Preface to the
Environmental Assessment for
2019 Ocean Salmon Fisheries Management Measures
(RIN 0648-BI05)

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 of the proposed action of adopting the 2019 ocean salmon fisheries management measures under the National Environmental Policy Act (NEPA). 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 2019 Ocean Salmon Fishery Regulations (February 2019).
>
> *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 2019 Ocean Salmon Fishery Regulations (March 2019).
>
> *PRE II describes the analysis of the action alternatives.*
>
> Preseason Report III (PRE III): Analysis of Council Adopted Management Measures for 2019 Ocean Salmon Fisheries (April 2019).
>
> *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 above and provides some aspects of the affected environment, especially related to salmon stocks:

> Review of 2018 Ocean Salmon Fisheries (February 2019).

Table 1. Directory of NEPA elements in the Environmental Assessment for 2018 Ocean Salmon Fisheries Management Measures (RIN 0648-BH22).

NEPA Element	**Location**
Purpose and Need	PRE I: Pages 1 – 2
Affected Environment	PRE I
Description of the Affected Environment	PRE I: Chapter I, pages 3 – 12
Affected Environment: Chinook Salmon	PRE I: Chapter II, pages 13 – 48
Affected Environment: Coho Salmon	PRE I: Chapter III, pages 49 – 74
Affected Environment: Pink Salmon	PRE I: Chapter IV, page 75
Alternatives	PRE I and PRE II
Description of No action alternative	PRE I: Chapter V, pages 76 – 91
Description of Action alternatives	PRE II: Chapter 7, pages 10 – 12, and Tables 1 – 4
Analysis of Impacts (Environmental Consequences)	PRE II: Chapter 8
Impacts on salmon stocks	PRE II: Chapter 8, pages 13 – 18, Tables 5 – 7
Socioeconomics	PRE II: Chapter 8, pages 18 – 23, Tables 9 – 10, Figures 1 – 2
Non-target Species	PRE II: Chapter 8, page 23 – 24
Marine Mammals	PRE II: Chapter 8, page 24
ESA Listed Species	PRE II: Chapter 8, pages 24 – 25 PRE III: Chapter 4, pages 4 – 6
Seabirds	PRE II: Chapter 8, page 25
Biodiversity and Ecosystem Function	PRE II: Chapter 8, page 25
Ocean and Coastal Habitats	PRE II: Chapter 8, page 26
Public Health and Safety	PRE II: Chapter 8, page 26
Cumulative Impacts	PRE II: Chapter 8, page 26 – 30
Final Preferred Alternative	PRE III
Description	PRE III: Tables 1 – 4
Socioeconomic Impacts	PRE III: Chapter 10, pages 14 – 17
Environmental Effects	PRE III: Chapter 10, pages 17, Table 11
Compliance with other Applicable Law	Addendum
Finding of No Significant Impact (FONSI)	Addendum

NOTE: Any meaningful changes or updates to the Council's documents used in this EA are shown in red.

ENVIRONMENTAL ASSESSMENT PART 1 FOR 2019 OCEAN SALMON FISHERY REGULATIONS

REGULATION IDENTIFIER NUMBER 0648-BI05

BASED ON

PRESEASON REPORT I

STOCK ABUNDANCE ANALYSIS

AND

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MARCH 2019

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This document may be cited in the following manner:
Pacific Fishery Management Council. 2019. *Preseason Report I: Stock Abundance Analysis and Environmental Assessment Part 1 for 2019 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 FNA10NMF4410016.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABC	acceptable biological catch
ACL	annual catch limit
BY	brood year
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
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
NMFS	National Marine Fisheries Service
NOC	north Oregon coast

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

NPGO	North Pacific Gyre Oscillation
NS1G	National Standard 1 Guidelines
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
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 fishery salmon management off the coasts of Washington, Oregon, and California. The 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) with established National Marine Fisheries Service (NMFS) ESA consultation standards. This report will be formally reviewed at the Council's March 2019 meeting.

This report provides 2019 salmon stock abundance forecasts, and an analysis of the impacts of 2018 management measures or regulatory procedures, on the projected 2019 abundance. This analysis is intended to give perspective in developing 2019 management measures. This report also constitutes the first part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2019 ocean salmon management measures. An EA is used to determine whether an action being considered by a Federal agency has significant impacts. This part of the EA includes a statement of the purpose and need, a summary description of the affected environment, a description of the No-Action Alternative, and an analysis of the No-Action Alternative effects on the salmon stocks included in the Council's Salmon Fishery Management Plan (FMP).

The STT and Council staff 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: Preseason Report II and Preseason Report III. These reports will analyze the impacts 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 2019 ocean salmon fisheries, a description of the alternatives, and an analysis of the environmental consequences of the alternatives. Preseason Report II will also analyze the potential impacts of a reasonable range of alternatives, which 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 2018 regulations applied to 2019 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. Appendix D summarizes the change in Sacramento River Winter Chinook management that was implemented beginning in 2018. 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 Needs

The purpose of this action, implementation of the 2019 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 consultation standards established for ESA-listed salmon stocks. In achieving this purpose, management measures must take into account the allocation of harvest among different user groups and port areas. Without this action, 2018

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 National Standard 1 Guidelines (NS1G).

Implementation of 2019 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.

The reauthorization of the MSA in 2006 established new 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 2019 fisheries.

CHAPTER I: DESCRIPTION OF THE AFFECTED ENVIRONMENT

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

The affected environment relevant to establishing the 2019 ocean salmon fishery management measures consists of the following components:

- Target Species – Chinook, coho, and pink salmon,
- ESA-listed salmon stocks; and
- Socioeconomic aspects of coastal communities, federally-recognized Tribes, and states.

A description of the historical baseline for these components of the affected environment is presented in the Review of 2018 Ocean Salmon Fisheries (PFMC 2019). The current status (2019 ocean abundance forecasts) of the environmental components expected to be affected by the 2019 ocean salmon fisheries regulation alternatives (FMP salmon stocks, including those listed under the ESA) are described in this report (Part 1 of the 2019 salmon EA); the Review of 2018 Ocean Salmon Fisheries (PFMC 2019) 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 2018 NEPA process for ocean salmon regulations (Preseason Reports II and III; PFMC 2018b and 2018c). In those analyses, proposed management measures were determined to have no significant impacts on several components of the affected environment. These components included:

- Non-target species – Pacific Halibut, groundfish (NMFS 2003; PFMC 2006, 2018a)
- Marine mammals – pinnipeds, killer whales (NMFS 2003, 2008; PFMC 2006, 2018a)
- Seabirds (NMFS 2003; PFMC 2006, 2018a)
- Ocean and coastal habitats, ESA critical habitat, and Essential Fish Habitat (EFH) (NMFS 2003; PFMC 2006, 2018a)
- Biodiversity and ecosystem function (NMFS 2003; PFMC 2006, 2018a)
- Unique characteristics of the geographic area (NMFS 2003; PFMC 2006, 2018a)
- Cultural, scientific, or historical resources such as those eligible for listing in the National Register of Historic Places (NMFS 2003; PFMC 2006, 2018a)
- Public health or safety (NMFS 2003; PFMC 2006, 2018a)

The 2019 No-Action alternative is the same as the 2018 action, therefore it is expected to have no significant impacts on these elements of the environment. Thus, this document includes 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 2019 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 2019 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 2019 ocean salmon fishery regulation alternatives, including socioeconomic components and updated additional information on the biological components of the environment, will be presented in Preseason Report II, to be issued after the March Council meeting.

ABUNDANCE FORECASTS

Abundance forecasts in 2019 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 2019 ocean salmon fishing seasons may be constrained by other stocks, such as those listed under the ESA or subject to 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.

ACCEPTABLE BIOLOGICAL CATCH, ANNUAL CATCH LIMITS, AND OVERFISHING LIMITS

Amendment 16 to the Salmon FMP, approved in December 2011, was developed to comply with the requirements of the 2006 MSA reauthorization, including specification of acceptable biological catch (ABC), annual catch limits (ACLs), overfishing limits (OFLs), and Scientific and Statistical Committee (SSC) recommendations for ABC. Amendment 16 established that ABC and ACLs were required for two stocks, Sacramento River fall Chinook (SRFC) and Klamath River fall Chinook (KRFC), which serve as indicator stocks for the Central Valley Fall and Southern Oregon/Northern California Chinook complexes, respectively. 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. Since publication of Amendment 16, ABC and ACL specifications have been added to the Salmon FMP for Willapa Bay natural coho.

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 NS1Gs state that ABCs are not required if stocks meet this international exception. The NS1Gs allow the flexibility to consider alternative approaches for specifying ACLs for stocks with unusual life history characteristics like Pacific salmon, and particularly for species listed under the ESA and hatchery stocks. For hatchery stocks, broodstock goals serve as conservation objectives rather than specifying ACLs. For ESA-listed stocks, biological opinions and associated consultation standards describe necessary controls to ensure their long-term conservation.

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

Acceptable Biological Catch

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

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

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

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

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}.

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

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

STATUS DETERMINATION CRITERIA

Amendment 16 also included new 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 2018 Ocean Salmon Fisheries (PFMC 2019).

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	Preseason Abundance Forecasts 2014	2015	2016	2017	2018	2019	Methodology for 2019 Prediction and Source
Sacramento River							
Fall (Sacramento Index)	634.7	652.0	299.6	230.7	229.4	379.6	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	Stochastic life cycle model applied to natural- and hatchery-origin production. STT.
Klamath River (Ocean Abundance)							
Fall	299.3	423.8	142.2	54.2	359.2	274.2	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)							
Upriver Spring [a/]	227.0	232.5	188.8	160.4	166.7	99.3	Log-linear sibling regressions of cohort returns in previous run years. Columbia River TAC.
Willamette Spring	58.7	55.4	68.7	38.1	53.8	40.2	Age-specific linear regressions of cohort returns in previous run years. ODFW. Forecast includes adult fish only.
Sandy Spring	5.5	5.5	NA	3.6	5.3	5.5	Recent 3-year average. ODFW.
Cowlitz Spring	7.8	11.2	25.1	17.1	5.2	1.3	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	0.5	1.9	4.9	3.1	1.5	1.4	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Lewis Spring	1.1	1.1	1.0	0.7	3.7	1.5	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Upriver Summer [b/]	67.5	73.0	93.3	63.1	67.3	35.9	Log-linear sibling regressions or average return (4-ocean fish). Columbia River TAC subgroup.
URB Fall	973.3	500.3	589.0	260.0	200.1	158.4	Columbia River Fall Chinook: Age-specific average cohort ratios or sibling regressions. Columbia River TAC subgroup and WDFW.
SCH Fall	115.1	160.5	89.6	158.4	50.1	46.0	
LRW Fall	34.2	18.9	22.2	12.5	7.6	13.7	
LRH Fall	110.0	94.9	133.7	92.4	62.4	54.5	
MCB Fall	360.1	113.3	101.0	45.6	36.4	56.7	

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

Production Source and Stock or Stock Group		Preseason Abundance Forecasts 2014	2015	2016	2017	2018	2019	Methodology for 2019 Prediction and Source
Washington Coast								
Willapa Bay Fall	Natural	2.9	3.8	3.3	4.2	3.8	4.3	Return per spawners applied to 3-6 year olds (brood years 2013-16)
	Hatchery	29.5	31.0	36.2	34.3	40.3	23.8	adjusted by brood year performance.
Grays Harbor Fall	Natural	--	--	--	--	16.4	NA	Past year based on a 4-year average recruits for age-3, and recruits per spawner adjusted by brood performance for age-4, 5, 6.
	Hatchery	--	--	--	--	4.8	NA	Past year based on a 10-year average recruits per spawn for age 3 and log linear regressions for age-4 on Age-2 and 3; age-5 on age-2, 3, and 4 for all stocks; and age- 6 on age-5.
Quinault Spring/Summer	Natural	NA	NA	NA	NA	NA	NA	Hatchery: Past year based on ten-year average recruits per
	Hatchery	--	--	--	--	4.8	NA	spawner for age-3; log linear regressions for age-4 on age-2 and 3; age-5 on age-2, 3, 4 for all stocks; and age-6 on age-5.
Quinault Fall	Natural	6.0	8.1	5.5	5.9	5.2	NA	
	Hatchery	10.3	4.0	5.3	4.4	3.1	NA	
Queets Spring/Sum	Natural	0.5	0.4	0.5	0.5	0.5	0.6	Based on recent 5 year average.
Queets Fall	Natural	3.6	4.3	4.9	3.7	3.3	NA	Past year based on recent year mean and cohort relationship.
	Hatchery	0.9	1.5	1.7	0.9	0.6	NA	Past year based on returns per smolt release.
Hoh Spring/Summer	Natural	0.9	0.8	0.9	1.0	1.1	1.0	Recent 3 year mean adjusted by previous performance.
Hoh Fall	Natural	2.5	2.6	1.8	2.7	2.6	2.5	Recent 5 year mean adjusted by previous performance, age 3 & 4 adjusted by regressions.
Quillayute Spring	Hatchery	2.0	1.7	1.8	2.2	2.1	2.1	Spring: Recent 5 year mean adjusted by previous performance.
Quillayute Sum/Fall	Natural	7.6	8.5	7.5	7.6	8.0	7.9	Summer: Recent 3 year mean for all ages. Fall: Recent 5 year means; adjusted for previous 5 year forecast performance.
Hoko[c/]	Natural	2.7	3.3	2.9	1.5	1.5	2.8	Includes supplemental. 2018 recruits for age-3 is recent 5-year average return, age 4-6 is sibling regression.
North Coast Totals								
Spring/Summer	*Natural*	*1.4*	*1.2*	*1.4*	*1.5*	*1.6*	*1.7*	
Fall	*Natural*	*19.7*	*23.5*	*19.7*	*19.9*	*19.1*	*NA*	
Spring/Summer	*Hatchery*	*2.0*	*1.7*	*1.8*	*2.2*	*2.1*	*2.1*	
Fall	*Hatchery*	*11.2*	*5.5*	*7.0*	*5.3*	*3.7*	*NA*	

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

Production Source and Stock or Stock Group		Preseason Abundance Forecasts 2014	2015	2016	2017	2018	2019	Methodology for 2019 Prediction and Source
Puget Sound summer/fall[d/]								
Nooksack/Samish	Hatchery	43.9	38.6	27.9	21.2	24.6	21.3	Three year average return rate.
East Sound Bay	Hatchery	1.2	1.2	0.7	0.8	0.7	0.3	Three year average return rate.
Skagit[e/]	Natural	18.0	11.8	15.1	15.8	13.3	13.6	Natural: Hierarchical Bayesian model to estimate the spawner-recruit dynamics. Hatchery: Recent 4-year average terminal smolt to adult return rate to estimate ages 2 -5.
	Hatchery	0.3	0.6	0.4	0.4	0.3	0.3	
Stillaguamish[f/]	Natural	1.6	0.5	0.5	1.5	1.6	0.9	Natural plus Hatchery. Multiple regression environmental model (EMPAR).
Snohomish[f/]	Natural	5.3	4.2	3.3	3.4	3.5	3.7	Escapement without fishing. Multiple regression environmental model (EMPAR).
	Hatchery	5.4	3.3	5.0	4.8	6.5	7.2	Terminal Run (to 8-2), with ocean fishing, Recent 4-year geomean age at return rates applied to releases.
Tulalip[f/]	Hatchery	4.7	1.3	1.4	5.3	7.5	12.7	Three year geomean escapement without fishing.
South Puget Sound	Natural	4.8	3.8	4.5	4.7	4.8	8.4	Natural: Puyallup R. average return per spawner applied to brood years contributing ages 3-5. For Nisqually, 5 year average age specific return/spawner. For Green, 3-year geometric return rates. Hatchery: Variety of recent year average return rates and sibling relationships.
	Hatchery	96.7	62.4	43.1	80.4	123.6	99.9	
Hood Canal[e/]	Natural	3.5	3.1	2.3	2.5	3.9	1.2	Natural fish based on the Hood Canal terminal run reconstruction-based relative contribution of the individual Hood Canal management units in the 2014-2018 return years.
	Hatchery	80.6	59	42.7	48.3	57.6	66.0	Brood 2015 fingerling lbs released from WDFW facilities in 2016, multiplied by the average of post-season estimated terminal area return rates for the last 5 years (2014-2018).
Strait of Juan de Fuca Including Dungeness spring run [e/]	Natural	3.8	4.9	3.7	3.1	6.0	8.3	Natural and hatchery. Dungeness and Elwha hatchery estimated by recent return rates times average releases. Dungeness wild estimated by smolts times average hatchery return rate. Elwha wild estimated using 9 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, forecasts are for Puget Sound run size (4B) available to U.S. net fisheries. Does not include fish caught in troll and recreational fisheries.
e/ Terminal run forecast.
f/ Includes a mixture of runsize types including escapement without fishing and terminal run. 2019 values are escapement w/out fishing for Tulalip and Snohomish natural, and terminal runsize for Stillaguamish and Snohomish hatchery.

