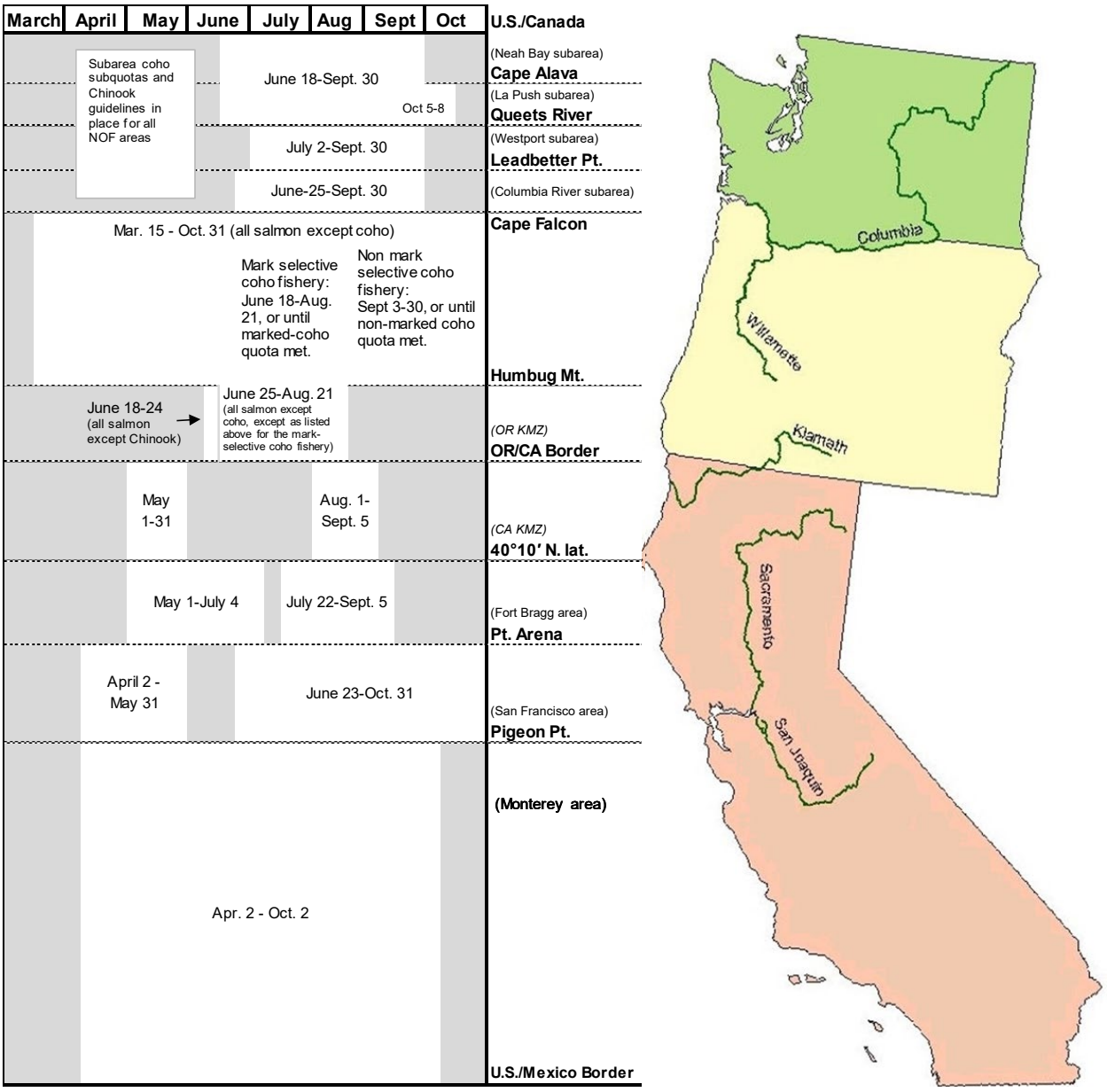

FIGURE 2. 2022 recreational salmon seasons – Council adopted.

TABLE 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. 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 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. 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 20,000 Chinook quota or 52,000 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 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 4. Chinook and coho harvest quotas and guidelines for 2022 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)	20,000	-	
U.S./Canada Border to Cape Falcon (All Species)	20,000	52,000	
Subtotal Treaty Indian Ocean Troll	40,000	52,000	
NON-INDIAN COMMERCIAL TROLL[b/]			
U.S./Canada Border to Cape Falcon (All Species Except Coho)	18,000	-	
U.S./Canada Border to Cape Falcon (All Species)	9,000	32,000	
Subtotal Non-Indian Commercial Troll	27,000	32,000	
RECREATIONAL			
U.S./Canada Border to Cape Alava[b/]	6,110	17,470	
Cape Alava to Queets River[b/]	1,120	4,370	
Queets River to Leadbetter Pt.[b/]	12,070	62,160	
Leadbetter Pt. to Cape Falcon[b/c/]	7,700	84,000	
Subtotal Recreational	27,000	168,000	
TOTAL NORTH OF CAPE FALCON	94,000	252,000	
SOUTH OF CAPE FALCON			
COMMERCIAL TROLL[b/]			
Cape Falcon to Humbug Mt.	-	10,000	
Humbug Mt. to OR/CA Border	1,450		
OR/CA Border to Humboldt South Jetty	-	-	
Subtotal Troll	1,450	10,000	
RECREATIONAL			
Cape Falcon to OR/CA Border[d/e]	-	117,000	[d/]
TOTAL SOUTH OF CAPE FALCON	1,450	127,000	

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 29,800 Chinook and 55,000 marked coho.
d/ The quota consists of both mark-selective and non-mark-selective quotas of 100,000 and 17,000, 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 2022 ocean salmon fishery management measures - Council adopted.[a/] (Page 1 of 5)

Key Stock/Criteria	Projected	2022 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
CHINOOK	**CHINOOK**		**CHINOOK**
SRKW PREY ABUNDANCE:			
North of Falcon	1,372.9	≥ 966.0	Oct 1 starting abundance of age 3+ Chinook from U.S./Canada Border to Cape Falcon
Oregon Coast	1,080.6	NA	Oct 1 starting abundance of age 3+ Chinook from Cape Falcon to Horse Mt.
California Coast	515.8	NA	Oct 1 starting abundance of age 3+ Chinook south of Horse Mt.
Southwest WCVI	715.6	NA	Oct 1 starting abundance of age 3+ Chinook off Southwest Vancouver Island
Salish Sea	706.7	NA	Oct 1 starting abundance of age 3+ Chinook in the Salish Sea
PUGET SOUND:			
Elwha Summer/Fall	4.5%	≤ 10.0%	Southern U.S. exploitation rate (NMFS ESA consultation standard).
Dungeness Spring	4.4%	≤ 10.0%	Southern U.S. exploitation rate (NMFS ESA consultation standard).
Mid-Hood Canal Summer/Fall	15.2%	≤ 15.2%	Preterminal Southern U.S. exploitation rate. Discussions between between WA state and tribal co-managers resulted in a conservation standard for 2022 fisheries consistent with NMFS guidance.
Skokomish Summer/Fall	50.0%	≤ 50.0%	Total exploitation rate (NMFS ESA consultation standard).
Nooksack Spring	10.7%	≤ 10.9%	Southern U.S. exploitation rate (NMFS ESA consultation standard).
	0.95	≤ 1.00	ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC.
Skagit Summer/Fall	41.2%	≤ 41.2%	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.
Skagit Spring	21.7%	≤ 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	8.9%	≤ 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	6.8%	≤ 8.3%	Southern U.S. exploitation rate limit under critical abundance forecast for 2022 (NMFS ESA consultation standard).
	0.69	≤ 1.00	ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC.
Lake Washington Summer/Fall	0.714	≥ 0.500	Natural spawning escapement in the Cedar River (NMFS ESA consultation standard).
Green River Summer/Fall	3.865	≥ 2.744	Natural spawning escapement in the Green River (NMFS ESA consultation standard).
White River Spring	17.0%	≤ 22.0%	Southern U.S. exploitation rate (NMFS ESA consultation standard).
Puyallup Summer/Fall	2.439	>1.170	Natural spawning escapement in the Puyallup River (NMFS ESA consutation standard). The resulting NOR spawning escapement, planned using this standard are consistent with NMFS guidance for 2022 fisheries.
Nisqually River Summer/Fall	47.5%	≤ 47.0%	Total exploitation rate, (NMFS ESA consultation standard). Up to an additional 2% ER may be added to facilitate inriver selective gear studies after meeting base criteria during final preseason modeling.
Puget Sound Spring	2.0%	≤ 3.0%	Exploitation rate in PFMC fisheries (NMFS ESA consultation standard).
Puget Sound Summer/Fall	5.5%	≤ 6.0%	Exploitation rate in PFMC fisheries (NMFS ESA consultation standard).