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

Production Source and Stock or Stock Group		Preseason Ocean Abundance Forecasts 2014	2015	2016	2017	2018	2019	Methodology for 2019 Prediction and Source
OPI Area Total Abundance (California, Oregon Coasts, and Columbia River)		1,213.7	1,015.0	549.2	496.2	349.0	1,009.6	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	983.1	808.4	396.5	394.3	294.1	933.5	OPIH: Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2018 adults. Columbia/Coastal proportions based on jacks; Columbia early/late proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		526.6	515.2	153.7	231.7	164.7	545.0	
Columbia River Late		437.5	261.8	226.9	154.6	121.5	360.6	
Coastal N. of Cape Blanco		4.8	6.9	5.5	3.5	3.3	12.0	
Coastal S. of Cape Blanco		14.2	24.4	10.4	4.5	4.6	15.9	
Lower Columbia River	Natural	33.4	35.9	40.0	30.1	21.9	36.9	Oregon: recent two year average return; Washingtion: natural smolt production multiplied by 2016 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	230.6	206.6	152.7	101.9	54.9	76.1	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	58.9	42.9	39.5	36.7	20.6	63.4	Washington Coast stocks: A variety of methods were used for 2019, primarily based on smolt production and survival. See text in Chapter III for details.
	Hatchery	41.0	57.7	28.1	55.0	44.5	94.0	
Grays Harbor	Natural	108.8	142.6	35.7	50.0	42.4	71.5	
	Hatchery	65.4	46.6	22.9	36.4	51.4	64.3	
Quinault	Natural	25.0	44.2	17.1	26.3	25.4	13.9	
	Hatchery	24.7	24.9	19.8	29.4	29.6	26.9	
Queets	Natural	10.3	7.5	3.5	6.5	7.0	11.1	
	Hatchery	15.7	11.3	4.5	13.7	10.8	13.2	
Hoh	Natural	8.9	5.1	2.1	6.2	5.8	7.0	

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

Production Source and Stock or Stock Group		Preseason Ocean Abundance Forecasts 2014	2015	2016	2017	2018	2019	Methodology for 2019 Prediction and Source
Quillayute Fall	Natural	18.4	10.5	4.5	15.8	10.6	14.7	For all Washington Coast stocks: A variety of methods were used for 2019, primarily based on smolt production and survival. See text in Chapter III for details.
	Hatchery	12.6	8.0	6.4	17.6	16.5	17.0	
Quillayute Summer	Natural	2.0	1.2	0.3	1.5	2.7	1.2	
	Hatchery	3.2	2.2	1.4	3.4	3.3	3.4	
North Coast Independent Tributaries	Natural	15.2	11.7	1.9	6.5	4.1	8.1	
	Hatchery	11.6	11.9	2.5	0.2	7.9	12.5	
WA Coast Total	*Natural*	*247.5*	*265.6*	*104.6*	*149.5*	*118.7*	*191.0*	
	Hatchery	*174.2*	*162.6*	*85.6*	*155.6*	*164.1*	*231.3*	
Puget Sound								
Strait of Juan de Fuca	Natural	12.5	11.1	4.4	13.1	7.2	8.8	For all Puget Sound stocks: A variety of methods were used for 2019, 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	17.3	11.1	3.9	15.4	10.6	16.8	
Nooksack-Samish	Natural	20.8	28.1	9.0	13.2	20.6	25.1	
	Hatchery	61.7	50.8	28.8	45.6	61.3	59.8	
Skagit	Natural	112.4	121.4	8.9	11.2	59.2	57.9	
	Hatchery	15.8	19.5	4.9	7.6	13.1	9.9	
Stillaguamish	Natural	32.5	31.3	2.8	7.6	19.0	23.8	
	Hatchery	6.0	0.0	0.0	1.5	0.0	2.2	
Snohomish	Natural	150.0	151.5	20.6	107.3	65.9	62.6	
	Hatchery	78.2	53.9	16.7	62.0	38.3	43.7	
South Sound	Natural	62.8	63.0	9.9	20.2	15.0	30.4	
	Hatchery	150.7	180.2	27.1	102.4	103.0	180.4	
Hood Canal	Natural	82.8	61.5	35.3	115.6	59.5	40.1	
	Hatchery	47.6	108.4	83.5	74.9	84.5	87.9	
Puget Sound Total	*Natural*	*473.8*	*467.9*	*91.0*	*288.3*	*246.4*	*248.8*	
	Hatchery	*377.3*	*423.9*	*165.0*	*309.3*	*310.8*	*400.7*	

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CHAPTER II: AFFECTED ENVIRONMENT - CHINOOK SALMON ASSESSMENT

CHINOOK STOCKS SOUTH OF CAPE FALCON

Sacramento River Fall Chinook

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

Predictor Description

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

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

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

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

where $\log \mathrm{SI}_t$ and $\log \mathrm{J}_{t-1}$ are log-transformed SI and jack escapement values, respectively; *t* is the year for which the SI is being forecast; 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 2014a).

Predictor Performance

The performance of past SI forecasts is displayed graphically in Figure II-4. For 2018, the postseason estimate of the SI was 223,854, which is 98 percent of the preseason forecast of 229,432.

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 2018 were expected to result in 151,009 hatchery and natural area adult spawners and an exploitation rate of 34.2 percent.

Postseason estimates of these quantities were 105,739 hatchery and natural area adult spawners and an exploitation rate of 52.8 percent (Table II-1).

Stock Forecast and Status

Sacramento Index forecast model parameters were estimated from SI data for years 1983-2018 and jack escapement data for years 1982-2017. A total of 41,184 SRFC jacks were estimated to have escaped to Sacramento River basin hatcheries and natural spawning areas in 2018. This jack escapement and the estimated parameters

$\beta_o = 7.53758,$
$\beta_1 = 0.5466653,$
$\rho = 0.7726405,$
$\epsilon_{t-1} = -0.740665,$
$\sigma^2 = 0.1457727,$

result in a 2019 SI forecast of 379,632.

Figure II-2 graphically displays the 2019 SI forecast. The model fit (line in Figure II-2) was higher than the 2018 postseason estimate of the SI. As a result, the 2019 SI forecast value is adjusted downward from the fitted model.

The forecast SI applied to the SRFC control rule (Appendix A, Figure A-1) results in an allowable exploitation rate of 67.9 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 2019.

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} = 379,632 × (1-0.78) = 83,519. 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} = 379,632 × (1-0.70) = 113,890, with $S_{ACL} = S_{ABC}$. These preseason estimates will be recalculated with postseason abundance estimates (when available) to assess ACL and OFL compliance.

Sacramento River Winter Chinook

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

The first component of the consultation standard is the season and size limit provisions that have been in place since the 2004 Biological Opinion. These provisions state that the recreational salmon fishery between Point Arena and Pigeon Point shall open no earlier than the first Saturday in April and close no later than the second Sunday in November. The recreational salmon fishery between Pigeon Point and the U.S.–Mexico Border shall open no earlier than the first Saturday in April and close no later than the first Sunday in October. The minimum size limit shall be at least 20 inches total length. The commercial salmon fishery between Point Arena and the U.S.–Mexico border shall open no earlier than May 1 and close no later than September 30, with the exception of an October fishery conducted Monday through Friday between Point

Reyes and Point San Pedro, which shall end no later than October 15. The minimum size limit shall be at least 26 inches total length.

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

Predictor Description

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

Predictor Performance

The forecast of SRWC age-3 escapement absent fishing was implemented for the first time in 2018. A postseason estimate for 2018 is not available.

Stock Forecast and Status

The forecast of SRWC age-3 escapement absent fishing is 1,924. Application of the control rule results in a maximum age-3 impact rate of 15.7 percent for the area south of Point Arena in 2019 (Table II-2).

Klamath River Fall Chinook

Predictor Description

For Klamath River fall Chinook, 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 CWT information (brood years 1979-2014). 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.

Predictor Performance

Since 1985, the preseason ocean abundance forecasts for age-3 fish have ranged from 0.33 to 3.09 times the postseason estimates; for age-4 fish from 0.37 to 2.60 times the postseason estimates; and for the adult stock as a whole from 0.34 to 2.43 times the postseason estimates (Table II-4). The September 1, 2017 age-3 forecast (330,000) was 0.83 times its postseason estimate (397,568). The age-4 forecast (28,400) was 2.58 times its postseason estimate (11,008); and the age-5 forecast (800) was 16.0 times its postseason estimate (50). The preseason forecast of the adult stock as a whole was 0.88 times the postseason estimate.

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 2018 salmon fishery regulations were expected to result in 40,700 natural-area spawning adults and an age-4 ocean harvest rate of 11.5 percent. Postseason estimates of these quantities were 53,624 natural-area adult spawners and an age-4 ocean harvest rate of 22.6 percent (Table II-5 and Table II-6).

Stock Forecast and Status

The 2019 forecast for the ocean abundance of KRFC as of September 1, 2018 (preseason) is 167,504 age-3 fish, 106,119 age-4 fish, and 599 age-5 fish.

Late-season commercial ocean fisheries in 2018 (September through November) were estimated to have harvested 157 adult KRFC, including 129 age-4. Late-season recreational ocean fisheries were estimated to have harvested 31 adult KRFC, all of which were age-4. For the two fisheries combined, this equates to a 0.2 percent age-4 ocean harvest rate, which will be deducted from the ocean fishery's allocation in determining the 2019 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 2019 KRFC potential spawner abundance forecast is 87,893 natural-area adults. This potential spawner abundance forecast applied to the KRFC control rule results in an allowable exploitation rate of 53.7 percent, which produces, in expectation, 40,700 natural-area adult spawners. Therefore, fisheries impacting KRFC must be crafted to achieve, in expectation, a minimum of 40,700 natural-area adult spawners in 2019.

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 = 87,893 × (1-0.71) = 25,489. 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} = 87,893 × (1-0.68) = 28,126, with $S_{ACL} = S_{ABC}$. These preseason estimates will be recalculated with postseason abundance estimates (when available) to assess ACL and OFL compliance.

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, Little, Mad, Eel, Mattole, and Russian rivers, and Redwood Creek. Except for the Smith River, these stocks 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 2018, the age-4 ocean harvest rate was estimated to be 22.6 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.

Oregon Coast Chinook Stocks

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

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

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

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

Predictor Description

Quantitative abundance predictions are made for all three of the coastal Chinook groups (NOC, MOC, and SOC), 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 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 2019, 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.

Predictor Performance

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

Stock Forecast and Status

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 2018 NOC density from standard survey areas (Nehalem R. through the Siuslaw R.) was a decrease from 2017 (PFMC 2019, Appendix B, Table B-11).

Based on the density index of total spawners, the generalized expectation for NOC stocks in 2019 is below recent years' average abundance. Specifically, the 2018 spawner density in standard survey areas for the NOC averaged 90 spawners per mile, the lowest since 2010.

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 2019 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 2018 MOC density from standard survey areas (Coos and Coquille basins) averaged 114 adult spawners per mile, an increase from 2017 (PFMC 2019, Appendix B, Table B-11). Fall Chinook escapement goals are currently under development for the South Umpqua and Coquille basins of the MOC.

South/Local Migrating Chinook (SOC group)

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

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

Rogue River Fall Chinook

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

Predictor Description

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

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

from a flow-based expansion of standardized seine catches of fall Chinook at Huntley Park (RM 8). The y-intercept of the regressions is constrained to zero.

The 2018 Huntley Park escapement estimate and the resulting 2019 ROPI forecast of 383,500 consists of age-3 (305,400), age-4 (69,200) and age-5-6 (8,900) fish.

Predictor Performance

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

Stock Forecast and Status

The 2019 ROPI is above recent years' average (Table II-7).

Other SOC Stocks

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

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

These stocks are minor contributors to general season mixed-stock ocean fisheries. Standard fall Chinook spawning index escapement data were available for the smaller SOC rivers (Winchuck, Chetco, and Pistol rivers). These had been used for assessment of the conservation objective for the SOC stocks prior to 2015. The 2018 average density from standard survey areas was 14 adult spawners per mile, the lowest since 2008 (PFMC 2018, 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 2019, Appendix B, Table B-10, Chapter II, Table II-5 and Figure II-3).

CHINOOK STOCKS NORTH OF CAPE FALCON

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 ESA-listed Lower Columbia River (LCR) natural tule Chinook. 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 serve the purpose of ACLs for ESA-listed stocks like LRW Chinook. Broodstock goals serve the purpose of ACLs for hatchery-origin stocks like LRH, SCH, and MCB.

Predictor Description

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

The 2019 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 2018 Ocean Salmon Fisheries* (Appendix B, Tables B-15 through B-20). The 2018 returns for summer Chinook and the five fall Chinook stocks listed in this report may differ somewhat from those provided in the *Review of 2018 Ocean Salmon Fisheries*, since ocean escapement estimates may have been updated after that report was printed.

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

Predictor Performance

Performance of the preliminary inriver run size estimation methodology can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table II-8; Figure II-4). The recent 10-year average March preliminary preseason forecasts as a percentage of the postseason estimates are 109 percent for URB, 107 percent for LRW, 117 percent for LRH, 146 percent for SCH, and 110 percent for MCB. None of the fall Chinook stocks had a notable bias in the recent time series of March preliminary forecasts, although all were slightly over-forecasted in March. The recent 5-year average March preliminary preseason forecasts as a percentage of the postseason estimates for summer Chinook is 100 percent.

Stock Forecasts and Status

The preliminary forecast for 2019 URB fall Chinook ocean escapement is 158,400 adults, about 106 percent of last year's return of 149,000 and about 37 percent of the recent 10-year average of 427,600. This forecast is about 79 percent of the 200,100 forecast in 2018 and is well below the strong returns that occurred during 2010-2016. 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 2019 ocean escapement of ESA-listed Snake River wild fall Chinook is 8,600 adults.

Ocean escapement of LRW fall Chinook in 2019 is forecast at 13,700 adults, about 85 percent of the recent 10-year average return of 16,100. The forecast is about 165 percent of last year's actual return of 8,300. The spawning escapement goal of 5,700 in the North Fork Lewis River is expected to be achieved this year.

The preliminary forecast for 2019 ocean escapement of LRH fall Chinook is for a return of 54,500 adults, about 108 percent of last year's return of 50,400 and 60 percent of the recent 10-year average of 90,400. Based on this abundance forecast, the total allowable LCR natural tule exploitation rate for 2019 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 2019 is 46,000 adults, about 159 percent of last year's return of 28,900 and 57 percent of the 10-year average of 80,800.

The preliminary forecast for the 2019 ocean escapement of MCB fall Chinook is 56,700 adults, about 158 percent of last year's return of 36,000 and about 52 percent of the recent 10-year average of 108,600.

The preliminary forecast for summer Chinook in 2019 is 35,900 adults, approximately 85 percent of last year's return of 42,100 and about 44 percent of the recent 5-year average of 81,300. This ocean escapement should allow opportunity for both ocean and in-river fisheries while exceeding the FMP S_{MSY} conservation objective of 12,143 escapement above Rock Island Dam.

Washington Coast Chinook

Washington Coast Chinook consist of spring, summer, and fall stocks from Willapa Bay through the Hoko River. Based on limited CWT analysis, these populations are harvested primarily in ocean fisheries off British Columbia and Southeast Alaska, and to a lesser degree in Council-area fisheries off Washington and Oregon.

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

Predictor Description and Past Performance

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

Stock Forecasts and Status

The 2019 Willapa Bay natural fall Chinook terminal runsize forecast is 4,309, which is above the FMP S_{MSY} conservation objective of 3,393. The hatchery fall Chinook terminal runsize forecast is 23,807.

The 2019 Grays Harbor spring Chinook terminal runsize forecast is 581, which is below the FMP S_{MSY} conservation objective of 1,400. The natural fall Chinook terminal runsize forecast was not available at the time of publication. The FMP S_{MSY} conservation objective is 13,326. The fall hatchery terminal runsize forecast was also not available at the time of publication.