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2022 ocean fishery management measures - Council adopted.[a/] (Page 2 of 5)

Key Stock/Criteria	Projected	2022 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
CHINOOK	**CHINOOK**		**CHINOOK**
WASHINGTON COAST:			
Hoko Fall	**0.735**	0.85	FMP MSY spawning escapement objective.
	2.1%	≤ 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	229.6	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	78.6	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	73.6	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 (threatened)	38.0%	≤ 38.0%	Total adult equivalent fishery exploitation rate (2022 NMFS ESA guidance).
Columbia Lower River Wild[e/] (threatened)	10.9	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	92.2	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	56.3	29.0	Aggregate escapement to mouth of Columbia River.
Snake River Fall (threatened) SRFI	53.1%	≤ 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 2022 ocean fishery management measures - Council adopted.[a/] (Page 3 of 5)

Key Stock/Criteria	Projected	2022 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
CHINOOK	**CHINOOK**		**CHINOOK**
OREGON COAST:			
Nehalem Fall	--	≤ 0.85	ISBM obligation not applicable, escapement goal 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	38.180	≥ 38.180	2022 minimum natural area adult escapement (FMP control rule).
Federally recognized tribal harvest	50.0%	50.0%	Equals 9.4 (thousand) adult fish for Yurok and Hoopa Valley tribal fisheries.
Exploitation (spawner reduction) rate	25.0%	≤ 25.0%	FMP control rule.
Adult river mouth return	66.8	NA	Total adults in thousands.
Age-4 ocean harvest rate	10.0%	≤ 10.0%	NMFS guidance.
KMZ sport fishery share	6.8%		
River recreational fishery share	22.5%	NA	Equals 2.1 thousand adult fish for recreational inriver fisheries.
Sacramento River Winter (endangered)	15.2%	≤ 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 2022 ESA Guidance).
Sacramento River Fall	198,694	≥ 180.000	2022 minimum hatchery and natural area adult escapement (Council Guidance).
Sacramento Index Exploitation Rate	49.9%	≤ 69.2%	FMP control rule.
Ocean commercial impacts	91.9		Includes fall (Sept-Dec) 2021 impacts (5.7 thousand SRFC).
Ocean recreational impacts	73.5		Includes fall (Sept-Dec) 2021 impacts (3.3 thousand SRFC).
River recreational impacts	32.3		Equals 16.4% of the total harvest.

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2022 ocean fishery management measures - Council adopted.[a/] (Page 4 of 5)

Key Stock/Criteria	Projected	2022 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
COHO	**COHO**		**COHO**
Interior Fraser (Thompson River)	9.5%(4.8%)	≤ 10.0%	2022 Southern U.S. exploitation rate ceiling; PSC coho agreement.
Skagit	43.2%(4.5%)	≤ 60.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Stillaguamish	35.9%(3.2%)	≤ 50.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Snohomish	33.5%(3.2%)	≤ 40.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Hood Canal	44.1%(4.9%)	≤ 45.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Strait of Juan de Fuca	10.9%(3.9%)	≤ 20.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Quillayute Fall	11.6	6.3	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
	37.4%	≤ 50%	PST total exploitation rate constraint for 2022.[d/f/]
Hoh	3.9	2.0	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
	53.6%	≤ 58%	PST total exploitation rate constraint for 2022.[d/f/]
Queets Wild	15.2	5.8	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
	36.3%	≤ 65%	FMP total exploitation rate constraint (MFMT).[d/f/]
Grays Harbor	118.9	35.4	FMP MSP natural area adult spawner estimate. Value depicted is ocean escapement.
	49.6%	≤ 65%	FMP total exploitation rate constraint (MFMT).[d/f/]
Willapa Bay	43.3	17.2	FMP MSY natural area adult spawner estimate. Value depicted is ocean escapement.
Lower Columbia River Natural (threatened)	17.5%	≤23.0%	Total marine and mainstem Columbia R. fishery exploitation rate (2022 NMFS ESA guidance).
Upper Columbia[c/]	63.3%	≥ 50%	Minimum percentage of the run to Bonneville Dam.
Columbia River Hatchery Early	379.2	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	241.1	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	15.0%	≤ 15.0%	Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard).
Southern Oregon/Northern California Coast (threatened)			
Trinity Natural	13.5%	≤ 16.0%	total exploitation rate ceiling. (2022 NMFS ESA Guidance)
Klamath Natural	8.7%	≤ 15.0%	total exploitation rate ceiling. (2022 NMFS ESA Guidance)
Rogue Natural	7.8%	≤ 15.0%	total exploitation rate ceiling. (2022 NMFS ESA Guidance)
Other Natural	2.9%	≤ 15.0%	total exploitation rate ceiling. (2022 NMFS ESA Guidance)

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2022 ocean fishery management measures - Council adopted.[a/] (Page 5 of 5)

a/ Reflects 2022 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 2022 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 2021 Catch	Observed in 2021 Bycatch Mortality	
OCEAN FISHERIES:		**CHINOOK (thousands of fish)**				
NORTH OF CAPE FALCON						
Treaty Indian Ocean Troll	40.0	4.1	10.2	8.2	0.8	
Non-Indian Commercial Troll	27.0	11.6	41.5	19.3	7.8	
Recreational	27.0	3.3	15.1	17.8	2.2	
CAPE FALCON TO HUMBUG MT.[c/]						
Commercial Troll	45.7	10.6	30.3	16.9	4.9	
Recreational	11.9	1.3	4.8	5.5	0.6	
HUMBUG MT. TO OR/CA BORDER						
Commercial Troll	1.5	0.3	1.0	0.4	0.1	
Recreational	1.6	0.2	0.9	0.9	0.4	d/
OR/CA BORDER TO 40°10' N. LAT.						
Commercial Troll	-	-	-	-	-	
Recreational	2.2	0.2	0.9	0.6	0.3	d/
40°10' N. LAT. TO PT. ARENA						
Commercial Troll	22.1	5.1	14.6	43.7	17.0	d/
Recreational	8.3	0.9	3.3	3.7	0.4	d/
PT. ARENA TO PIGEON PT.						
Commercial Troll	24.5	5.7	16.2	104.9	21.5	d/
Recreational	53.8	6.1	19.9	34.0	3.9	d/
SOUTH OF PIGEON PT.						
Commercial Troll	37.8	8.7	25.1	52.8	8.7	d/
Recreational	20.7	2.4	7.7	17.0	1.8	d/
TOTAL OCEAN FISHERIES						
Commercial Troll	198.5	46.0	138.8	246.3	60.9	
Recreational	125.4	14.5	52.6	79.5	9.4	
INSIDE FISHERIES:						
Area 4B	-	-	-	-	-	
Buoy 10	29.8	16.8	3.2	20.8	3.0	d/

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2022 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 2021 Catch	Observed in 2021 Bycatch Mortality
OCEAN FISHERIES:		**COHO (thousands of fish)**			
NORTH OF CAPE FALCON					
Treaty Indian Ocean Troll[e/]	52.0	3.4	5.6	26.4	1.3
Non-Indian Commercial Troll	32.0	12.8	40.6	3.5	2.0
Recreational	168.0	30.7	131.7	64.2	15.6
SOUTH OF CAPE FALCON					
Commercial Troll	10.0	10.1	36.0	2.1	3.2
Recreational[e/]	117.0	27.1	127.6	79.0	24.1
TOTAL OCEAN FISHERIES					
Commercial Troll	94.0	26.3	82.2	32.0	6.5
Recreational	285.0	57.8	259.4	143.2	39.7
INSIDE FISHERIES:					
Area 4B					
Buoy 10	- 55.0	- 10.6	- 46.1	- 37.0	- 6.8 [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 2022 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%	2.9%
BRITISH COLUMBIA	0.1%	0.3%	13.0%
PUGET SOUND/STRAIT	0.2%	0.0%	0.3%
NORTH OF CAPE FALCON			
Treaty Indian Ocean Troll	2.1%	0.5%	2.2%
Recreational	5.0%	0.9%	3.0%
Non-Indian Troll	1.6%	0.3%	4.1%
SOUTH OF CAPE FALCON			
Recreational:			0.6%
Cape Falcon to Humbug Mt.	3.7%	7.6%	-
Humbug Mt. to OR/CA border (KMZ)	0.0%	0.2%	-
OR/CA border to Latitude 40°10' N. (KMZ)	0.0%	0.2%	-
Fort Bragg	0.0%	0.2%	-
South of Pt. Arena	0.0%	0.1%	-
Troll:			2.1%
Cape Falcon to Humbug Mt.	0.8%	0.9%	-
Humbug Mt. to OR/CA border (KMZ)	0.0%	0.0%	-
OR/CA border to Horse Mt. (KMZ)	0.0%	0.0%	-
Fort Bragg	0.0%	0.1%	-
South of Pt. Arena	0.0%	0.1%	-
BUOY 10	2.0%	0.1%	9.8%
ESTUARY/FRESHWATER	1.8%	3.4%	
TOTAL[a/]	17.5%	15.0%	38.0%

TABLE 7. Expected coastwide exploitation rates by fishery for 2022 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	0.1%	0.1%	0.1%	0.1%
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	0.1%	0.1%	0.1%	0.1%
Non-Indian Troll	0.0%	0.0%	0.0%	0.0%
SOUTH OF CAPE FALCON				
Recreational:				
Cape Falcon to Humbug Mt.	0.5%	0.5%	0.5%	0.5%
Humbug Mt. to OR/CA border (KMZ)	0.3%	0.3%	0.3%	0.3%
OR/CA border to Latitude 40°10' N. (KMZ)	0.7%	0.7%	0.7%	0.7%
Fort Bragg	0.4%	0.4%	0.4%	0.4%
South of Pt. Arena	0.2%	0.2%	0.2%	0.2%
Troll:				
Cape Falcon to Humbug Mt.	0.1%	0.1%	0.1%	0.1%
Humbug Mt. to OR/CA border (KMZ)	0.1%	0.1%	0.1%	0.1%
OR/CA border to Horse Mt. (KMZ)	0.0%	0.0%	0.0%	0.0%
Fort Bragg	0.2%	0.2%	0.2%	0.2%
South of Pt. Arena	0.1%	0.1%	0.1%	0.1%
BUOY 10	0.0%	0.0%	0.0%	0.0%
ESTUARY/FRESHWATER	10.6%	5.8%	4.9%	0.0%
TOTAL[a/]	13.5%	8.7%	7.8%	2.9%

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. 2022 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	29%	26%	21%	--
West Coast Vancouver Island	Recreational	60%	50%	44%	47%
North Georgia Strait	Recreational	40%	40%	38%	31%
South Georgia Strait	Recreational	41%	46%	42%	39%
Juan de Fuca Strait	Recreational	46%	44%	45%	38%
Johnstone Strait	Troll	--	--	--	--
NW Vancouver Island	Troll	42%	51%	50%	34%
SW Vancouver Island	Troll	52%	46%	45%	--
Georgia Strait	Troll	--	--	--	--
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	--	51%	48%	45%
Strait of Juan de Fuca (Area 6)	Recreational	--	49%	50%	43%
San Juan Island (Area 7)	Recreational	--	52%	44%	29%
North Puget Sound (Areas 6 & 7A)	Net	--	--	47%	44%
Council Area					
Neah Bay (Area 4/4B)	Recreational	44%	56%	50%	52%
LaPush (Area 3)	Recreational	57%	61%	63%	50%
Westport (Area 2)	Recreational	--	68%	63%	55%
Columbia River (Area 1)	Recreational	73%	74%	65%	64%
Tillamook	Recreational	67%	60%	53%	45%
Newport	Recreational	61%	56%	51%	32%
Coos Bay	Recreational	53%	47%	34%	38%
Brookings	Recreational	48%	34%	29%	--
Neah Bay (Area 4/4B)	Troll	--	53%	52%	49%
LaPush (Area 3)	Troll	--	56%	52%	49%
Westport (Area 2)	Troll	--	62%	61%	58%
Columbia River (Area 1)	Troll	--	70%	65%	52%
Tillamook	Troll	--	59%	57%	--
Newport	Troll	--	57%	49%	--
Coos Bay	Troll	--	--	39%	--
Brookings	Troll	--	--	--	--
Columbia River					
Buoy 10	Recreational	--	--	--	62%

TABLE 9. Preliminary projected exvessel value by catch area under Council-adopted 2022 non-Indian commercial troll management measures compared with 2021 and the 2017-2021 average (inflation-adjusted 2021 dollars).

	Exvessel Value (thousands of dollars)[a/]			Percent Change	
Management Area	2022 Projected[b/]	2021	2017-2021 Average	From 2021 (Modeled)	From 2017-2021 Average
North of Cape Falcon	3,536	2,019	2,234	+75%	+58%
Cape Falcon to Humbug Mt.	5,590	1,993	1,893	+180%	+195%
Humbug Mt. to OR/CA Border (OR KMZ)	200	56	166	+257%	+21%
OR/CA Border to 40º10' N. Lat. (CA KMZ	0	0	218	-	-100%
40º10' N. Lat. to Pt. Arena (Fort Bragg)	1,680	3,264	1,039	-49%	+62%
Pt. Arena to Pigeon Pt. (SF)	2,312	9,718	8,024	-76%	-71%
South of Pigeon Pt. (MO)	4,178	5,722	3,931	-27%	+6%
Total South of Cape Falcon	13,960	20,753	15,271	-33%	-9%
West Coast Total	17,496	22,772	17,505	-23%	-0%

a/ All dollar amounts are inflation-adjusted 2021 values. Exvessel value estimates are not comparable to the community income impacts shown in Table 10.

b/ 2022 projections are based on expected catches in the Council management areas, 2021 exvessel prices and 2021 average weights per fish.

TABLE 10. Preliminary projected angler trips and associated state-level personal income impacts under Council-adopted 2022 recreational ocean salmon management measures compared with 2021 and the 2017-2021 average (inflation-adjusted 2021 dollars).

	Angler Trips (thousands)			Coastal Community Income Impacts[a/] (thousands of dollars)[b/]			Percent Change in Income Impacts	
Management Area	2022 Projected	2021	2017-2021 Avg.	2022 Projected	2021	2017-2021 Avg.	Compared to 2021	Compared to 2017-2021 Avg.
North of Cape Falcon	148.5	62.8	59.3	23,101	9,777	8,762	+136%	+164%
Cape Falcon to Humbug Mt.	66.1	79.9	56.7	5,479	6,624	4,414	-17%	+24%
Humbug Mt. to OR/CA Border (OR KMZ)	6.9	5.9	5.1	482	410	335	+17%	+44%
OR/CA Border to 40º10' N. Lat. (CA KMZ)	10.3	2.2	4.5	1,374	298	555	+360%	+148%
40º10' N. Lat. to Pt. Arena (Fort Bragg)	12.4	8.6	7.2	2,033	1,413	1,186	+44%	+71%
Pt. Arena to Pigeon Pt. (SF)	58.9	45.4	53.7	15,353	11,838	13,514	+30%	+14%
South of Pigeon Pt. (MO)	34.3	31.9	19.1	5,169	4,807	2,720	+8%	+90%
Total South of Cape Falcon	188.8	173.9	146.2	29,889	25,390	22,724	+18%	+32%
West Coast Total	337.3	236.8	205.5	52,990	35,167	31,486	+51%	+68%

a/ Income impacts are not comparable to exvessel values shown in Table 9.