The 2019 Quinault River natural fall Chinook terminal runsize forecast was not available at the time of publication. The fall hatchery terminal runsize forecast was also not available at the time of publication.

The 2019 Queets River spring Chinook terminal runsize forecast is 642, which is below the FMP S_{MSY} conservation objective of 700. The natural fall Chinook terminal runsize forecast was not available at the time of publication. The FMP S_{MSY} conservation objective is 2,500. The fall hatchery terminal runsize forecast was also not available at the time of publication.

The 2019 Hoh River natural spring/summer Chinook spawning escapement forecast is 1,023, which is above the FMP S_{MSY} conservation objective of 900. The natural fall Chinook forecast is 2,536, which is above the FMP S_{MSY} conservation objective of 1,200.

The 2019 Quillayute River hatchery spring Chinook ocean escapement forecast is 2,091 and the natural summer/fall Chinook forecast is 7,946 (1,301 summer and 6,645 fall). The FMP S_{MSY} conservation objectives are spawning escapements of 1,200 summer Chinook and 3,000 fall Chinook.

The 2019 Hoko River terminal runsize forecast is 2,809, which is above the FMP S_{MSY} conservation objective of 850.

Puget Sound Chinook

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

Council-area fishery impacts to Puget Sound Chinook stocks are generally very low, on the order of 5 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 stocks are minor, ocean regulations are not generally used to manage these stocks

Predictor Description

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

Predictor Performance

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

Stock Forecasts and Status

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

Spring Chinook

Puget Sound Spring Chinook abundances remain depressed.

Summer/Fall Chinook

The 2019 preliminary natural Chinook return forecast is 36,200 and the preliminary hatchery Chinook return forecast is 207,800. The 2018 preseason natural Chinook return forecast was 33,100 and the hatchery Chinook return forecast was 220,800 (includes supplemental category forecasts).

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.

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. These two stocks remain overfished at the current time, based on escapement estimates detailed in the PFMC *Review of 2018 Ocean Salmon Fisheries*, released in February 2019.

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. There were no mark selective fisheries for Chinook in Council waters in 2016, 2017, and 2018. For 2019 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 2019.

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	120.0	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	46.6	22.8	0.0	69.4	18.2 [e/]	77.9	41.5	119.3	207.0	42
2012	183.2	93.4	0.3	276.8	65.8 [e/]	166.2	119.2	285.4	628.0	55
2013	290.9	114.3	0.0	405.2	57.5 [e/]	305.6	101.2	406.8	869.6	53
2014	240.6	62.4	0.0	303.0	35.7 [e/]	168.3	44.2	212.5	551.2	61
2015	100.1	24.5	0.0	124.6	16.9 [e/]	74.8	39.3	114.1	255.6	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/]	18.0	24.8	42.7	135.5	68
2018[f/]	53.5	48.5	0.0	102.0	16.1 [e/]	71.9	33.8	105.7	223.9	53

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.

				Age-3 impact rate south of Point Arena, CA		
Year	Escapement[a/]	3-yr GM Escapement[b/]	Abundance Forecast[c/]	Maximum Allowable (%)[d/]	Preseason Forecast (%)	Postseason 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	11.6
2017	975	2,521	-	15.8	12.2	17.1 f/
2018	2,638	1,731	1,594	14.4	8.5	NA g/
2019	NA	1,584	1,924	15.7	NA	NA

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

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	90.6	63.4	154.0	0.01	0.10	26.9	18.5	41.6	1.3	61.4
2007	376.9	33.6	410.5	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	240.7	21.1	261.8	0.00	0.00	11.9	78.6	16.4	5.6	100.6
2010	192.8	62.1	254.9	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	304.7	0.03	0.08	84.9	59.0	41.0	2.0	102.0
2012	799.0	74.3	873.3	0.03	0.08	21.4	243.9	49.3	2.1	295.3
2013	438.3	194.4	632.6	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	110.6	61.0	171.6	0.02	0.22	6.1	36.7	34.0	7.1	77.8
2016	32.7	24.8	57.5	0.01	0.09	2.8	8.6	15.5	0.5	24.6
2017	63.4[a/]	9.8	73.2	0.02[a/]	0.04	20.3	24.4	7.3	1.6	33.2
2018	397.6[b/]	11.0[a/]	408.6	NA[c/]	0.23[a/]	11.1	86.7	5.6	0.0	92.3

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	189,976	0.98
2006	44,100	90,606	0.49
2007	515,400	376,922	1.37
2008	31,600	68,003	0.46
2009	474,900	240,713	1.97
2010	223,400	192,760	1.16
2011	304,600	240,160	1.27
2012	1,567,600	799,014	1.96
2013	390,700	438,264	0.89
2014	219,800	216,499	1.02
2015	342,200	110,592	3.09
2016	93,400	32,668	2.86
2017	42,000	63,360	0.66
2018[c/]	330,000	397,568	0.83
2019	167,500	--	--

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	63,383	1.01
2007	26,100	33,615	0.78
2008	157,200	81,408	1.93
2009	25,200	21,124	1.19
2010	106,300	62,092	1.71
2011	61,600	64,568	0.95
2012	79,600	74,289	1.07
2013	331,200	194,379	1.70
2014	67,400	180,662	0.37
2015	71,100	60,983	1.17
2016	45,100	24,826	1.82
2017	10,600	9,820	1.08
2018[c/]	28,400	11,008	2.58
2019	106,100	--	--

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	3,944	1.45
2014	12,100	7,623	1.59
2015	10,400	13,283	0.78
2016	3,700	1,144	3.23
2017	1,700	2,024	0.84
2018[c/]	800	50	16.00
2019	600	--	--

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	234,914	1.02
2006	110,000	159,225	0.69
2007	546,200	413,448	1.32
2008	190,700	152,311	1.25
2009	505,700	268,896	1.88
2010	331,500	255,369	1.30
2011	371,100	307,481	1.21
2012	1,651,800	878,413	1.88
2013	727,700	636,587	1.14
2014	299,300	404,784	0.74
2015	423,800	184,858	2.29
2016	142,200	58,638	2.43
2017	54,200	75,204	0.72
2018[c/]	359,200	408,626	0.88
2019	274,200	--	--

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	189,976	38,079	0.08	0.16	0.20	0.19	7,100	9,600	12,807	10,001
2006	44,100	63,700	90,606	63,383	0.11	0.23	0.10	0.18	10,000	10,000	10,401	10,345
2007	515,400	26,100	376,922	33,615	0.16	0.63	0.21	0.56	30,200	51,400	30,249	33,884
2008	31,600	157,200	68,003	81,408	0.02	0.43	0.10	0.38	4,500	49,500	8,718	24,180
2009	474,900	25,200	240,713	21,124	0.00	0.57	0.00	0.40	100	61,700	51	34,040
2010	223,400	106,300	192,760	62,092	0.12	0.49	0.04	0.40	22,600	46,600	4,497	32,920
2011	304,600	61,600	240,160	64,568	0.16	0.54	0.08	0.34	26,900	42,700	11,996	30,502
2012	1,567,600	79,600	799,014	74,289	0.16	0.77	0.08	0.51	92,400	227,600	34,721	109,263
2013	390,700	331,200	438,264	194,379	0.16	0.62	0.20	0.51	74,800	154,800	59,421	82,835
2014	219,800	67,400	216,499	180,662	0.16	0.40	0.17	0.25	23,200	31,400	40,152	31,353
2015	342,200	71,100	110,592	60,983	0.16	0.59	0.22	0.47	29,400	57,700	20,020	35,890
2016	93,400	45,100	32,668	24,826	0.08	0.19	0.09	0.31	6,300	8,500	3,064	6,470
2017[d/]	42,000	10,600	63,360	9,820	0.03	0.06	0.04	0.08	700	900	1,777	1,951
2018[e/]	330,000	28,400	397,568	11,008	0.12	0.34	0.23	0.36	14,600	21,600	14,863	18,844
2019	167,500	106,100	-	-	-	-	-	-	-	-	-	-

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	Sport	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	477	477	32	341	373	850	2,388	13	2,401
2007	770	8,101	8,871	4,194	9,367	13,561	22,432	17,543	5,734	23,277
2008	0	0	0	0	0	0	0	3,225	608	3,833
2009	0	51	51	0	0	0	51	19,820	4,715	24,535
2010	112	28	140	0	1,664	1,664	1,804	13,132	1,884	15,016
2011	334	1,119	1,453	35	4,830	4,865	6,318	13,286	2,630	15,916
2012	1,121	11,350	12,471	926	13,089	14,015	26,486	70,409	12,104	82,513
2013	390	5,574	5,964	865	11,986	12,851	18,815	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[a/]	0	0	0	114	1,258	1,372	1,372	1,261	23	1,284
2018[a/]	1,895	1,210	3,105	4,941	4,287	9,228	12,333	12,954	3,896	16,850

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

Year (t) or Average	Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t)) KMZ Troll	KMZ Sport	KMZ Subtotal	North of KMZ	South of KMZ	Subtotal	Ocean Total	River Fisheries (t) Net	River Fisheries (t) Sport	River Fisheries (t) Total
HARVEST (numbers of fish)										
Age-4										
1986-90	10,282	4,358	14,640	38,450	31,653	70,103	84,743	28,720	5,500	34,220
1991-95	34	484	519	1,438	1,807	3,245	3,764	5,072	856	5,928
1996-00	200	1,002	1,202	3,833	5,093	8,926	10,128	15,076	2,948	18,023
2001	1,312	1,604	2,916	5,819	3,926	9,745	12,661	20,759	4,819	25,578
2002	1,938	827	2,765	2,811	9,416	12,227	14,992	11,929	4,063	15,992
2003	834	919	1,753	7,856	30,011	37,867	39,620	22,754	4,592	27,346
2004	1,429	1,234	2,663	11,645	22,132	33,777	36,440	17,623	1,751	19,374
2005	247	317	564	5,243	1,909	7,152	7,716	3,048	304	3,352
2006	196	725	921	4,192	985	5,177	6,098	7,569	42	7,611
2007	270	2,336	2,606	1,991	2,472	4,463	7,069	8,987	502	9,489
2008	6,379	1,106	7,485	581	113	694	8,179	17,891	1,260	19,151
2009	0	0	0	0	0	0	0	5,831	706	6,537
2010	42	112	154	886	1,482	2,368	2,522	16,630	1,134	17,764
2011	417	176	593	1,043	3,780	4,823	5,416	12,587	1,466	14,053
2012	336	2,087	2,423	760	2,957	3,717	6,140	23,285	1,718	25,003
2013	4,265	6,236	10,501	4,047	23,993	28,040	38,541	43,671	12,043	55,714
2014	1,292	1,434	2,726	19,818	8,977	28,795	31,521	21,303	3,404	24,707
2015	273	197	470	5,763	7,128	12,891	13,361	13,160	2,692	15,852
2016	0	56	56	671	1,571	2,242	2,298	3,966	870	4,836
2017	0	124	124	98	183	281	405	503	43	546
2018[a/]	638	36	674	925	885	1,810	2,484	1,815	179	1,994

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[a/]	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.05	0.00	0.05
2018[a/]	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.15	0.04	0.19

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[a/]	0.06	0.00	0.06	0.08	0.08	0.16	0.23	0.33	0.03	0.36

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	228.2
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	484.3
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	132.9
2008	16.2	7.6	14.1	4.2	42.1	0.00	0.10	41.3	37.6	15.4	94.2
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	46.5	0.01	0.09	102.6	16.2	17.6	136.4
2017	25.0	58.6	24.4	12.7	122.5	0.02 [e/]	0.04	214.0	19.2	13.6	246.9 [e/]
2018	23.9	27.7	11.4	0.4	63.4	-	0.23 [e/]	303.0 [e/]	138.8 [e/]	21.0	462.8 [e/]
2019	NA	NA	NA	NA	NA	-	-	305.4 [f/]	69.2 [f/]	8.9 [f/]	383.5 [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	127.2	132.7	232.6	0.55	0.57
2002	281.0	273.8	276.9	1.01	0.99
2003	280.4	253.2	373.2	0.75	0.68
2004	292.2	287.0	367.9	0.79	0.78
2005	352.2	354.6	268.7	1.31	1.32
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[c/]	200.1	205.8	149.0	1.34	1.38
2019	158.4	-	-	-	-
			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	16.7	18.5	15.7	1.06	1.18
2002	18.7	18.3	24.9	0.75	0.73
2003	24.6	23.4	26.0	0.95	0.90
2004	24.1	24.2	22.3	1.08	1.09
2005	20.2	21.4	16.8	1.20	1.27
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[c/]	7.6	7.9	8.3	0.92	0.95
2019	13.7	-	-	-	-

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	32.2	30.5	94.3	0.34	0.32
2002	137.6	133.0	156.4	0.88	0.85
2003	115.9	116.9	155.0	0.75	0.75
2004	77.1	79.0	108.9	0.71	0.73
2005	74.1	78.4	78.3	0.95	1.00
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[c/]	62.4	63.9	50.4	1.2	1.3
2019	54.5	-	-	-	-
			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	56.6	61.9	125.0	0.45	0.50
2002	144.4	136.0	160.8	0.90	0.85
2003	96.9	101.9	180.6	0.54	0.56
2004	138.0	150.0	175.3	0.79	0.86
2005	114.1	115.8	93.1	1.23	1.24
2006	50.0	51.8	27.9	1.79	1.86
2007	21.8	21.3	14.6	1.49	1.46
2008	87.2	86.2	91.9	0.95	0.94
2009	59.3	56.5	49.0	1.21	1.15
2010	169.0	162.9	130.8	1.29	1.25
2011	116.4	116.7	70.1	1.66	1.66
2012	63.8	60.0	56.8	1.12	1.06
2013	38.0	36.7	86.6	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	44.6	2.01	2.26
2017	158.4	164.4	48.2	3.29	3.41
2018[c/]	50.1	51.4	28.9	1.73	1.78
2019	46.0	-	-	-	-

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	43.5	45.3	76.4	0.57	0.59
2002	96.2	91.8	108.4	0.89	0.85
2003	104.8	94.6	150.2	0.70	0.63
2004	90.4	88.8	117.6	0.77	0.76
2005	89.4	89.7	98.0	0.91	0.92
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[c/]	36.4	41.2	36.0	1.01	1.14
2019	56.7	-	-	-	-
			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[c/]	67.3	70.5	42.1	1.60	1.67
2019	35.9	-	-	-	-

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 4)

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 Hatchery**			**Skagit Natural**		
1993-95	45.2	27.6	1.65	3.3	1.6	9.41	1.3	3.4	0.47	9.1	7.3	1.33
1996-00	27.0	35.4	0.77	2.1	0.5	13.35	0.2	0.2	0.87	7.0	10.9	0.80
2001	34.9	65.6	0.53	1.6	0.9	1.85	0.0	0.0	-	9.1	14.1	0.64
2002	52.8	57.0	0.93	1.6	0.9	1.87	0.0	0.1	0.00	13.8	20.0	0.69
2003	45.8	30.0	1.53	1.6	0.2	7.51	0.0	0.3	0.00	13.7	10.3	1.33
2004	34.2	18.1	1.89	0.8	0.0	200.00	0.5	0.0	-	20.3	24.3	0.84
2005	19.5	16.5	1.18	0.4	0.0	13.33	0.7	0.4	1.88	23.4	23.4	1.00
2006	16.9	31.9	0.53	0.4	0.0	25.00	0.6	0.4	1.51	24.1	22.5	1.07
2007	18.8	26.5	0.71	0.4	0.0	66.67	1.1	0.4	2.75	15.0	13.0	1.15
2008	35.3	29.1	1.21	0.8	0.0	-	0.7	0.2	3.50	23.8	15.0	1.59
2009	23.0	20.9	1.10	0.1	0.0	25.00	0.6	0.1	6.00	23.4	12.5	1.87
2010	30.3	35.8	0.85	2.3	0.7	3.29	0.9	0.1	11.25	13.0	10.0	1.30
2011	37.5	33.3	1.13	0.4	0.7	0.57	1.5	0.1	15.00	14.3	9.2	1.55
2012	44.0	32.6	1.35	0.4	1.6	0.25	1.3	0.1	13.00	8.3	15.8	0.53
2013	47.2	31.4	1.50	2.0	1.1	1.82	0.3	0.1	3.00	12.9	13.0	0.99
2014	43.9	25.5	1.72	1.2	0.3	4.00	0.3	0.0	7.50	18.0	10.1	1.78
2015	38.6	18.1	2.13	1.2	0.9	1.33	0.6	0.0	-	11.8	14.8	0.80
2016	27.9	15.8	1.77	0.7	0.7	1.00	0.4	0.1	4.00	15.1	21.1	0.72
2017[b/]	21.2	17.2	1.23	0.8	0.5	1.70	0.4	0.1	4.08	15.8	13.6	1.16
2018	24.6	NA	-	0.7	NA	-	0.3	NA	-	13.3	NA	-
2019	21.3	-	-	0.3	-	-	0.3	-	-	13.6	-	-