b/ Dollar amounts are in inflation-adjusted 2021 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	2022 Criteria	Objective or Other Comparative Standard as Noted
Chinook								
KRFC	Spawning Escapement	**33.829**	38.180	38.180	38.180	38.180	≥ 38.180	2022 minimum natural area adult escapement (FMP control rule).
	Exploitation (spawner reduction) rate	**33.5%**	25.0%	25.0%	25.0%	25.0%	≤ 25.0%	FMP control rule.
SRFC	Spawning Escapement	189.235	199.881	202.639	197.756	198.694	≥ 180.000	2022 minimum hatchery and natural area adult escapement (Council Guidance).
	Exploitation Rate	52.3%	49.6%	48.9%	50.1%	49.9%	≤ 69.2%	FMP control rule.
Canadian Stocks								
Interior Fraser Coho		6.0%(2.6%)	9.7%(6.2%)	8.8%(5.3%)	7.8%(4.3%)	9.5%(4.8%)	≤ 10.0%	2022 Southern U.S. exploitation rate ceiling; PSC coho agreement.
Puget Sound Coho								
Skagit		33.3%	33.4%(5.8%)	32.7%(4.9%)	32.0%(4.1%)	43.2%(4.5%)	≤ 60.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Stillaguamish		32.9%	33.2%(4.2%)	32.7%(3.5%)	32.3%(2.9%)	35.9%(3.2%)	≤ 50.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Snohomish		33.0%	33.3%(4.2%)	32.8%(3.5%)	32.3%(2.9%)	33.5%(3.2%)	≤ 40.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Hood Canal		44.6%	44.7%(6.2%)	44.1%(5.3%)	43.5%(4.3%)	44.1%(4.9%)	≤ 45.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Strait of Juan de Fuca		9.1%	10.6%(5.1%)	9.8%(4.3%)	9.1%(3.6%)	10.9%(3.9%)	≤ 20.0%	2022 total exploitation rate ceiling; FMP matrix[d/]
Washington Coastal Coho (in thousands of fish)								
Quillayute Fall Coho		12.0	11.5	11.6	11.8	11.6	6.3	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
			17.7%	16.9%	16.0%	37.4%	≤ 50%	PST total exploitation rate constraint for 2022.[d/]
Hoh Coho		4.0	3.8	3.9	4.0	3.9	2.0	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
			31.7%	30.0%	27.9%	53.6%	≤ 58%	PST total exploitation rate constraint for 2022.[d/]
Queets Wild Coho		15.7	15.0	15.3	15.7	15.2	5.8	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
			24.7%	23.2%	21.3%	36.3%	≤ 65%	FMP total exploitation rate constraint (MFMT).[d/]
Grays Harbor Coho		122.5	118.0	119.1	120.5	118.9	35.4	FMP MSP natural area adult spawner estimate. Value depicted is ocean escapement.
			29.0%	28.3%	27.4%	49.6%	≤ 65%	FMP total exploitation rate constraint (MFMT).[d/]
Willapa Bay Natural Coho		32.9	43.2	43.6	44.5	43.3	17.2	FMP MSY natural area adult spawner estimate. Value depicted is ocean escapement.
ESA-Listed Salmon								
California Coastal Chinook		**16.5%**	10.0%	10.0%	9.9%	10.0%	≤ 10.0%	KRFC age-4 ocean harvest rate. (NMFS Guidance)
SRWC		14.6%	14.9%	12.5%	14.0%	15.2%	≤ 20.0%	SRWC age-3 ocean impact rate in fisheries south of Pt. Arena.
LCR Natural Tule Chinook[d/]		NA	**40.3%**	**38.8%**	38.0%	38.0%	≤ 38.0%	Total adult equivalent fishery exploitation rate (2022 NMFS ESA guidance).
LCN Coho[d/]		13.5%	14.2%	12.9%	11.1%	17.5%	≤23.0%	Total marine and mainstem Columbia R. fishery ER (2022 NMFS ESA guidance).
OCN coho[d/]		13.9%	14.4%	13.8%	14.9%	15.0%	≤ 15.0%	Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard).
SONCC coho								
	Trinity Natural		14.1%	14.0%	13.7%	13.5%	≤ 16.0%	total exploitation rate ceiling
	Klamath Natural		8.7%	8.6%	8.3%	8.7%	≤ 15.0%	total exploitation rate ceiling
	Rogue Natural		7.8%	7.7%	7.4%	7.8%	≤ 15.0%	total exploitation rate ceiling
	Other Natural		2.9%	2.8%	2.5%	2.9%	≤ 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	3,536	7,282	6,659	5,857	6,232
Cape Falcon to Humbug Mt.	3,286	9,532	7,214	8,238	9,244
Humbug to OR/CA border (OR KMZ)	250	441	275	570	425
OR/CA border to 40º10' N. Lat. (CA KMZ)	493	415	229	142	398
40º10' N. Lat. to Pt. Arena (Fort Bragg)	5,556	2,641	1,114	405	2,519
Pt. Arena to Pigeon Pt. (San Francisco)	23,726	7,342	10,048	11,329	7,451
South of Pigeon Pt. (Monterey)	3,818	2,623	3,110	3,412	2,730
West Coast Total	40,666	30,276	28,649	29,953	29,000
Recreational Community Personal Income Impacts (thousands of dollars)					
North of Cape Falcon	9,777	28,401	25,176	21,837	23,101
Cape Falcon to Humbug Mt.	6,624	5,479	5,189	3,505	5,479
Humbug to OR/CA border (OR KMZ)	410	161	433	259	482
OR/CA border to 40º10' N. Lat. (CA KMZ)	298	1,350	1,447	577	1,374
40º10' N. Lat. to Pt. Arena (Fort Bragg)	1,413	2,116	2,139	2,726	2,033
Pt. Arena to Pigeon Pt. (San Francisco)	11,838	14,672	13,574	13,118	15,353
South of Pigeon Pt. (Monterey)	4,807	5,168	5,156	5,141	5,169
West Coast Total	35,167	57,348	53,114	47,164	52,990

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 2021 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/ Includes projected impacts of inriver fisheries.

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. 2022 spawning escapement and exploitation rate estimates are based on 2022 preseason abundance forecasts and 2022 adopted Council regulations.

	Estimated Adult Spawning Escapement									Total Exploitation Rate						
	2017	2018	2019	2020	2021[a/]	Forecast 2022[b/]	3-yr Geo Mean	MSST	S_{MSY}	2017	2018	2019	2020	2021[a/]	2022[b/]	MFMT
Chinook																
Sacramento Fall	44,329	105,466	163,767	138,091	104,483	198,694	142,058	91,500	122,000	0.68	0.52	0.68	0.61	0.68	0.50	0.78
Klamath River Fall	19,904	52,352	20,022	26,190	30,196	38,180	31,139	30,525	40,700	0.10	0.32	0.43	0.30	0.38	0.25	0.71
Southern Oregon[c/]	91,977	39,497	19,426	30,497	48,870	NA	30,706	20,500	34,992	NA	NA	NA	NA	NA	NA	0.54
Central and Northern OR[d/]	114	92	65	137	85	NA	91	30 fish/mi	60 fish/mi	0.45	0.66	0.50	NA	NA	NA	0.78
Upper Columbia Bright - Fall[d/]	96,096	58,540	77,880	98,401	86,644	71,978	84,979	19,182	39,625	0.49	0.34	0.37	NA	NA	NA	0.86
Upper Columbia - Summer[d/]	56,265	38,816	41,090	70,654	52,076	56,345	59,185	6,072	12,143	0.46	0.54	0.26	NA	NA	NA	0.75
Willapa Bay - Fall[e/]	3,147	2,847	2,894	3,585	NA	NA	3,091	1,696	3,393	0.51	0.61	0.73	NA	NA	NA	0.78
Grays Harbor Fall[e/]	17,145	20,741	14,880	20,879	NA	NA	18,609	5,694	13,326	0.48	0.63	0.72	NA	NA	NA	0.78
Grays Harbor Spring	1,384	493	983	2,828	2,573	NA	1,927	700	1,400	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall[d/]	2,822	2,207	2,663	3,459	NA	NA	2,729	1,250	2,500	0.55	0.66	0.64	NA	NA	NA	0.87
Queets - Sp/Su	825	484	322	342	NA	NA	376	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall[e/]	1,808	2,478	1,552	2,273	NA	NA	2,060	600	1,200	0.51	0.56	0.79	NA	NA	NA	0.90
Hoh Sp/Su	1,364	793	766	1,248	NA	NA	912	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall[e/]	3,604	3,937	7,765	8,672	3,873	NA	6,389	1,500	3,000	0.69	0.72	0.73	NA	NA	NA	0.87
Quillayute - Sp/Su	1,097	990	1,442	935	748	NA	1,003	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa[d/]	1,188	2,179	1,815	2,122	NA	NA	2,032	425	850	0.26	0.54	0.77	NA	NA	NA	0.78
Coho																
Willapa Bay[f/]	11,379	17,228	15,115	16,476	NA	24,418	18,253	8,600	17,200	0.34	0.35	0.39	0.33	NA	0.53	0.74
Grays Harbor[f/]	26,907	49,622	30,468	23,814	NA	65,626	36,245	18,320	24,426	0.32	0.22	0.39	0.29	NA	0.50	0.65
Queets	5,232	2,631	1,700	4,181	NA	11,673	4,362	4,350	5,800	0.23	0.23	0.57	0.22	NA	0.36	0.65
Hoh	4,478	2,463	2,445	2,840	NA	2,187	2,476	1,890	2,520	0.43	0.34	0.57	0.49	NA	0.54	0.65
Quillayute Fall	7,474	6,091	6,852	7,695	8,321	7,842	7,948	4,725	6,300	0.42	0.30	0.37	0.16	NA	0.37	0.59
Juan de Fuca	5,530	5,470	4,625	8,548	NA	6,519	**6,364**	7,000	11,000	0.05	0.08	0.12	0.07	NA	0.11	0.60
Hood Canal	23,871	7,512	7,884	16,832	33,299	11,350	18,529	10,750	14,350	0.35	0.57	0.46	0.29	NA	0.44	0.65
Skagit	20,184	19,047	14,246	23,808	NA	45,869	24,964	14,875	25,000	0.09	0.49	0.48	0.43	NA	0.43	0.60
Stillaguamish	6,099	23,937	12,887	21,555	NA	16,017	16,447	6,100	10,000	0.12	0.22	0.20	0.13	NA	0.36	0.50
Snohomish	18,195	58,135	40,314	42,675	NA	42,871	41,937	31,000	50,000	0.21	0.25	0.17	0.11	NA	0.34	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/ Preliminary CWT-based exploitation rates from PSC-CTC 2021 Exploitation Rate Analysis.

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/ Escapement and exploitation rate estimates based on natural area adult spawners.

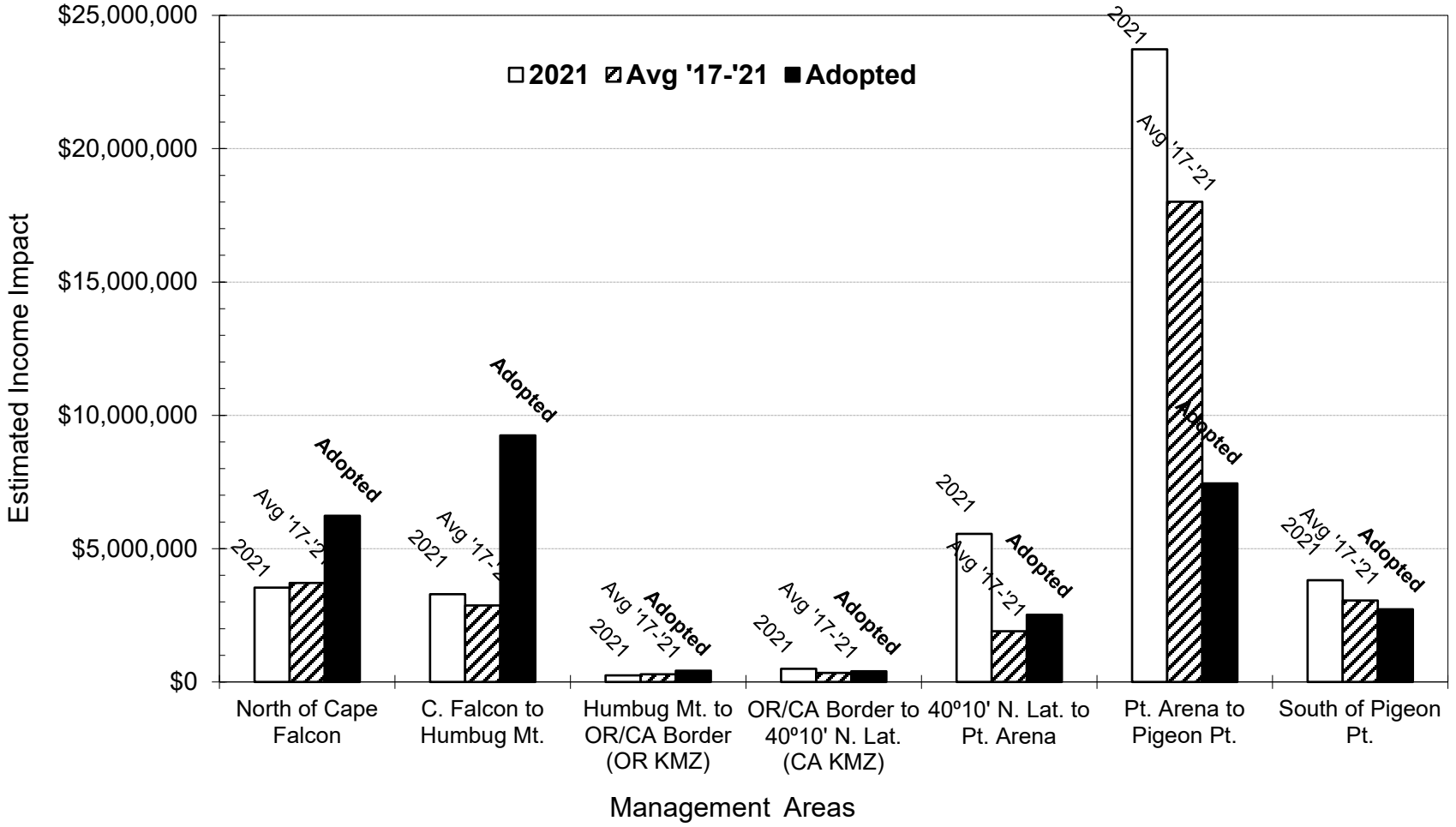

FIGURE 3. Projected coastal community personal income impacts associated with the 2022 commercial troll fishery under Council-adopted management measures compared to estimated 2021 and the 2017-2021 inflation-adjusted average (in 2021 dollars).

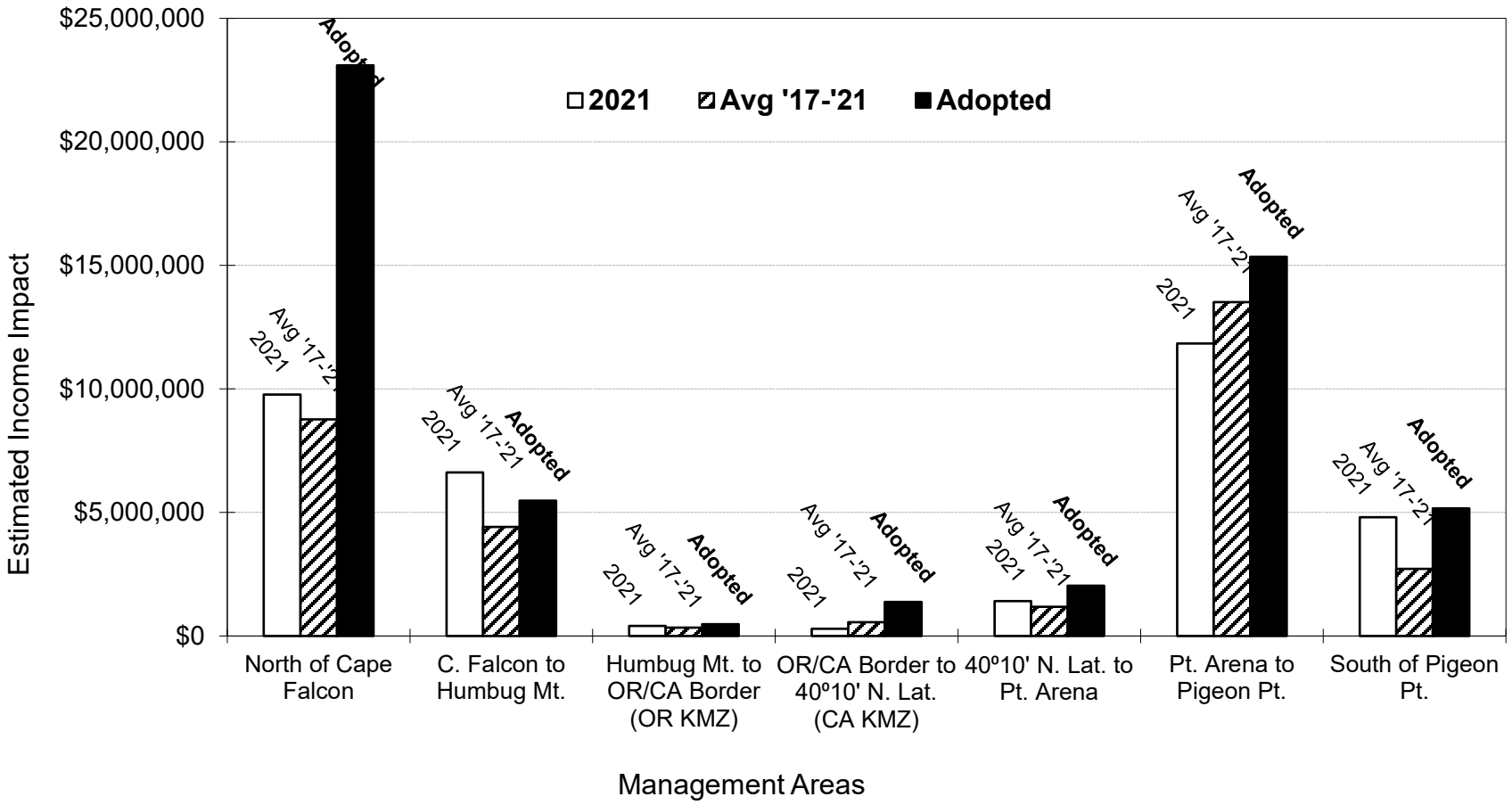

FIGURE 4. Projected coastal community personal income impacts associated with the 2022 recreational ocean salmon fishery under Council-adopted management measures compared to estimated 2021 and the 2017-2021 inflation-adjusted average (in 2021 dollars).