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 4)

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 [c/] Natural			**Snohomish [c/] Hatchery**			**Snohomish [c/] Natural**			**Tulalip [c/] Hatchery**		
1993-95	1.8	1.2	1.92	2.0	4.1	0.29	4.6	4.8	0.96	2.6	3.9	1.30
1996-00	1.6	1.3	1.20	7.0	5.6	1.67	5.3	5.5	0.98	3.7	10.1	0.39
2001	1.7	1.4	1.22	4.1	0.9	4.57	5.8	8.4	0.69	5.5	5.1	1.08
2002	2.0	1.6	1.25	6.8	2.6	2.66	6.7	7.3	0.92	5.8	5.2	1.12
2003	2.0	1.0	1.98	9.4	5.8	1.63	5.5	5.6	0.99	6.0	8.7	0.69
2004	3.3	1.6	2.06	10.1	6.4	1.58	15.7	11.2	1.40	6.8	6.5	1.05
2005	2.0	1.2	1.67	9.9	4.0	2.48	14.2	5.0	2.84	6.4	7.4	0.86
2006	1.6	1.3	1.26	9.6	4.3	2.23	8.7	8.8	0.99	9.3	5.8	1.60
2007	1.9	0.8	2.38	8.7	6.6	1.32	12.3	4.0	3.08	8.4	6.1	1.38
2008	1.1	1.8	0.61	8.8	6.3	1.40	6.5	8.7	0.75	2.7	3.2	0.84
2009	1.7	1.2	1.42	4.9	2.2	2.23	8.4	2.3	3.65	4.0	1.7	2.35
2010	1.4	1.0	1.40	5.6	2.7	2.07	9.9	4.8	2.06	3.4	3.2	1.06
2011	1.8	1.3	1.38	5.2	3.1	1.68	7.4	2.0	3.70	3.5	5.8	0.60
2012	0.9	1.7	0.53	3.9	8.4	0.46	2.8	3.4	0.82	5.9	0.6	9.83
2013	1.3	0.9	1.44	5.9	6.1	0.97	3.6	2.6	1.38	10.9	1.9	5.74
2014	1.6	0.4	4.00	5.4	6.2	0.87	5.3	2.4	2.21	4.7	1.8	2.61
2015	0.5	0.6	0.83	3.3	4.8	0.69	4.2	2.3	1.83	1.3	2.0	0.65
2016	0.5	0.5	1.00	5.0	10.0	0.50	3.3	3.5	0.94	1.4	6.0	0.23
2017[b/]	1.5	1.7	0.89	4.8	9.0	0.53	3.4	4.4	0.78	5.3	11.3	0.47
2018	1.6	NA	-	6.5	NA	-	3.5	NA	-	7.5	NA	-
2019	0.9	-	-	7.2	-	-	3.7	-	-	12.7	-	-

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 4)

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**			**Strait of Juan de Fuca Natural**		
1993-95	54.7	56.1	1.05	22.1	15.0	1.78	2.5	0.9	2.85	1.7	1.6	1.10
1996-00	64.3	51.1	1.31	19.2	24.0	0.96	2.1	1.2	1.91	0.9	2.3	0.43
2001	73.7	76.6	0.96	16.2	60.6	0.27	0.0	1.7	0.00	3.5	2.0	1.79
2002	90.8	69.3	1.31	16.9	57.0	0.30	0.0	1.6	0.00	3.6	2.2	1.65
2003	86.6	57.2	1.51	19.6	38.6	0.51	0.0	1.3	0.00	3.4	2.8	1.21
2004	86.5	66.6	1.30	17.5	42.3	0.41	0.0	1.4	0.00	3.6	4.1	0.89
2005	83.1	73.9	1.12	17.7	19.0	0.93	0.0	1.4	0.00	4.2	2.1	2.00
2006	85.8	104.1	0.82	21.3	37.0	0.58	0.0	1.2	0.00	4.2	3.2	1.31
2007	83.0	140.3	0.59	17.0	30.1	0.56	0.0	0.8	0.00	4.4	1.3	3.38
2008	101.6	90.6	1.12	21.1	32.2	0.65	0.0	0.7	0.00	3.2	1.2	2.67
2009	93.0	72.7	1.28	17.2	13.3	1.29	0.0	1.5	0.00	2.4	1.3	1.85
2010	97.4	82.9	1.17	12.7	15.8	0.80	0.0	0.7	0.00	1.9	2.6	0.73
2011	118.6	83.9	1.41	8.9	20.6	0.43	0.0	0.7	0.00	2.5	2.9	0.86
2012	95.8	61.9	1.55	8.9	23.0	0.39	0.0	1.2	0.00	2.9	2.1	1.38
2013	102.0	75.5	1.35	5.0	22.2	0.23	2.7	2.1	1.29	1.6	4.8	0.33
2014	96.7	37.1	2.61	4.8	7.1	0.68	3.8	2.0	1.90	1.5	4.2	0.36
2015	62.4	47.1	1.32	3.8	5.5	0.69	4.9	2.8	1.75	3.5	4.5	0.78
2016	43.1	83.8	0.51	4.5	6.0	0.75	4.3	1.9	2.26	2.3	2.6	0.88
2017[b/]	80.4	143.4	0.56	5.7	8.7	0.66	3.8	2.0	1.94	0.8	3.3	0.24
2018	123.6	NA	-	4.8	NA	-	6.0	NA	-	1.4	NA	-
2019	99.9	-	-	8.4	-	-	7.7	-	-	0.6	-	-

TABLE II-9. Comparison of preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 4 of 4)

Year or Average	Preseason Forecast	Postseason Return	Pre/Post-season
	Hood Canal		
	Hatchery and Natural		
1993-95	11.6	8.4	1.46
1996-00	7.3	26.4	0.26
2001	19.2	26.1	0.74
2002	25.3	30.2	0.84
2003	24.0	33.0	0.73
2004	29.6	34.3	0.86
2005	30.6	54.7	0.56
2006	30.2	40.7	0.74
2007	47.5	32.5	1.46
2008	36.8	33.1	1.11
2009	42.6	38.0	1.12
2010	45.0	37.8	1.19
2011	40.6	53.2	0.76
2012	46.8	90.3	0.52
2013	66.2	71.7	0.92
2014	84.1	25.2	3.34
2015	62.1	33.0	1.88
2016	45.0	63.6	0.71
2017[b/]	50.8	111.0	0.46
2018	61.4	NA	-
2019	67.2	-	-

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 are preliminary.

c/ These numbers 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, the Stillaguamish and Snohomish Rivers harvest in sport fisheries in Area 8D and the Stillaguamish and Snohomish Rivers and escapement.

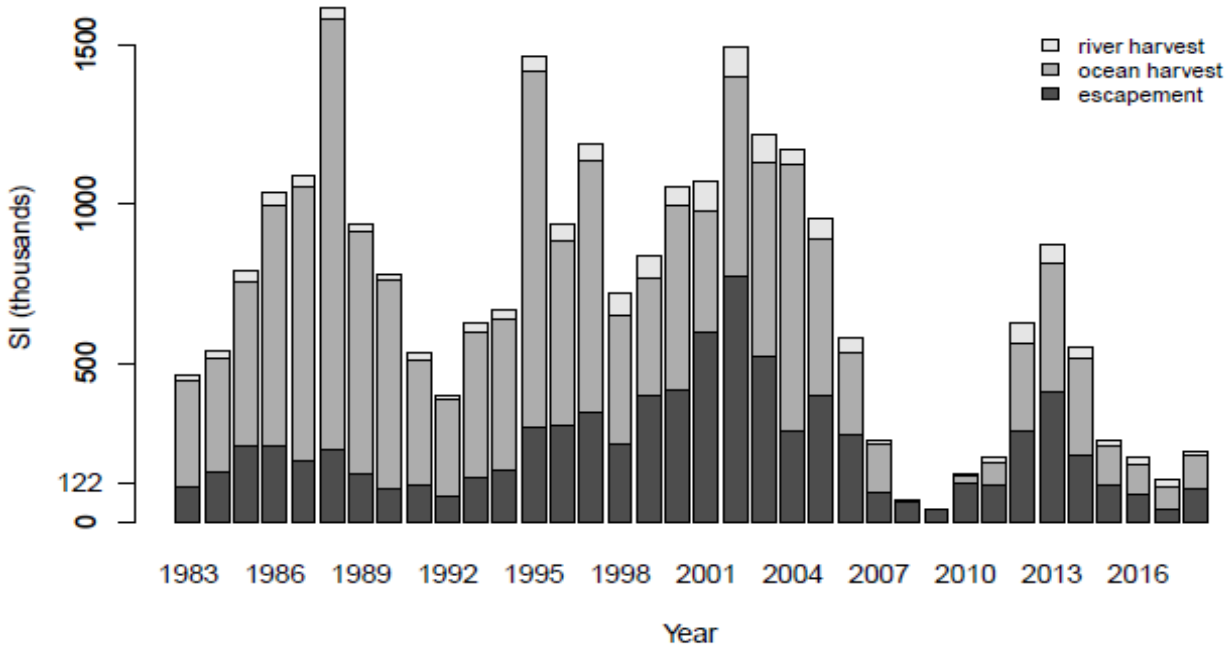

FIGURE II-1. The Sacramento Index (SI) and relative levels of its components. The Sacramento River fall Chinook S_{MSY} of 122,000 adult spawners is noted on the vertical axis.

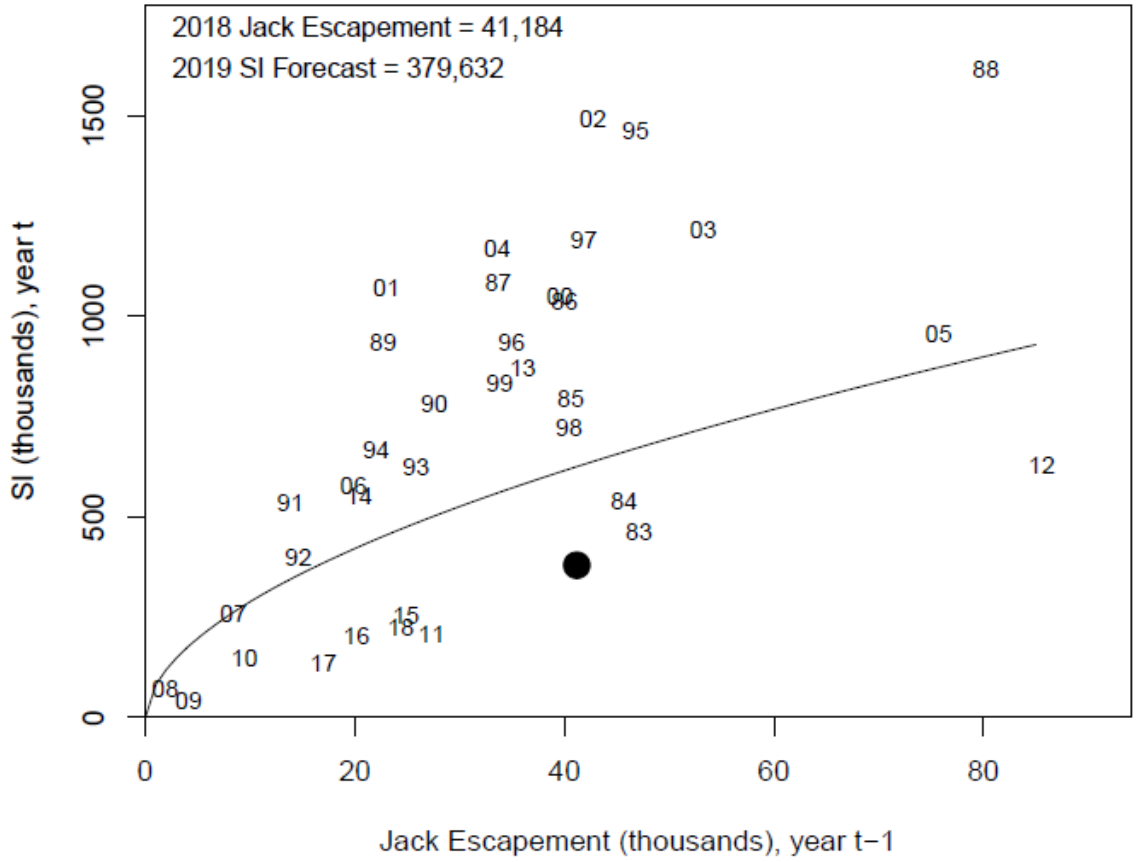

FIGURE II-2. Sacramento Index (SI) forecast based on log-log regression of the SI on jack escapement from the previous year, accounting for autocorrelated errors. The solid line represents the fitted model and the black dot denotes the SI forecast. Years shown are SI years.

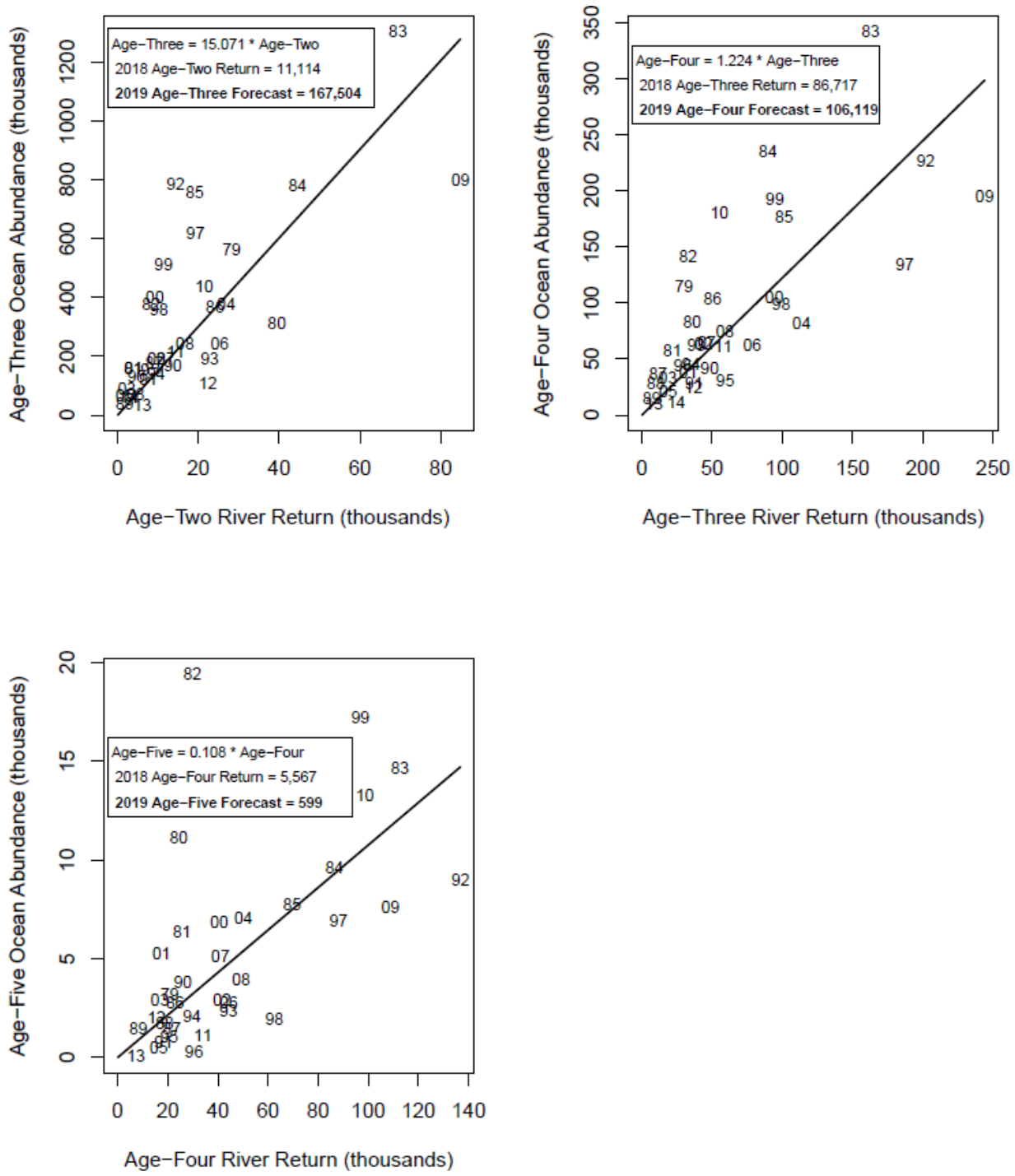

FIGURE II-3. Regression estimators for Klamath River fall Chinook ocean abundance (September 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