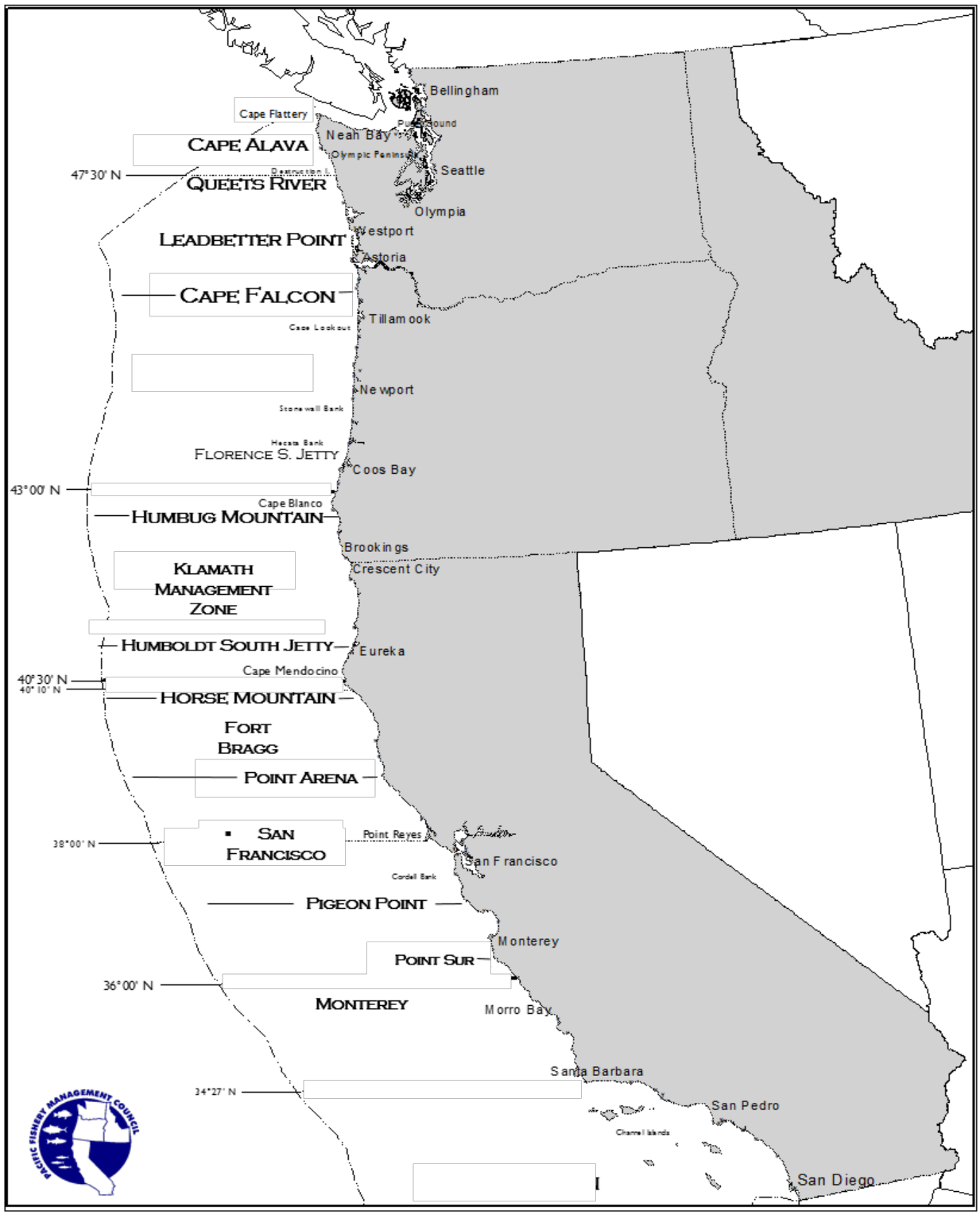

FIGURE 5. Map of Pacific West Coast with major salmon ports and management boundaries. This map is for reference only and is not intended for use in navigation or fishery regulation.

APPENDIX A: STANDARDIZED BYCATCH REPORTING METHODOLOGY

The National Marine Fisheries Service (NMFS) requires all fishery management plans (FMPs) to establish a standardized bycatch reporting methodology (SBRM) to assess the amount and type of bycatch occurring in its fisheries (82 FR 6317). SBRM is used to estimate bycatch as it is defined by the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Bycatch includes fish which are harvested in a fishery, but which are not sold or kept for personal use and includes economic discards and regulatory discards.

The Salmon Technical Team (STT) provided a report to the Pacific Fishery Management Council (Council) in November 2021 which (1) described monitoring programs that generate bycatch estimates for commercial and recreational ocean salmon fisheries, (2) described how SBRM requirements are met, and (3) proposed draft new language for the salmon FMP that would provide further details on SBRM for salmon fisheries (which will be included under Salmon FMP Amendment 22).

Salmon bycatch projections for the upcoming salmon seasons, and postseason salmon bycatch estimates from the previous season are presented in Table 6 of this report (Preseason Report III). Footnotes to Table 6 describe aspects of the bycatch enumeration methodology, but do not fully describe the methods used. To more comprehensively document the methods used to make preseason and postseason estimates of bycatch, the STT developed this appendix that describes the data and methods used to generate bycatch projections and estimates, and how the methods differ for commercial and recreational fisheries and along the coast.

CHINOOK

North of Cape Falcon

Projected Chinook bycatch mortality in the north of Cape Falcon area is estimated using the Chinook Fishery Regulation Assessment Model (FRAM) and is the sum of both drop-off and hook-and-release mortality. Drop-off mortality is estimated as five percent of the total number of legal-sized Chinook projected by the model to be encountered (brought to the boat and either retained or released) based on preseason abundance forecasts and the fishery management measures being modeled.

Hooking mortality occurs in both standard Chinook retention fisheries and in mark-selective Chinook fisheries. Sublegal-sized encounters and mortalities occur in all Chinook retention fisheries with size limits and are calculated based on the minimum size limit for a fishery and stock-specific von Bertalanffy growth equations for the stocks that contribute to each fishery. Legal-sized releases during Chinook directed fisheries are only expected to occur if mark-selective regulations are in place, which are rare for Chinook in Council area fisheries. In these situations, all legal-sized unclipped Chinook are expected to be released, except for a small allowance for an "unmarked retention error" rate, which is the proportion of legal-sized unclipped Chinook that are retained. Similarly, all legal-sized clipped encounters are assumed to be retained, except for a small allowance for a "marked recognition error" rate, which specifies the proportion of legal-sized clipped Chinook encounters that are expected to be released. Hooking mortality is calculated by applying hooking mortality rates to the estimated number of sublegal- and legal-sized releases in each fishery. Hooking mortality rates in north of Cape Falcon Council area fisheries vary by gear type and are assumed to be 26 percent for ocean commercial troll and 14 percent for ocean recreational fisheries.

Regulations requiring Chinook non-retention in Council area fisheries north of Cape Falcon are rare and have not occurred in many years. Should they occur, expected encounters would likely be estimated external to the model using similar approaches to those used for coho (see below), based on previous estimates of Chinook per coho encounter ratios from on board observer, on-water trip report, or dockside sampling data. These estimates of encounters are supplied as inputs to Chinook FRAM, to which gear-specific hooking mortality rates get applied.