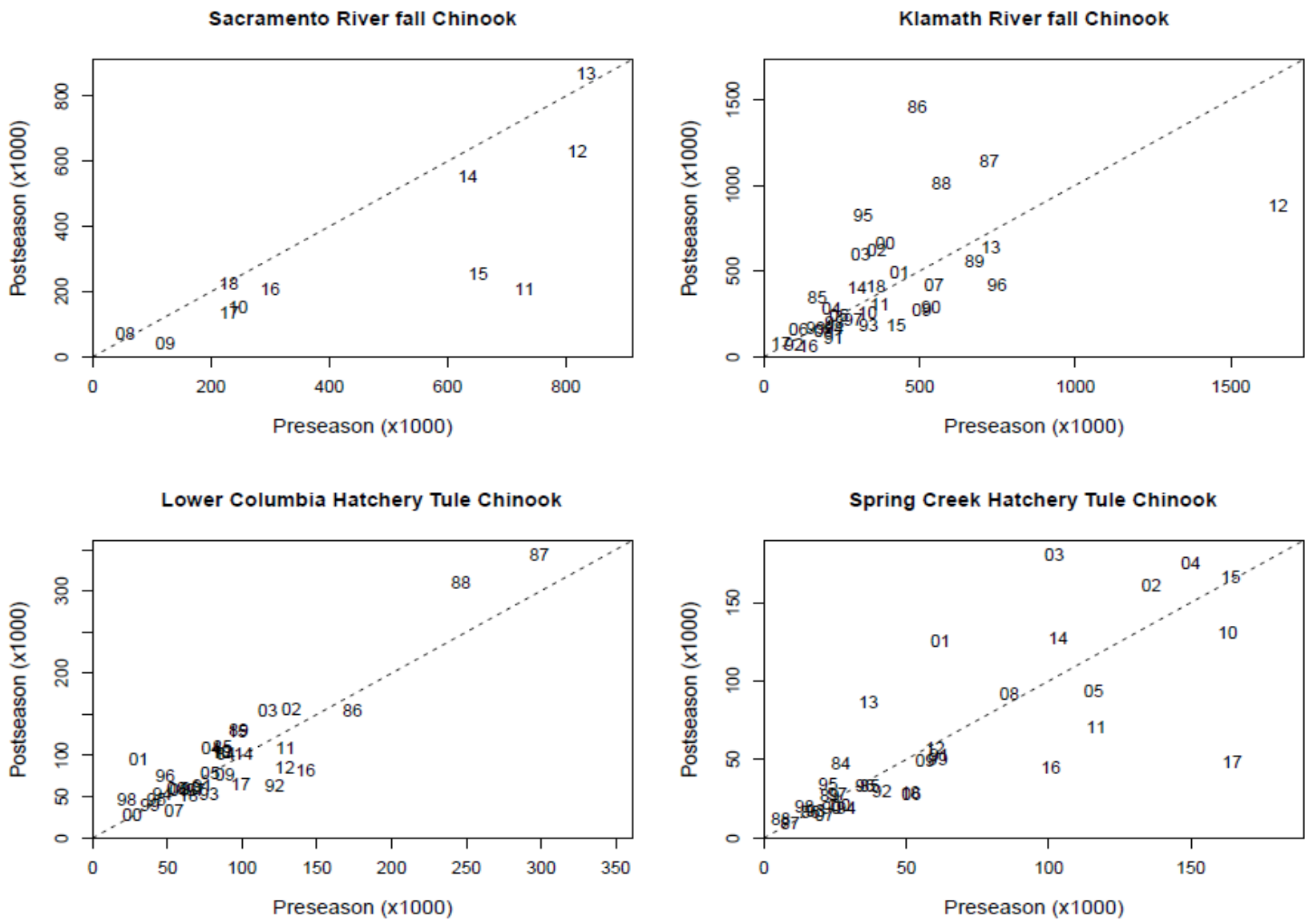

FIGURE II-4. Selected preseason vs. postseason forecasts for Chinook stocks with substantial contribution to Council area fisheries.

CHAPTER III - COHO SALMON ASSESSMENT

COLUMBIA RIVER AND OREGON/CALIFORNIA COAST COHO

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) public hatchery (OPIH), (2) Oregon coastal natural (OCN), including river and lake components, (3) Lower Columbia natural (LCN), and (4) natural and hatchery stocks south of Cape Blanco, Oregon, which include the Rogue, Klamath, and Northern California coastal stocks. Direct comparisons of 2019 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 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 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) used 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 and was based on CWT recoveries and associated tag rates. The MSM 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 the 1986-1997 base period and FRAM run reconstructions for more recent years. The Oregon Production Index Technical Team (OPITT) decided to use the MSM run reconstruction database for future accounting and forecasts. The MSM estimates were refined for use in 2009, with particular attention to the base period reconstruction for OCN coho. In 2010, the relationship between the MSM and previous time series was reconsidered. The changes in fishery effort patterns that resulted in biased harvest estimates began in the mid- to late-1990s, so the first few years of the MSM time series should be equivalent to the previous time series. This was used as justification to use the MSM data set as a continuation of the previous time series starting in 1986. In 2013, the OPI hatchery and OCN predictors used the longer, merged time series. This results in a higher level of statistical significance for the predictors and lower residuals in most recent years.

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) program releases were discontinued after the 2004 brood. OPI area smolt releases since 1960 are reported by geographic area in Appendix C, Table C-1.

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

Predictor Description

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.

The OPIH stock predictor is partitioned into Columbia River early and late stocks based on the proportion of the 2018 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 2018 partition was based on the proportion of the smolt releases in 2018.

For the 2019 abundance forecast, the database includes 1970-2017 recruits and 1969-2016 jack returns (in thousands of fish). The model was:

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

Where:

a	=	19.25
b	=	27.43
c	=	-97.25
adjusted r^2	=	0.94

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

Predictor Performance

Recent year OPIH stock preseason abundance forecasts partitioned by production area, stock, and as a total, are compared with postseason estimates in Table III-1. The 2018 preseason abundance prediction of 294,100 OPIH coho was about 2 times higher than the preliminary postseason estimate of 149,400 coho.

Since 1983, the OPIH predictor has performed well (Figure III-1a). The years with the highest variations were due principally to high interannual variability in the jack-to-adult ratios.

Stock Forecast and Status

Using the appropriate values from Appendix C, Table C-2, the OPIH abundance forecast for 2019 is 933,500 coho, 3.2 times higher than the 2018 prediction and 6.2 times higher than the preliminary 2018 postseason estimate.

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 are used in place of ACLs for ESA-listed stocks like OCN (and Southern Oregon/Northern California (SONCC) and Central California Coho (CCC)) coho.

Predictor Description

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 3 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 2019 forecast was the geometric mean of the six GAM predictors:

Ensemble Mean of six forecasts based on environmental conditions and spawners.

Variables			Prediction	r^2	OCV[a/]
PDO	Spring Transition (Julian date; t-1)	Log Spawners (t-3)	67,525	0.65	0.56
PDO	Multivariate ENSO Index (Oct-Dec; t-1)	Upwelling (July-Sept; t-1)	67,001	0.68	0.59
PDO	Spring Transition (Julian date; t-1)	Multivariate ENSO Index (Oct-Dec; t-1)	63,031	0.68	0.60
PDO	Upwelling (July-Sept; t-1)	Sea Surface Temperature (May-Jul; t-1)	82,522	0.64	0.52
PDO	Sea Surface Height (Apr-June; t-1)	Upwelling (July-Sept; t-1)	95,194	0.68	0.55
PDO	Upwelling (Sept-Nov; t-1)	Sea Surface Temperature (Jan; t)	52,956	0.67	0.54
Ensemble Mean (90% prediction intervals)			70,097 (32,597-152,440)	0.74	0.61

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.

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 2019, OPITT chose to use the most recent three-year average adult stock abundance, which predicts 6,000 coho.

Predictor Performance

Recent year OCN preseason abundance predictions are compared to postseason estimates in Table III-1. The 2018 preseason abundance prediction of 54,900 OCN coho was 68 percent of the preliminary postseason estimate of 81,300 coho.

Stock Forecasts and Status

The 2019 preseason prediction for OCN (river and lake systems combined) is 76,100 coho, 39 percent higher than the 2018 preseason prediction and 94 percent of the 2018 postseason estimate (Table III-1). The 2019 preseason prediction for OCNR and OCNL components are 70,100 and 6,000 coho, respectively.

Based on parent escapement levels and observed OPI smolt-to-jack survival for 2016 brood OPI smolts, the total allowable OCN coho exploitation rate for 2019 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 3.8 percent allows for a total allowable exploitation rate for 2019 fisheries that is no greater than 15.0 percent (Table V-8: Appendix Table A-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. LCN coho were listed as endangered under the Oregon State ESA in 2002, and as threatened under the Federal ESA on June 28, 2005. Under the FMP, ESA consultation standards are used in place of ACLs for ESA-listed stocks like LCN coho.

Predictor Description

The 2019 predictions for the Oregon LCN coho populations are derived by the recent 2-year average abundances based on spawning ground counts. The 2019 adult abundance forecast for Oregon LCN coho is 8,800.

The 2019 predictions for the Washington LCN coho populations are derived by combining estimates of the 2016 brood year natural smolt production based on watershed area and the marine survival rate of 4.1 percent. The 2019 adult abundance forecast for Washington LCN coho is 28,100.

Predictor Performance

The LCN stock predictor methodology was developed in 2007. The preseason abundance compared to the postseason estimate is presented in Table III-1. The 2018 preseason abundance prediction of 21,900 LCN coho was lower than the preliminary postseason estimate of 29,700 coho.

[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.

Stock Forecast and Status

The 2019 prediction for LCN coho is 36,900 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 2019 fisheries would be no more than 23.0 percent.

Oregon Production Index Area Summary of 2018 Stock Forecasts

The 2019 combined OPI area stock abundance is predicted to be 1,009,600 coho, which is 2.89 times higher than the 2018 preseason prediction of 349,000 coho and 4.38 times higher than the 2018 preliminary postseason estimate of 230,700 coho. The historical OPI abundances are reported in Table III-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 forecasts with postseason estimates derived from run reconstructions using FRAM ("Backwards" mode) 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.

Willapa Bay

Predictor Description

The natural forecast was calculated using the 2016 brood year spawner escapements expanded by freshwater survival to calculate Willapa Bay smolt outmigrants. That value was then applied to a marine survival rate of 4.60 percent and corrected for a four-year average (2015-18) model performance. The terminal runsize was expanded to ocean age-3 using a recent four-year average exploitation rate (2015-2018) from the ocean fisheries.

The hatchery forecast is based on a terminal marine survival rate of 4.60 percent. This was applied to the 2016 brood year smolts released in the spring of 2018 to create a terminal runsize. The terminal runsize was expanded to ocean age-3 using a recent four-year average exploitation rate (2015-18) from the ocean fisheries.

The 4.60 percent terminal marine survival rate used for both natural and hatchery coho was calculated by averaging the results of a Willapa Bay jack to marine survival regression (5.46 percent) and Quinault Fisheries Department marine survival estimate of 3.73 percent ocean age 3.

Predictor Performance

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

Stock Forecasts and Status

The 2019 natural coho ocean age-3 abundance forecast is 63,448 compared to a 2018 preseason forecast of 20,645.

The 2019 Willapa Bay hatchery coho ocean age-3 abundance forecast is 94,019 compared to a 2018 preseason forecast of 44,542.

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 coho ocean age-3 abundance to the predicted abundance of ocean age-3 hatchery origin coho spawning in natural areas. The abundance of ocean age-3 naturally spawning hatchery origin coho was calculated by multiplying the ocean age-3 hatchery coho abundance forecast by the most recent 3 year average proportion of hatchery origin returns that spawned naturally (.302), also known as stray rate. 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 $S_{OFL} = 91{,}843 \times (1\text{-}0.74) = 23{,}879$. 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 $S_{ABC} = 91{,}843 \times (1\text{-}0.70) = 27{,}553$, with $S_{ACL} = S_{ABC}$. These preseason estimates will be recalculated with postseason abundance estimates (when available) to assess ACL and OFL compliance.

Grays Harbor

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

Predictor Description

The natural forecast is the sum of the Chehalis River natural, Humptulips River natural, and South Bay tributary natural forecasts. The Chehalis River coho forecast was developed by applying the Queets River natural coho January age-3 marine survival prediction to Grays Harbor coho smolt production estimate. The Grays Harbor coho smolt production estimate was developed by scaling the 2018 Queets River natural coho smolt production to the Chehalis River production based on the relationship between the Backward FRAM January age-3 ocean abundances of Queets and Chehalis natural Coho abundances. 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 10 year average return/smolt rates (excluding two highest return rates) expanded to January age-3 recruits.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates for Grays Harbor natural coho derived from FRAM run reconstruction indicated no notable bias. The 2017 forecast was higher than the 2017 postseason return estimate (Table III-3; Figure III-1).

Stock Forecasts and Status

The 2019 Grays Harbor natural ocean age-3 abundance forecast is 71,527, compared to a 2018 preseason forecast of 42,379. 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 2019 Grays Harbor hatchery coho ocean age-3 abundance forecast is 64,347, compared to a 2018 preseason forecast of 51,414.

OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Grays Harbor natural coho MFMT = 0.65 and the OFL is S_{OFL} = 71,527 × (1-0.65) = 25,034. The preseason S_{OFL} will also be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

Quinault River

Predictor Description

The natural forecast is based on a 3-year geometric mean of 2004, 2005 and 2015 recruits per spawner January Age-3 (JA3) abundance. These years are selected based on similar brood-year size.

The hatchery forecast is based on the smolt releases from the Quinault Cook Creek Hatchery (667,663) multiplied by the marine survival rate of 4.03 percent. The marine survival rate is based on the 10-year smolt to ocean age-3 survival (excluding 2009 and 2014). This is a lower marine survival rate than the 4.38 and 4.54 percent used in 2017 and 2018, respectively.

Predictor Performance

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

Stock Forecasts and Status

The 2019 forecast for Quinault natural coho is 13,888 ocean age-3 recruits, a decrease from the 2018 forecast of 25,442.

The Quinault hatchery coho forecast is 26,904 ocean age-3 recruits. 100 percent of the hatchery smolts were marked with an adipose fin clip.

Queets River

Predictor Description

The natural coho forecast represents the estimated smolt outmigration multiplied by a projected marine survival rate of 4.60 percent to January age-3. The marine survival rate estimate is based on a model developed by Quinault Fisheries Department, which uses a relationship between survival to January age-3; specifically the mean Queets River flow in December of the smolt year and the maximum PDO value recorded from June through November of the smolt year (measured at 48N 125W). In 2018, an estimated 297,034 smolts emigrated from the Queets System.

The hatchery forecast is based on the smolt releases from 2018 (670,550) multiplied by a three-year average (2015-2017) marine survival rate of 1.96 percent. This is a lower marine survival rate than the 2.12 and 2.27 percent used in 2017 and 2018, respectively.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates derived from FRAM run reconstruction indicated no persistent tendency to under- or over- predict abundance. The 2017 forecast was slightly lower than the postseason return estimate (Table III-3; Figure III-1).

Stock Forecasts and Status

The 2019 Queets natural coho forecast is 11,100 ocean age-3 recruits, an increase compared to the 2016, 2017 and 2018 forecast levels of 3,495, 6,548 and 6,964, respectively. 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 2018 Queets hatchery (Salmon River) coho forecast is 13,175 ocean age-3 recruits, an increase compared to the 2018 forecast of 10,814. Approximately 85 percent of the fish released from the Salmon River facility were marked with an adipose fin clip.

OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Queets River coho, MFMT = 0.65, and the OFL is $S_{OFL} = 11,100 \times (1\text{-}0.65) = 3,885$. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

Hoh River

Predictor Description

The natural coho forecast is based on estimated average smolt production per square mile of watershed from the Clearwater tributary which lies between the Queets River mainstem and the Hoh River. The Quinault Fisheries Department has a long-standing trapping program on the Clearwater River to estimate smolt production; it is assumed the two rivers produce smolts at a comparable rate per square mile of watershed (WDFW 2019). To estimate Hoh River production the Clearwater production of 591.37 smolts per square mile was multiplied by the size of the Hoh watershed (299 square miles), for a total of 176,820 coho smolts.

The total natural smolt production estimate was then multiplied by an expected marine survival rate of 4.85 percent. This is the same marine survival rate used to forecast 2019 Quillayute system and Strait of Juan de Fuca wild coho abundance, and is similar to the 4.60 percent survival to JA3 used in the Queets River. Each model used correlations between ocean indicators and January age-3 run sizes from prior years.

No hatchery production is projected for the Hoh system for 2019.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates derived from FRAM run reconstruction indicated no persistent tendency to under- or over- predict abundance. The 2017 forecast was slightly higher than the postseason return estimate (Table III-3; Figure III-1).

Stock Forecasts and Status

The 2019 Hoh River natural coho forecast is 6,963 ocean age-3 recruits, an increase compared to the 2017 and 2018 forecasts of 6,198 and 5,816, respectively. This ocean abundance results in classification of this stock's status as "Abundant" under the 2019 PST Southern Coho Management Plan (Table III-5).

OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Hoh River coho, MFMT = 0.65, and the OFL is S_{OFL} = 6,963 × (1-0.65) = 2,437. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

Quillayute River

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

Predictor Description

The natural coho forecast is based on a scalar and average smolt production when the Quillayute system was trapped. The Clearwater River smolt production is used as a scalar to adjust the smolt production up or down from average production during the years the Bogachiel and Dickey Rivers were trapped, 1987-88, 1990, and 1992-94 respectively. The Quinault Fisheries Department has a long-standing trapping program on the Clearwater River to estimate smolt production.

In 2018, an estimated 119,905 smolts emigrated from the Dickey River and 284,009 smolts emigrated from the rest of the Quillayute system. The total freshwater production for the system is the sum of the two pieces, or 403,914 wild smolts. Separating these into summer and fall wild coho smolts by the relative number of spawners in brood year 2016 yields estimates of 29,977 wild summer coho smolts and 373,936 wild fall coho smolts.

Summer Coho

The summer natural coho forecast is based on the estimated total summer coho smolt production (29,977) and a projected marine survival rate of 4.85 percent. This is the same marine survival rate used to forecast Strait of Juan de Fuca wild coho abundance, and is similar to the 4.60 percent survival to JA3 used in the Queets River. It is a lower marine survival rate than the 5.10 and 4.88 percent used in 2017 and 2018, respectively.

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 marine survival rate of 3.85 percent was selected. The survival rate of 3.85 percent was multiplied by a release of 109,666 smolts from the Sol Duc Hatchery.

Fall Coho

The forecast for the natural component was based on the estimated total fall coho smolt production (373,936) multiplied by an expected marine survival rate of 4.85 percent, the same as summer natural returns.

The fall hatchery production forecast was based on the same prediction of marine survival (3.85 percent) used for the summer hatchery coho forecast, multiplied by a release of 542,362 smolts.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates for fall natural coho derived from FRAM run reconstruction indicated a tendency to over-predict actual run size. The 2017 Quillayute fall forecast was higher than the postseason return estimate (Table III-3; Figure III-1).

Stock Forecasts and Status

The 2019 Quillayute River summer natural and hatchery coho forecasts are 1,180 and 3,428 ocean age-3 recruits, respectively; 100 percent of the hatchery smolts were marked with an adipose fin clip. The 2019 forecast abundance of natural summer coho is lower than the 2018 forecast of 2,743.

The 2019 Quillayute River fall natural and hatchery coho forecasts are 14,724 and 16,953 ocean age-3 recruits, respectively. The 2019 forecast abundance of Quillayute fall natural and hatchery coho forecasts are higher than the respective 2018 forecasts of 10,557 and 16,505, respectively. The hatchery smolts were marked as follows: 392,140 (72.3 percent) adipose fin clip only; 75,195 (13.86 percent) adipose fin clip + CWT; and 75,027 (13,83 percent CWT only).

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).

North Washington Coast Independent Tributaries

Predictor Description

Production from several smaller rivers and streams along the North Washington Coast (Waatch River, Sooes River, Ozette River, Goodman Creek, Mosquito Creek, Cedar Creek, Kalaloch Creek, Raft River, Camp Creek, Duck Creek, Moclips River, Joe Creek, Copalis River, and Conner Creek), which flow directly into the Pacific Ocean, is forecast as an aggregate. Generally, stock assessment programs on these systems are minimal.

The 2019 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 multiplied by an expected marine survival rate of 4.725 percent. The expected marine survival rate was developed by averaging the marine survival rate for Strait of Juan de Fuca natural coho, 4.85 percent, and the marine survival rate for Queets natural coho, 4.6 percent.

The 2019 hatchery forecast is based on the predicted marine survival of 7.77 percent for the brood year 2016 multiplied by brood year smolt release (198,161) into the Tsoo-Yess River from the Makah National Fish Hatchery. Ocean indicators suggest the 2016 brood encountered improving ocean conditions after migrating seaward in 2017. The forecast model predicts marine survival using the natural log of the brood's jack return rate. The jack return in 2018 was relatively high making up approximately 30% of the hatchery rack returns. The forecast model using the jack return rate predicted a marine survival rate of 7.77 percent.

Predictor Performance

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

Stock Forecasts and Status

The 2019 forecast of natural coho production for these independent streams is 8,133 age-3 ocean recruits, compared to the 2018 preseason forecast of 4,144.

The 2019 hatchery forecast is 12,505 age-3 ocean recruits, compared to 7,891 age-3 recruits in 2018. All smolts released were marked with an adipose fin clip.

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 currently are 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 2016 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 2019 total Puget Sound region natural and hatchery coho ocean recruit forecast is 649,560, compared to a 2018 preseason forecast of 529,836. The 2019 natural forecast is 248,848, compared to the 2018 preseason forecast of 243,074. The 2019 hatchery forecast is 400,712, compared to the 2018 preseason forecast of 286,762.

A comparison was made of preseason ocean age-3 forecasts with postseason estimates derived from run reconstructions using FRAM ("Backwards" mode). 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.

Strait of Juan de Fuca

Predictor Description

The natural forecast includes both Eastern and Western Strait of Juan de Fuca drainages. The forecast is based on a January age-3 ocean survival rate of 4.85 percent. The marine survival rate was predicted by a multiple linear regression model using two independent predictor variables: the natural log of the Elwha Hatchery coho jack return rate, and the PDO sum from May through September of the year preceding smolt outmigration. The marine survival rate was then applied to the coho smolt outmigration (223,939) to produce the forecast of January age-3 recruits and converted to ocean age-3.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates derived from FRAM run reconstruction in recent years indicated no notable bias. The 2017 preseason forecast over-predicted the 2017 postseason estimate by a factor of 2.24 (Table III-4; Figure III-1b).

Stock Forecasts and Status

The 2019 Strait of Juan de Fuca natural ocean age-3 abundance forecast is 8,800 compared to the 2018 preseason forecast of 7,168.

The 2019 Strait of Juan de Fuca hatchery ocean age-3 abundance forecast is 16,846.

The preseason forecast of 8,800 age-3 ocean recruits places Strait of Juan de Fuca natural coho in the "Critical" category under the FMP and in the Low category under the PST. 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).

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} = 8,800 × (1-0.60) = 3,520. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

Nooksack-Samish

Predictor Description

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

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

Predictor Performance

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

Stock Forecasts and Status

The 2019 Nooksack-Samish natural ocean age-3 abundance forecast is 25,133, compared to the 2018 preseason forecast of 20,574.

The 2019 Nooksack-Samish hatchery ocean age-3 abundance forecast is 59,790, compared to the 2018 preseason forecast of 61,256.

Skagit

Predictor Description

This natural forecast is based on weighted regression results of Saratoga Passage chlorophyll and light transmissivity in May, ONI in January - June, PDO in May – September and NPGO in May - September. The range of brood years used in this analysis was 1996 to 2014; brood years 1998 and 1999 were excluded because no Baker wild smolts were tagged in those years. The analysis produced an average marine survival of 3.88 percent; this was multiplied by the measured smolt production from the Skagit basin (49,075 Baker wild smolts and 1,444,051 Skagit wild smolts).

The hatchery forecast is based on weighted regression results of Saratoga Passage chlorophyll and light transmissivity in May, PDO in May - September and NPGO in May - September. Analysis of Marblemount Hatchery CWT recoveries for brood years 1996-2014 produced an average marine survival rate of 2.92

percent; this was multiplied by the total number of 2018 smolts released from all regional hatcheries (64,614 Baker marked hatchery smolts, 37,851 Marblemount unmarked hatchery smolts, and 237,149 Marblemount marked hatchery smolts).

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates derived from FRAM run reconstruction indicated a tendency to over-predict actual run size, especially early in the time series. The 2017 preseason forecast under-predicted the postseason estimate by a factor of .50 (Table III-4; Figure III-1b).

Stock Forecasts and Status

The 2019 Skagit natural ocean age-3 abundance forecast is 57,933, compared to the 2018 preseason forecast of 59,196.

The 2019 Skagit hatchery ocean age-3 abundance forecast is 9,917, compared to the 2018 preseason forecast of 13,101.

The preseason forecast of 57,933 age-3 ocean recruits places Skagit natural coho in the Low category under the FMP and in the Moderate category under the PST. This results in an allowable total exploitation rate of no more than 35 percent under both the Council adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Skagit River coho, MFMT = 0.60 and the OFL is S_{OFL} = 57,933 × (1-0.60) = 23,173. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

Stillaguamish

Predictor Description

Regressing annual coho 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 South Fork 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 4.0 percent, which is below the long term average for the South Fork Skykomish (12.79 percent) and in consideration of ocean conditions to be similar, if not slightly worse, to 2018 returns. Due to consecutive years of low returns, discussion with the co-managers concluded that a MS of 4.0 percent is most risk-averse for harvest management purposes.

The Stillaguamish Hatchery released 57,060 marked and 6,765 unmarked yearlings in 2018, with an estimated 1,997 marked and 237 unmarked adults returning based on current a hatchery marine survival estimate of 3.5 percent.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates derived from FRAM run reconstruction in recent years indicated no notable bias. The 2017 preseason forecast over-predicted the postseason estimate by a factor of 1.10 (Table III-4; Figure III-1b).

Stock Forecasts and Status

The 2019 Stillaguamish natural ocean age-3 abundance forecast is 23,820, compared to the 2018 preseason forecast of 18,950.

The 2019 Stillaguamish hatchery ocean age-3 abundance is 2,234, compared to the 2018 preseason forecast of less than 500.

The preseason forecast of 23,820 age-3 ocean recruits places Stillaguamish natural coho in the Normal category under the FMP and in the "Abundant" category under the PST. This results in an allowable total exploitation rate of no more than 50 percent under both the Council-adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Stillaguamish coho, MFMT = 0.50 and the OFL is S_{OFL} = 23,820 × (1-0.50) = 11,910. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

Snohomish

Predictor Description

The natural forecast is based on production of 2018 out-migrant smolts estimated from rotary screwtraps in the Skykomish and Snoqualmie rivers, and expanded to account for the "unsampled" spawning habitat downstream the traps and a 4.0 percent marine survival. The total smolt production estimate for the Snohomish watershed during 2018 is 1,565,000 smolts.

The hatchery forecast is based on 2018 hatchery releases of smolts from the WDFW Wallace River Hatchery, the Everett Net Pens, Eagle Creek and Tulalip Bernie Kai Kai Gobin Hatchery and a 3.5 percent marine survival.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates derived from FRAM run reconstruction indicated no notable bias. The 2017 forecast over-estimated the postseason estimate by a factor of 4.64 (Table III-4; Figure III-1b).

Stock Forecasts and Status

The 2019 Snohomish natural ocean age-3 abundance forecast is 62,600, compared to the 2018 preseason forecast of 65,925.

The 2019 Snohomish hatchery ocean age-3 abundance forecast is 43,662, compared to the 2018 preseason forecast of 38,303.

The preseason forecast of 62,600 age-3 ocean recruits places Snohomish natural coho in the Low category under the FMP and in the Moderate category under the PST. This results in an allowable total exploitation

rate of no more than 40 percent under both the Council-adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Snohomish coho, MFMT = 0.60 and the OFL is S_{OFL} = 62,600 × (1-0.60) = 25,054. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

Hood Canal

Predictor Description

The natural forecast is based on a regression of CWT natural Big Beef Creek jacks on Hood Canal December age-2 recruits, using brood years 1983-1998 and 2002-2014 and 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 2019, as was done in the previous three years, the co-managers agreed to apply a 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 2016 brood smolt releases for each facility and converted to ocean age-3.

Predictor Performance

A comparison of preseason ocean age-3 forecasts with postseason estimates derived from FRAM run reconstruction indicated no notable bias. The 2017 preseason forecast over-predicted the postseason estimate by a factor of 3.32 (Table III-4; Figure III-1b).

Stock Forecasts and Status

The 2019 Hood Canal natural ocean age-3 abundance forecast is 40,140, compared to the 2018 preseason forecast of 59,530.

The 2019 Hood Canal hatchery ocean age-3 abundance forecast is 87,869, compared to the 2018 preseason forecast of 84,549.

The 2019 preseason forecast of 40,140 age-3 ocean recruits places Hood Canal natural coho in the Low category under the FMP and in the Moderate category under the PST. This results in an allowable total exploitation rate of no more than 45 percent under both the Council adopted exploitation rate matrix (Appendix A, Table A-5) and the 2019 PST Southern Coho Management Plan (Table III-5).

OFL

The OFL is defined in terms of spawner escapement (S_{OFL}). For Hood Canal coho MFMT = 0.65, and the OFL is S_{OFL} = 40,140 × (1-0.65) = 14,049. The preseason S_{OFL} value will be recalculated with postseason abundance estimates (when available) to assess OFL compliance.

South Sound

Predictor Description

The natural forecast is the product of projected smolt production from each of the stream basins in the region multiplied by a marine survival rate expectation for natural coho in the region. The upper South

Sound natural stocks' marine survival rate of 2.4 percent was based upon a recent year average smolt to adult ratio. The deep South Sound stocks' marine survival prediction of 2.8 percent also came from the methods of WDFW 2019 Wild Coho Forecast paper.

The hatchery 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 hatchery coho in the region. The upper South Sound hatchery stocks' marine survival rate of 2.4 percent was based upon a recent year average smolt to adult ratio expanded to ocean age 3 using pre-terminal ERs from 2010 – 2017, excluding 2016. The deep South Sound stocks' marine survival prediction of 2.1 percent came from the South Sound recent year average.

Stock Forecasts and Status

The 2019 South Sound natural ocean age-3 abundance forecast is 30,422 compared to the 2018 preseason forecast of 15,034.

The 2019 South Sound hatchery ocean age-3 abundance forecast is 180,394, compared to the 2018 preseason forecast of 103,011.

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. These three stocks remain overfished at the current time, based on escapement estimates detailed in the PFMC *Review of 2018 Ocean Salmon Fisheries*, released in February 2019.