Observed Chinook bycatch mortality in both the troll and recreational fisheries in the north of Cape Falcon area are calculated simply by scaling the preseason projected bycatch mortality from the respective fishing year by the ratio of the observed catch to the preseason projected catch.

South of Cape Falcon

Chinook bycatch mortality in the south of Cape Falcon area is estimated using interview data collected at the docks in California. All sampled boats are asked about the number of salmon discarded. Then hook and release mortality rates (HRM) are applied to the bycatch estimate in each fishery. The sport HRM south of Point Arena is a weighted average of the mooching (42.2 percent) and trolling (14 percent) HRM rates, weighted for the proportion of angling effort that used the respective modes of fishing. The sport HRM north of point arena is 14 percent and the commercial HRM in all areas South of Falcon is 26 percent. Total bycatch mortality is the combined hook and release mortality and drop off mortality. Drop off mortality is the total estimated contacts (catch + bycatch) multiplied by a 5 percent drop off mortality rate.

When projecting bycatch mortality for an upcoming season, fishery-specific bycatch impact rates (bycatch mortality per harvest) are used from the previous season and applied to the harvest projections for the upcoming season[2]. Harvest projections for summer fisheries are produced by the KOHM and SHM models, however the models do not project catch in fall fisheries (September- November).

The projected total harvest north of Point Arena is calculated as:

KOHM summer catch + [Sept, Oct, Nov] federal days open * 5- year average [Sept, Oct, Nov] catch per day open + 5-year average [Sept, Oct, Nov, Dec] state-waters-only catch.

The projected total harvest south of Point Arena is projected as :

SHM summer catch + [Sept, Oct, Nov] federal days open * 5- year average [Sept, Oct, Nov] catch per day open.

COHO

Projected coho bycatch mortality in Council area fisheries is estimated using coho FRAM and is the sum of both drop-off and hook and release mortality. In Council area fisheries, coho bycatch mortality occurs in standard retention fisheries, in mark-selective retention fisheries, and in coho non-retention fisheries. In standard retention fisheries, bycatch mortality is equal to the drop-off mortality, which is calculated by applying the assumed drop-off mortality rate of five percent to the total number of coho encountered, which is equivalent to the landed catch.

In mark-selective coho fisheries, the model projects encounters by mark-status (adipose fin clip). All unclipped encounters are assumed to be released, except for a small allowance for an "unmarked retention error" rate, which specifies the proportion of unmarked encounters that are expected to be retained and is an input into the model that can be specified at a fishery and time-period specific level. Similarly, all clipped encounters are assumed to be retained, except for a small allowance for a "marked recognition error" rate, which specifies the proportion of marked encounters that are expected to be released and is an input into the model that can be specified at a fishery and time-period specific level. Projected hooking mortality in coho mark-selective fisheries is calculated as the total number of coho projected to be released (both marked and unmarked) times the fishery-specific hooking mortality rate. Hooking mortality rates in Council area fisheries vary by gear type and are assumed to be 26 percent for ocean commercial troll and 14 percent for ocean recreational fisheries, except for those that occur south of Point Arena, which vary

[2] Bycatch projections in coho-only fisheries are calculated in the same manner but using total legal-sized Chinook encounters from the KOHM and SHM rather than harvest.

annually based on the proportion of fish caught using mooching versus trolling gear (see above). Projected drop-off mortality in coho mark-selective fisheries is calculated as the total number of coho encounters (retained plus released) times the assumed drop-off mortality rate of five percent. Total projected bycatch mortality in a coho mark-selective fishery is calculated as the sum of hooking mortality and drop-off mortality.

For coho non-retention fisheries, projected bycatch mortality is calculated externally to FRAM and provided as an input to the model. While the method for calculating bycatch mortality is generally consistent (i.e., drop-off and hooking mortality rates applied to estimates of coho encountered and released), the methods for estimating coho encounters during non-retention time periods varies by region across the Council area. For coho non-retention fisheries that occur north of Cape Falcon, the projected coho encounters in commercial troll fisheries are based on Chinook to coho encounter ratios from on-board observer data collected between 1998 and 2006 in the Treaty Indian troll fishery and between 2004 and 2007 in the non-Indian commercial troll fishery. In recreational fisheries, expected coho encounters are based on chinook to coho encounter ratios collected through dockside sampling programs during previous years' coho non-retention fisheries. Drop-off and hooking mortality rates are applied to these estimates of encounters in non-retention fisheries to project bycatch mortality.

For non-retention fisheries that occur between Cape Falcon and Humbug Mountain, total coho encounters for each fishery/time stratum are estimated by applying a CPUE to projected effort produced by the Klamath Ocean Harvest Model (KOHM) for the specific set of fishery management measures being modeled. The CPUE values are derived using landings and effort data from the coho FRAM base period years (1986 – 1992, when coho retention was allowed in these fisheries), then scaled based on the ratio of the current year's OPI coho forecast relative to the average OPI coho abundance during the base period years. Adjustments are incorporated that discount the projected number of encounters in Oregon troll fisheries to account for targeting Chinook only (25 percent reduction) and for a four-spread gear credit (reductions variable by area). Drop-off and hooking mortality rates are applied to these estimates of encounters in non-retention fisheries to project bycatch mortality.

For non-retention fisheries that occur south of Humbug Mountain, total coho encounters are estimated using coho FRAM. Fishery scaler inputs for each FRAM fishery/time stratum are derived by dividing projected effort (from the KOHM) by the average effort that occurred during the coho FRAM base period years, then the model is run using these inputs as a standard retention fishery input. The projected landed catch that results from this model run is used as the projected total encounters during the non-retention period in each fishery/time stratum. This results in encounters estimates that are scaled both for the projected levels of fishing effort and the forecasted coho stock abundances. Drop-off and hooking mortality rates, in addition to any gear/target adjustments, are applied to these estimates of encounters in non-retention fisheries to project bycatch mortality.

Observed bycatch mortality in the Council area troll fisheries that permit coho retention (both standard and mark-selective retention) is calculated simply by scaling the preseason projected bycatch mortality from the year of interest by the ratio of the observed catch to the preseason projected catch, as there are no data on the number of releases that could be used to generate an independent estimate.

In the Council area, recreational fisheries that permit coho retention (either standard or mark-selective retention) occur in both Washington and Oregon. In these fisheries the numbers of coho retained and released by fishery/time stratum are estimated though comprehensive dockside sampling programs[3] operated by WDFW and ODFW. These sampling programs employ some combination of on-board observers, dockside interviews, and voluntary on-water trip reports (VTRs), which are forms completed by

[3] See the links below for details on methods associated with WDFW and ODFW dockside sampling and estimation programs:

- https://www.recfin.org/wp-content/uploads/2017/11/Washington-Ocean-Sampling-Program-OSP-Overview-for-RECFIN-UPDATEDNOV-2....pdf
- https://www.dfw.state.or.us/MRP/salmon/docs/ORBS_Design_2021.pdf

anglers while fishing, to enumerate encounters by species, size class, and mark status. These data are used to estimate the total number of coho retained and released from which bycatch mortality is calculated by applying the drop-off and hooking mortality rates as described above.

Methods for calculating observed bycatch mortality in coho non-retention fisheries vary by region. In fisheries north of Cape Falcon, where preseason projections of coho non-retention encounters are derived based on assumed coho-per-Chinook encounter rates, the preseason projections are scaled by the ratio of observed Chinook catch to the preseason projected Chinook catch. For non-retention fisheries south of Cape Falcon, the same methods are used as described above, but using observed effort and abundances rather than the forecasted values that were used for preseason projections.

ADDENDUM: CONSISTENCY WITH OTHER APPLICABLE LAW

Magnuson-Stevens Conservation and Management Act (MSA)

The MSA provides parameters and requirements 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 2022, some salmon stocks are forecast at low abundance, and 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 2022. These are: Klamath River Fall Chinook (KRFC), California Coastal Chinook salmon (ESA-listed threatened), Lower Columbia River Chinook salmon (natural tule component) (ESA-listed threatened) north and south of Cape Falcon, and Puget Sound Chinook salmon (ESA-listed threatened) north 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).

In 2018, five stocks were determined to be overfished: KRFC, Sacramento River fall-run Chinook salmon (SRFC), Queets natural coho, Juan de Fuca natural coho, and Snohomish natural coho. In 2020, NMFS determined that Snohomish coho status had improved to not overfished-rebuilding. In 2021, NMFS determined that SRFC had achieved rebuilt status. The alternatives in this EA were designed to be risk averse with respect to overfished 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 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.