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 Canadian, Puget Sound, and north Washington Coast fisheries are generally slightly higher than 2018 projections. Table III-6 summarizes projected 2019 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)

	Columbia River Hatchery - Early Stock			Columbia River Hatchery - Late Stock			Lower Columbia River Natural (LCN)			**Oregon Coast Natural** (Rivers and Lakes)		
Year	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/]
1996	142.2	98.0	1.45	114.4	30.8	3.71				63.2	86.1	0.73
1997	206.9	129.8	1.59	86.5	53.7	1.61				86.4	27.8	3.11
1998	63.8	126.4	0.50	24.9	47.3	0.53				47.2	29.2	1.62
1999	325.5	174.9	1.86	140.9	120.7	1.17				60.7	51.9	1.17
2000	326.3	378.0	0.86	278.0	260.1	1.07				55.9	69.0	0.81
2001	1036.5	873.0	1.19	491.8	488.3	1.01				50.1	163.2	0.31
2002	161.6	324.7	0.50	143.5	271.8	0.53				71.8	304.5	0.24
2003	440.0	645.7	0.68	377.9	248.0	1.52				117.9	278.8	0.42
2004	313.6	389.0	0.81	274.7	203.0	1.35				150.9	197.0	0.77
2005	284.6	282.7	1.01	78.0	111.6	0.70				152.0	150.1	1.01
2006	245.8	251.4	0.98	113.8	156.3	0.73				60.8	116.4	0.52
2007	424.9	291.0	1.46	139.5	171.0	0.82	21.5	20.5	1.05	255.4	60.0	4.26
2008	110.3	333.9	0.33	86.4	207.6	0.42	13.4	28.7	0.47	60.0	170.9	0.35
2009	672.7	681.4	0.99	369.7	374.1	0.99	32.7	37.6	0.87	211.6	257.0	0.82
2010	245.3	274.3	0.89	144.2	263.6	0.55	15.1	53.2	0.28	148.0	266.8	0.55
2011	216.0	288.5	0.75	146.5	141.2	1.04	22.7	29.5	0.77	249.4	311.6	0.80
2012	229.8	114.7	2.00	87.4	55.6	1.57	30.1	12.9	2.33	291.0	123.8	2.35
2013	331.6	190.8	1.74	169.5	110.7	1.53	46.5	36.8	1.26	191.0	128.4	1.49
2014	526.6	760.5	0.69	437.5	480.3	0.91	33.4	108.7	0.31	230.6	403.3	0.57
2015	515.2	150.5	3.42	261.9	91.8	2.85	35.9	20.9	1.72	206.6	70.4	2.93
2016	153.7	127.0	1.21	226.9	96.1	2.36	40.0	25.1	1.59	152.7	83.2	1.84
2017	231.7	170.9	1.36	154.6	108.4	1.43	30.1	31.2	0.96	101.9	65.6	1.55
2018	164.7	82.7	1.99	121.5	64.6	1.88	21.9	29.7	0.74	54.9	81.3	0.68
2019	545.0	-	-	360.6	-	-	36.9	-	-	76.1	-	-

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	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 Area Hatchery Total[b/]**		
1996	0.4	1.2	0.33	38.5	28.0	1.38	14.2	25.8	0.55	309.2	182.6	1.69
1997	1.3	0.3	4.33	60.4	19.0	3.18	22.3	12.8	1.74	376.1	215.3	1.75
1998	0.2	0.3	0.67	21.6	19.7	1.10	8.1	10.2	0.79	118.4	203.6	0.58
1999	0.7	0.4	1.75	59.4	14.4	4.13	33.4	9.6	3.48	559.2	319.6	1.75
2000	0.6	0.5	1.20	48.5	23.4	2.07	18.6	15.6	1.19	671.4	677.1	0.99
2001	1.0	1.4	0.71	127.3	46.9	2.71	52.0	46.0	1.13	1707.6	1454.2	1.17
2002	0.6	3.0	0.20	36.6	41.6	0.88	20.0	22.0	0.91	361.7	660.1	0.55
2003	3.6	3.6	1.00	29.3	34.5	0.85	15.9	24.3	0.65	863.1	952.5	0.91
2004	3.1	1.0	3.10	16.6	21.7	0.76	19.0	29.9	0.64	623.9	634.6	0.98
2005	1.0	0.4	2.50	11.5	10.7	1.07	15.8	38.1	0.41	389.9	443.1	0.88
2006	0.6	0.1	6.00	8.6	7.9	1.09	30.6	25.0	1.22	398.8	440.6	0.91
2007	0.2	0.0	-	7.0	1.3	5.38	22.2	13.2	1.68	593.6	476.5	1.25
2008				1.7	7.1	0.24	17.7	16.8	1.05	216.1	565.4	0.38
2009				7.3	7.5	0.97	23.4	3.1	7.55	1073.1	1066.2	1.01
2010				4.4	8.6	0.51	14.1	4.8	2.94	408.0	551.3	0.74
2011				3.6	3.6	1.00	9.0	9.0	1.00	375.1	442.3	0.85
2012				6.4	3.1	2.06	18.1	8.6	2.10	341.7	182.3	1.87
2013				5.6	5.7	0.98	18.7	7.6	2.46	525.4	316.9	1.66
2014				4.8	19.3	0.25	14.2	3.4	4.18	983.1	1263.6	0.78
2015				6.9	5.6	1.23	24.4	3.8	6.42	808.4	251.7	3.21
2016				5.5	9.3	0.59	10.4	1.5	6.93	396.5	233.8	1.70
2017				3.5	1.9	1.84	4.5	3.6	1.25	394.3	284.8	1.38
2018				3.3	1.1	3.00	4.6	1.0	4.60	294.1	149.4	1.97
2019				12.0	-	-	15.9	-	-	933.5	-	-

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	0.85
1981-1985	451.2	274.0	37.2	56.0	176.8	305.3	1,328.6	0.63
1986-1990	574.6	339.3	55.1	45.5	154.3	705.0	1,602.2	0.70
1991-1995	107.4	182.7	46.6	53.2	35.1	315.1	668.4	0.35
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	197.3	-	463.5	904.5	0.21
2005	10.5	58.2	42.7	164.6	-	354.7	629.9	0.11
2006	4.5	47.5	29.5	132.7	-	409.7	674.1	0.08
2007	26.2	128.5	10.9	71.4	-	349.0	631.3	0.25
2008	0.6	26.4	16.0	180.1	-	520.8	769.8	0.04
2009	27.7	201.2	16.5	265.3	-	760.2	1,341.3	0.17
2010	5.8	48.8	18.5	287.1	-	466.5	848.4	0.06
2011	4.2	54.7	20.0	360.8	-	378.1	836.4	0.07
2012	4.7	45.5	18.5	104.6	-	152.4	311.3	0.16
2013	8.4	48.3	26.5	135.6	-	252.8	494.1	0.11
2014	35.6	197.4	42.0	362.1	-	1,019.5	1,724.8	0.14
2015	11.7	84.4	11.8	61.2	-	169.5	336.3	0.29
2016	2.8	31.7	11.4	82.2	-	205.0	334.8	0.10
2017	2.1	50.0	3.9	65.9	-	236.3	355.4	0.15
2018[g/]	1.5	53.8	3.0	79.4	-	138.4	232.4	0.24

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.

Year or Ave.	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
	Quillayute River Fall			**Hoh River**			**Queets River**			**Grays Harbor**[a/b/]		
1991-1995	15.4	16.2	1.07	7.1	8.5	1.32	11.9	14.0	1.2	122.8	68.0	2.2
1996	13.0	20.3	0.64	4.2	7.7	0.54	8.3	22.6	0.37	121.4	89.7	1.35
1997	8.9	5.8	1.53	2.8	4.1	0.68	4.3	2.2	1.92	26.1	20.2	1.29
1998	8.0	17.4	0.46	3.4	5.6	0.61	4.2	6.3	0.66	30.1	46.4	0.65
1999	14.5	16.1	0.90	3.2	6.8	0.47	4.3	8.6	0.50	57.7	42.7	1.35
2000	8.7	16.5	0.53	3.5	9.3	0.38	2.7	12.1	0.22	47.8	51.9	0.92
2001	23.0	28.4	0.81	8.5	16.2	0.52	12.0	35.8	0.33	51.3	103.2	0.50
2002	22.3	33.2	0.67	8.5	13.2	0.64	12.5	26.3	0.47	55.4	142.0	0.39
2003	24.9	22.5	1.11	12.5	8.7	1.44	24.0	15.7	1.52	58.0	108.4	0.54
2004	21.2	20.7	1.02	8.1	6.9	1.17	18.5	13.3	1.39	117.9	90.8	1.30
2005	18.6	20.9	0.89	7.6	8.2	0.93	17.1	11.9	1.43	91.1	65.9	1.38
2006	14.6	9.9	1.48	6.4	2.7	2.36	8.3	9.2	0.90	67.3	30.6	2.20
2007	10.8	10.7	1.01	5.4	5.8	0.93	13.6	7.1	1.92	59.4	34.6	1.72
2008	10.5	11.1	0.95	4.3	4.3	1.00	10.2	7.4	1.39	42.7	49.0	0.87
2009	19.3	15.5	1.24	9.5	9.5	1.00	31.4	16.0	1.97	59.2	104.6	0.57
2010	22.0	17.1	1.29	7.6	11.4	0.67	21.8	19.9	1.09	67.9	117.4	0.58
2011	28.2	13.3	2.11	11.6	13.0	0.89	13.3	15.1	0.88	89.1	86.2	1.03
2012	33.5	12.8	2.61	14.3	8.1	1.77	37.2	9.1	4.08	150.2	103.9	1.45
2013	17.2	15.8	1.09	8.6	9.2	0.94	24.5	9.9	2.48	196.8	80.3	2.45
2014	18.4	17.3	1.07	8.9	9.1	0.97	10.3	12.8	0.80	108.8	152.9	0.71
2015	10.5	4.8	2.19	5.1	2.9	1.74	7.5	2.7	2.75	142.6	31.7	4.50
2016	4.5	11.7	0.38	2.1	5.4	0.39	3.5	6.5	0.54	35.7	35.3	1.01
2017	15.8	12.9	1.22	6.2	6.0	1.03	6.5	6.8	0.96	50.0	37.3	1.34
2018	10.6	NA	NA	5.8	NA	NA	7.0	NA	NA	42.4	NA	NA
2019	14.7	-	-	7.0	-	-	11.1	-	-	71.5	-	-

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	59.2	NA	NA	19.0	NA	NA	59.5	NA	NA
2019	57.9	-	-	23.8	-	-	40.1	-	-

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	65.9	NA	NA	7.2	NA	NA
2019	62.6	-	-	8.8	-	-

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

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

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

FMP

FMP Stock	Total Exploitation Rate Constraint[a/]	Categorical Status[a/]
Skagit	35%	Low
Stillaguamish	50%	Normal
Snohomish	40%	Low
Hood Canal	45%	Low
Strait of Juan de Fuca	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	35%	Moderate
Stillaguamish	50%	Abundant
Snohomish	40%	Moderate
Hood Canal	45%	Moderate
Strait of Juan de Fuca	20%	Low
Quillayute Fall[c/]	57%	Abundant
Hoh[c/]	71%	Abundant
Queets[c/]	48%	Abundant
Grays Harbor	51%	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). This also becomes the maximum allowable rate unless the stock is in the "Low" status. In that case, an ER of up to 20% is allowed.

TABLE III-6. Projected coho mark rates for 2019 U.S. forecasts under base period fishing patterns (percent marked).

Area	Fishery	June	July	August	Sept
Canada					
Johnstone Strait	Recreational	-	47%	42%	-
West Coast Vancouver Island	Recreational	58%	47%	58%	62%
North Georgia Strait	Recreational	58%	59%	59%	57%
South Georgia Strait	Recreational	42%	61%	53%	59%
Juan de Fuca Strait	Recreational	59%	58%	60%	55%
Johnstone Strait	Troll	65%	60%	45%	56%
NW Vancouver Island	Troll	51%	48%	45%	40%
SW Vancouver Island	Troll	49%	52%	51%	55%
Georgia Strait	Troll	62%	61%	62%	58%
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	67%	61%	58%	60%
Strait of Juan de Fuca (Area 6)	Recreational	67%	59%	60%	56%
San Juan Island (Area 7)	Recreational	47%	60%	56%	45%
North Puget Sound (Areas 6 & 7A)	Net	-	67%	57%	50%
Council Area					
Neah Bay (Area 4/4B)	Recreational	47%	63%	57%	63%
LaPush (Area 3)	Recreational	70%	64%	73%	59%
Westport (Area 2)	Recreational	77%	72%	67%	66%
Columbia River (Area 1)	Recreational	81%	81%	74%	77%
Tillamook	Recreational	72%	66%	64%	65%
New port	Recreational	68%	64%	63%	55%
Coos Bay	Recreational	65%	62%	57%	48%
Brookings	Recreational	62%	51%	45%	17%
Neah Bay (Area 4/4B)	Troll	54%	59%	58%	62%
LaPush (Area 3)	Troll	48%	59%	59%	62%
Westport (Area 2)	Troll	66%	63%	64%	59%
Columbia River (Area 1)	Troll	75%	74%	70%	65%
Tillamook	Troll	62%	62%	67%	61%
New port	Troll	64%	62%	63%	63%
Coos Bay	Troll	64%	62%	59%	48%
Brookings	Troll	57%	54%	57%	66%
Columbia River					
Buoy 10	Recreational	-	-	-	71%

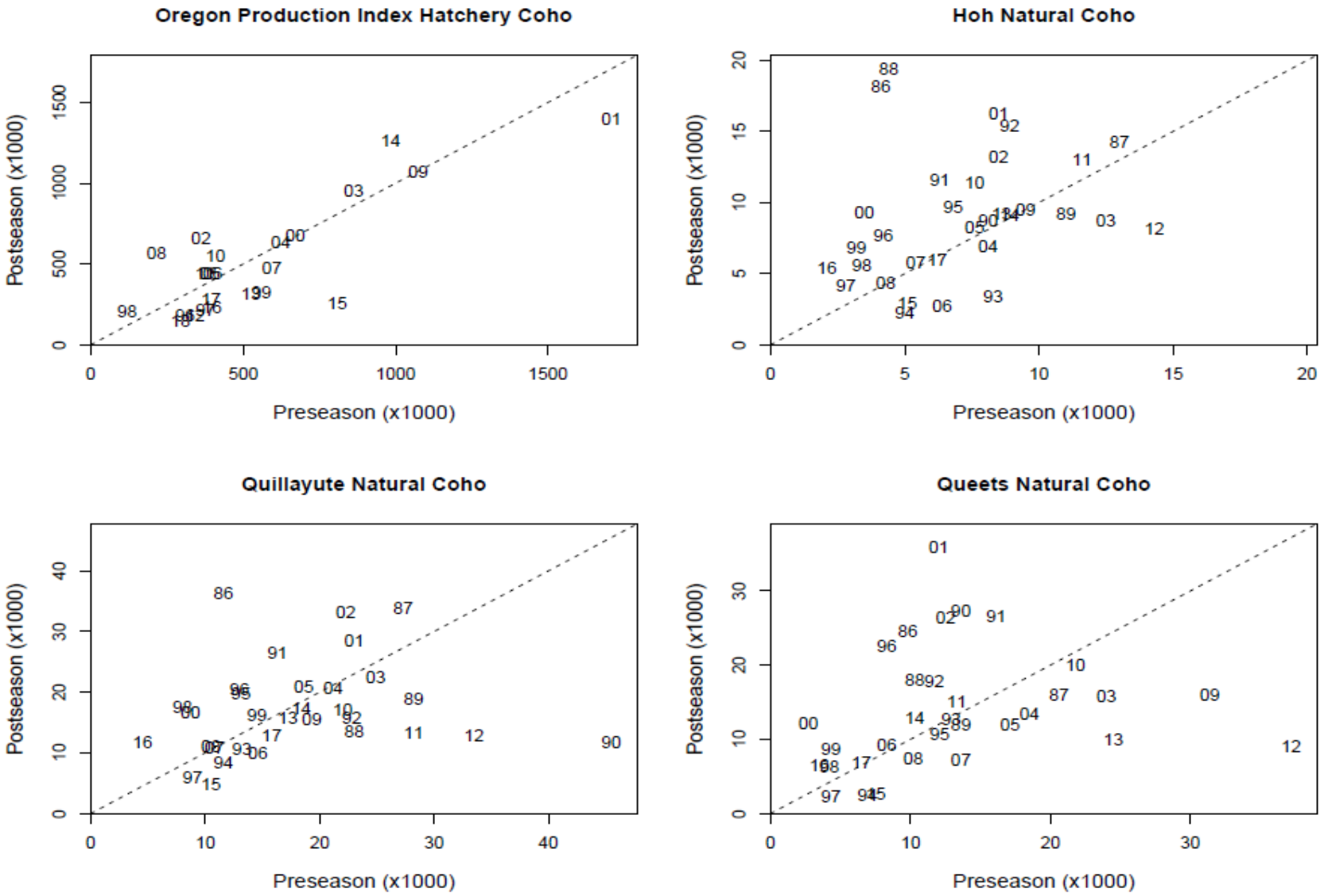

FIGURE III-1a. Selected preseason vs. postseason forecasts for coho stocks with substantial contribution to Council area fisheries.