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 with regard to stock status determinations and catch specifications. 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 crafted 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, i.e., stock complex.[1] 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, which were in turn developed to meet National Standard 4.

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, consistent with the FMP, have provisions to adjust management measures if unsafe weather or public health emergency affects the fisheries' access.

[1] Stock complexes are groups of individual stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impacts of management actions on the stocks are similar. Stock complexes may be formed to facilitate management requirements such as setting ACLs in a mixed stock fishery. Each stock complex has one or more indicator stocks to establish annual harvest constraints based on status of those indicator stocks.. For example, the Central Valley Fall Chinook Stock Complex includes fall and late fall Chinook from the Sacramento and San Joaquin basins; the indicator stock is Sacramento River Fall Chinook.

The development of the Alternatives in this EA has taken into account safety per the involvement of the fishing communities in their development.

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 principal 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 following stocks or distinct population segments (DPS) of marine mammals are listed as depleted under the MMPA or ESA-listed as threatened or endangered (any species listed as endangered or threatened under the ESA is considered depleted under the MMPA):

- blue whale (*Balaenoptera musculus*)—throughout its range (ESA endangered);
- gray whale (*Eschrichtius robustus*)—throughout its range (ESA endangered);
- fin whale (*Balaenoptera physalus*)—throughout its range (ESA endangered);
- Guadalupe fur seal (*Arctocephalus townsendi*)—throughout its range (ESA threatened);
- humpback whale (*Megaptera novaeangliae*)—Central America DPS (ESA endangered), Mexico DPS (ESA threatened), California/Oregon/Washington stock (MMPA depleted);
- killer whale (*Orcinus orca*)—Southern Resident DPS (ESA endangered) (see below);
- North Pacific right whale (*Eubalaena japonica*)—throughout its range (ESA endangered);
- Northern fur seal (*Callorhinus ursinus*)—Pribilof Island/Eastern Pacific Stock (MMPA depleted);
- sea otter (*Enhydra lutris nereis*)—southern (ESA threatened)

- sei whale (*Balaenoptera borealis*)—throughout its range (ESA endangered);
- sperm whale (*Physeter microcephalus*)—throughout its range (ESA endangered).

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 (87 FR 23122, April 19, 2022). 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 11, 2022. 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).[2]

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 take in the fisheries that has been exempted via either section 7(a)(2) or 4(d) of the ESA in biological opinions and 4(d) determinations issued by NMFS. The proposed action is consistent with those biological opinions and determinations as summarized in Table 1 below. Under Section 7 of the ESA, biological opinions evaluate whether incidental take of a listed species in an otherwise lawful activity would jeopardize the species. Section 4(d) exempts take of listed species provided specific conditions are met. These conditions are described in NMFS' salmon and steelhead 4(d) rule (June 28, 2005 70 FR 37160).The California Coastal (CC) Chinook salmon ESU has been listed as threatened under the ESA since 1999. The current consultation standard for CC Chinook salmon is described in the FMP and is based on a 2000 NMFS biological opinion, which included a RPA specifying fishery management measures needed to avoid jeopardy to the ESU. In 2005, after the ocean salmon fishery exceeded the take limit, NMFS reinitiated consultation and affirmed and clarified the finding of the 2000 biological opinion and the RPA. On March 28, 2022 NMFS reinitiated consultation on the effects of the implementation of the FMP on CC Chinook because the post-season assessment of the 2021 ocean fisheries indicated that the take limit for CC Chinook had been exceeded. We anticipate completion of a biological opinion prior to the implementation of the regulations for the 2023 ocean salmon season. We reviewed the available information and concluded that implementation of the 2022 harvest management measures will not jeopardize the CC Chinook salmon ESU, will not adversely modify its designated critical habitat, and will not result in any irreversible or irretrievable commitment of resources that would have the effect of foreclosing the formulation or

[2] 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.

implementation of any reasonable and prudent alternative measures, consistent with sections 7(a)(2) and 7(d) of the ESA.

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 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 analyzed in the 2021 biological opinion when developing the alternatives for 2022 annual management measures and found that the abundance of Chinook salmon in 2022 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 ESA 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	S. Oregon/N. California Coastal coho Central California Coast coho Oregon Coast natural coho
April 28, 2000	until reinitiated	Central Valley Spring-run Chinook California Coastal Chinook
September 14, 2001	until withdrawn	Hood Canal summer-run chum
April 30, 2001	until reinitiated	Upper Willamette River Chinook Columbia River chum Ozette Lake sockeye Upper Columbia River spring-run Chinook Ten listed steelhead DPSs
June 13, 2005	until reinitiated	California Coastal Chinook
April 9, 2015	until reinitiated	Lower Columbia River coho
March 30, 2018	until reinitiated	Sacramento River winter-run Chinook
April 29, 2004 May 19, 2021	until reinitiated until May 14, 2022	Puget Sound Chinook Puget Sound steelhead
April 27, 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	Western DPS Steller Sea Lion
April 21, 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 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, 2022, for review under section 307(c)(1) of the CZMA. NMFS did not receive responses from the agencies, 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 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.. 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 2022 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 2022 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. 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 2022 measures are not in place on May 16 when the first salmon fisheries under the 2022 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, 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 2022 Ocean Salmon Fisheries Management 0648-BK78

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). 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 both short- and long-term effects (40 CFR § 1501.3(b)(2)(i); 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)(ii)-(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 2022 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 is not considered to meaningfully contribute to a significant impact based on the scale of impact, as the action is temporary (i.e., these annual management measures will be in place for one year, until superseded by the next year's management measures), and the salmon fishery is small in terms of economic and environmental impacts.

The proposed action will not meaningfully contribute to significant impacts to specific resources in the affected area. The ocean salmon fisheries have 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, such that the effects taken together could be significant.

III. Geographic Extent and Scale of the Proposed Action:

The proposed action establishes annual 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 action 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 fish species that are potentially impacted by the fisheries are listed as threatened or endangered under the Endangered Species Act (ESA). The 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 fishery impacts on ESA-listed stocks within the range are analyzed under the appropriate biological opinions to minimize or avoid adverse effects on each species. The alternatives for the 2022 ocean salmon 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 completed an ESA consultation and issued a biological opinion (WCRO-2021-03260, April 28, 2022) on the effects of implementing the salmon FMP on the threatened Southern Oregon/Northern California Coastal coho salmon (SONCC coho salmon) evolutionarily significant unit (ESU). The biological opinion concluded authorization of the ocean salmon fishery in the West Coast EEZ through approval of

the salmon FMP and promulgation of regulations implementing the FMP is not likely to jeopardize the continued existence of the SONCC coho salmon ESU or destroy or adversely modify its designated or proposed critical habitat.

NMFS has reinitiated consultation on the effects of the implementation of the FMP on California Coastal Chinook (CCC) salmon because the post-season assessment of the 2021 ocean fisheries indicated that the take limit for CCC salmon had been exceeded. We anticipate completion of a biological opinion prior to the implementation of the regulations for the 2023 ocean salmon season. NMFS has assessed the potential impacts of the 2022 management measures to CCC salmon, and has made a determination under ESA sections 7(a)(2) and 7(d) that the 2022 fisheries are not likely to jeopardize CCC 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 (MMPA);

Ocean salmon fisheries are classified under the MMPA as Category III (87 FR 23122, April 19, 2022), indicating there is "a remote likelihood of or no known incidental mortality or serious injury of marine mammals" (MMPA 118(c) I). See item C.a., above, for information on ESA-listed Southern Resident killer whale (SRKW).

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 2022. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response. Effects of the Pacific Coast Salmon Fishery Management Plan on the

Southern Oregon / Northern California Coast Coho Salmon Evolutionarily Significant Unit Listed Under the Endangered Species Act. WCRO-2021-03260. April 28, 2022. 92 p.

NMFS has continued to confirm this conclusion from the 2001 EFH consultation through subsequent EFH consultations, including one completed most recently in 2022 for SONCC coho salmon (WCRO-2021-03260).

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 analyses, 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-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. 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 are 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 SRKW 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 (PFMC) fisheries are managed consistent with ESA requirements for listed salmon. The conservation objectives and rebuilding requirements of the FMP are designed to ensure the sustainability of salmon stocks affected by PFMC 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 2022 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 PFMC'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 PFMC-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). PFMC-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 2022 Ocean Salmon Fisheries Management, it is hereby determined that the 2022 Ocean Salmon Fisheries Management will not significantly impact the quality of the human environment. The Final EA for 2022 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 29, 2022

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West Coast Region
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Date