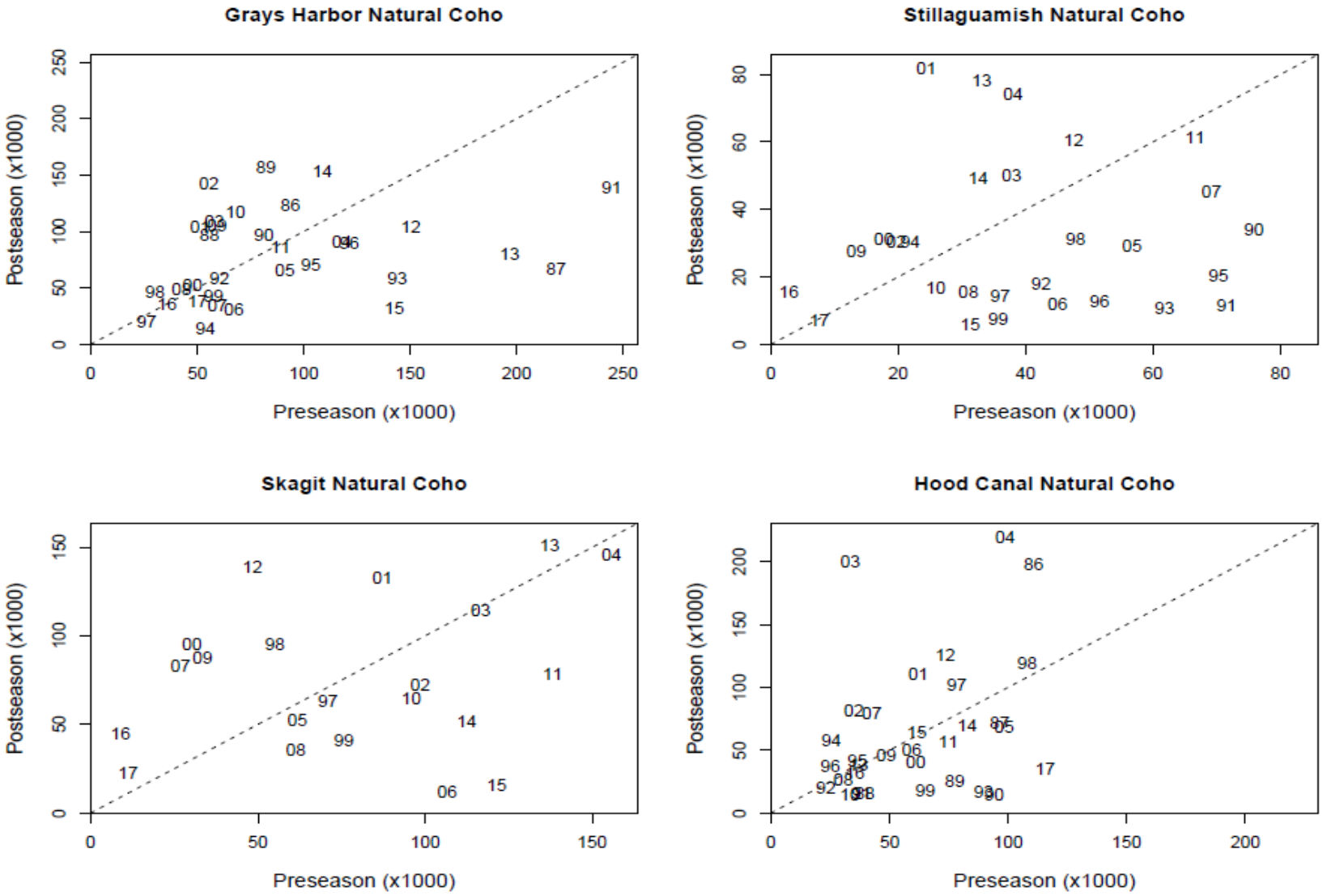

FIGURE III-1b. Selected preseason vs. postseason forecasts for coho stocks with substantial contribution to Council area fisheries.

CHAPTER IV: AFFECTED ENVIRONMENT - PINK SALMON ASSESSMENT

Two major runs comprise the pink salmon population available to Council fisheries during odd-numbered years: the Puget Sound run and the Fraser River (British Columbia) run, which is more abundant of the two runs. The 2017 pink salmon runsize forecasts included 1.15 million for Puget Sound and 8.69 million for Fraser River. The 2017 actual run sizes included 510,857 for Puget Sound and 3.62 million for Fraser River. The Puget Sound runsize was the fifth lowest in the time series from 1959-2018 and lowest since 1997. The Fraser River run size represented 42 percent of the pre-season forecast. The 2019 run size forecasts include 608,388 Puget Sound pink salmon and 5.02 million Fraser River pink salmon (Table IV-1).

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[b/]	0.61	NA	5.02	NA

a/ Total run size.

b/ Preliminary forecast.

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

The No-Action Alternative consists of the preseason management measures adopted by the Council and approved by the Secretary of Commerce for the 2018 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 2018 preseason management measures and analyses of their projected effects on the biological and socioeconomic environment are presented in Preseason Report III (PFMC 2018c). A description of the 2018 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 2018 Ocean Salmon Fisheries (PFMC 2019).

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

Overview

Table V-4 provides a summary of Salmon FMP stock spawning escapement and exploitation rate projections for 2019 under the No-Action Alternative (2018 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 2018 Ocean Salmon Fisheries 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 2019 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 estimated using Coho FRAM. Abundance forecasts for 2019 were updated for Washington and Oregon stocks, but forecasts for Canadian stocks are unchanged from those employed for 2018 planning. Updated forecasts for Canadian stocks are expected to become available in March 2019. To provide information on the effect of changes in abundance forecasts, the final 2018 pre-season regulatory package for ocean and inside fisheries was applied to 2019 projections of abundance.

Sacramento River Fall Chinook

A repeat of 2018 regulations would be expected to result in an escapement of 230,486 hatchery and natural area SRFC adults. This projection is higher than the minimum escapement level specified by the control rule for 2019 (122,000), S_{MSY} (122,000), and the 2019 preseason S_{ACL} (113,890; Tables V-4 and V-5). The geometric mean of the 2017 and 2018 spawning escapement estimates and the 2019 forecast spawning escapement under the No-Action Alternative is greater than the MSST, yet lower than S_{MSY} (Table V-4). The predicted SRFC exploitation rate under the No-Action Alternative is 39.3 percent, which is below the MFMT (78.0 percent; Table V-4) and the maximum allowable rate specified by the control rule for 2019 (67.9 percent). If the ocean fisheries were closed from January through August 2019 between Cape Falcon and the U.S./Mexico border, and Sacramento Basin fisheries were closed in 2019, the expected number of hatchery and natural area adult spawners would be 365,710.

The 2018 estimate of SRFC adult escapement was 105,739, which exceeds the 2018 postseason S_{ACL} of 67,156 (Table V-5).

Sacramento River Winter Chinook

A repeat of 2018 regulations would be expected to result in an age-3 impact rate of 9.1 percent for the area south of Point Arena, California. The 2019 forecast age-3 impact rate under the No-Action Alternative is lower than the 2019 maximum allowable rate of 15.7 percent.

Klamath River Fall Chinook

A repeat of 2018 regulations, which included a river recreational harvest allocation of 19.3 percent of the non-tribal harvest and a tribal allocation of 50 percent of the overall adult harvest, would be expected to result in 58,729 natural area adult spawners. This projection is greater than the minimum escapement level specified by the control rule for 2019 (40,700), S_{MSY} (40,700), and the 2019 preseason S_{ACL} (28,126; Tables V-4 and V-5). The geometric mean of the 2017 and 2018 natural area adult spawner escapement estimates and the 2019 forecast spawning escapement under the No-Action Alternative is greater than the MSST, yet lower than S_{MSY} (Table V-4). The predicted KRFC exploitation rate under the No-Action Alternative is 33.2 percent, which is lower than the MFMT (71.0 percent; Table V-4) and the maximum allowable rate specified by the control rule for 2019 (53.7 percent). If the ocean fisheries were closed from January through August 2019 between Cape Falcon and Point Sur, and the Klamath Basin fisheries (tribal and recreational) were closed in 2019, the expected number of natural area adult spawners would be 87,768.

The 2018 estimate of KRFC escapement was 53,624 natural area adults, which exceeds the 2018 postseason S_{ACL} of 23,794 (Table V-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 2018 is 22.6 percent. Applying 2018 regulations to the 2019 KRFC abundance results in an age-4 ocean harvest rate forecast of 10.2 percent. If the ocean fisheries were closed from January through August 2019 between Cape Falcon and Point Sur, the expected age-4 ocean harvest rate would be 0.2 percent (160 age-4 KRFC were harvested during the September through November 2018 period).

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 are 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 of these stocks, but given recent trends, the escapement goals would likely be met again in 2019 under 2018 fishing seasons.

Columbia River Chinook Stocks

The 2019 forecasts for Columbia River spring and summer stocks are less than the 2018 forecasts. Most 2019 forecasts for tule and bright fall Chinook are less than the 2018 forecasts, but the 2019 forecasts for Lower River Wild and Mid-Columbia Brights are higher than the 2018 forecasts. Despite these reduced forecasts in 2019 from 2018, applying 2018 regulations to the forecasted 2019 abundance of Columbia River Chinook would result in ocean escapements meeting spawning escapement goals for all summer and fall Chinook stocks (Table V-4).

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. An evaluation of 2018 Council area management measures on projected 2019 abundance would not provide a useful comparison of fishery impacts in relation to conservation objectives.

Oregon Production Index Area Coho Stocks

Ocean fisheries were modeled with 2018 Council regulations and 2018 regulations for non-Council area fisheries. Because of the increase in forecasts for most hatchery coho stocks in 2019 relative to the forecasts in 2018, this model run shows lower fishery impact rates. Due to the changes in the forecasts, the model run shows fishery impact rate decreases 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 2019. Under this scenario, the expected escapement is 71,600 for OCN coho (Table V-6). For Columbia River hatchery coho stocks, the predicted ocean exploitation rate (excluding Buoy 10) is 9.8 percent on the Columbia River early stock and 12.5 percent on the Columbia River late stock; total predicted exploitation rates are 42.2 percent and 26.4 percent for early and late stock respectively. Predicted ocean escapements (after Buoy 10) into the Columbia River in 2019 show that under 2018 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 2019 fisheries is no greater than 15.0 percent in the revised OCN coho matrix (Table V-8; Appendix A, Table A-4), and the total allowable RK hatchery coho marine exploitation rate is 13.0 percent (NMFS ESA consultation standard). Under 2018 fishery regulations and 2019 abundance forecasts, these exploitation rates are predicted to be 6.1 percent for OCN, and 2.4 percent (marine) for RK coho (Table V-7). The 2019 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 2018 fishery regulations and 2019 abundance forecasts, the exploitation rate is predicted to be 4.0 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 0.7 percent and the estimated exploitation rate in freshwater fisheries would be 3.9 percent. The total exploitation rate on LCN coho would be 8.6 percent, less than the assumed 23.0 percent allowable rate.

Washington Coast, Puget Sound, and Canadian Coho Stocks

Exploitation rate and ocean escapement expectations in relation to management goals for selected naturally-spawning coho stocks, given 2019 preseason abundance forecasts and 2018 preseason projections for fishing patterns, are presented in Table V-6. The 2019 forecasts for Canadian coho stocks are not available, but are assumed to be at 2018 levels for this analysis. More detailed fishery management goals for Council area coho stocks are listed in Appendix A.

Under 2018 regulations, 2019 exploitation rates are expected to meet FMP conservation objectives applicable for 2019 for all Puget Sound coho stocks except Hood Canal. Ocean abundance forecasts for all Washington Coast natural coho stocks are above FMP spawning escapement conservation objectives. Management objectives for U.S. Puget Sound stocks subject to the PSC agreement are identical to FMP objectives and would be met under 2018 regulations for all Puget Sound stocks except Hood Canal; all coastal stocks would meet PSC agreement management objectives under 2018 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 Coho Agreement. The Council area fisheries portion would be 1.2 percent.

Coho bycatch during Puget Sound fisheries directed at pink, chum, and sockeye salmon will also be a consideration for preseason planning.

Summary

The effects of projected impacts (where available) under 2018 fishery regulations and 2019 abundance forecasts are as follows:

- SRFC are not at risk of approaching an over-fished 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 2019 objective.
- KRFC are not at risk of approaching an over-fished condition.
- The KRFC age-4 ocean harvest rate would not exceed the California Coastal Chinook ESA consultation standard.
- Willapa Bay, Grays Harbor, Queets, Hoh, Quillayute fall, Hood Canal, Skagit, and Stillaguamish coho would achieve S_{MSY} spawning escapement objectives.
- Strait of Juan de Fuca and Snohomish coho would not achieve S_{MSY} spawning escapement objectives.
- OCN coho 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 except Hood Canal coho would have exploitation rates that comply with the annual rates allowed under the FMP harvest rate matrix and the PST 2002 Southern Coho Management Plan. The exploitation rate on Hood Canal coho would exceed the rate allowed under both the FMP harvest rate matrix and the PST 2002 Southern Coho Management Plan.
- All coastal coho stocks would have exploitation rates that comply with the annual rates allowed under the FMP harvest rate matrix and the PST 2002 Southern Coho Management Plan.

Conclusion

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

- The projected total exploitation rate on Hood Canal natural coho would be above the rate allowed under the FMP harvest rate matrix and above PST management 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 2019 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. 2018 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted.
(Page 1 of 6)

A. SEASON DESCRIPTIONS
North of Cape Falcon
Supplemental Management Information
1 Overall non-Indian TAC: 55,000 Chinook and 47,600 coho marked with a healed adipose fin clip (marked). 2. Non-Indian commercial troll TAC: 27,500 Chinook and 5,600 marked coho.
Model #: Coho-1830, Chin3218
U.S./Canada Border to Cape Falcon • May 1 through the earlier of June 30 or 16,500 Chinook, no more than 5,200 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 4,600 of which may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8). Open seven days per week (C.1). All salmon except coho may be retained (C.4, C.7). Chinook minimum size limit of 28 inches total length (B). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Chinook landing and possession limits per vessel per landing week (Thurs. - Wed.) are in place: -U.S./Canada border to the Queets River: 50 Chinook; -Queets River to Leadbetter Point: 100 Chinook; -Leadbetter Point to Cape Falcon: 50 Chinook (C.1, C.6). When it is projected that approximately 60% of the overall Chinook guideline has been landed, or approximately 60% of the Chinook subarea guideline has been landed in the area between the U.S./Canada border and the Queets River, or approximately 60% of the Chinook subarea guideline has been landed in the area between Leadbetter Pt. and Cape Falcon, inseason action will be considered to ensure the guideline is not exceeded.
U.S./Canada Border to Cape Falcon • July 1 through the earlier of September 19 or 11,000 Chinook or 5,600 coho, no more than 4,600 Chinook may be caught in the area between the U.S./Canada border and the Queets River, and no more than 1,300 Chinook may be caught in the area between Leadbetter Pt. and Cape Falcon (C.8). Open seven days per week. All salmon may be retained, except no chum retention north of Cape Alava, Washington in August and September (C.4, C.7). Chinook minimum size limit of 28 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.e). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). In the area between the U.S./Canada border and the Queets River and the area between Leadbetter Pt. and Cape Falcon, a landing and possession limit of 50 Chinook per vessel per landing week (Thurs. - Wed.) will be in place (C.1, C.6). Landing and possession limit of 10 coho per vessel per landing week (C.1). When it is projected that approximately 60% of the overall Chinook guideline has been landed, or approximately 60% of the Chinook subarea guideline has been landed in the area between the U.S./Canada border and the Queets River, or approximately 60% of the Chinook subarea guideline has been landed in the area between Leadbetter Pt. and Cape Falcon, inseason action will be considered to ensure the guideline is 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 13, 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 while fishing, north of Leadbetter Point must land and deliver all species of fish within the area and north of Leadbetter Point. 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 must notify ODFW within one hour of delivery or prior to transport away from the port of landing by either calling 541-867-0300 ext. 271 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). 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.

TABLE 1. 2018 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 2 of 6)

A. SEASON DESCRIPTIONS

South of Cape Falcon

Supplemental Management Information

1. Sacramento River fall Chinook spawning escapement of 151,009 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 34.2%.
3. Klamath River recreational fishery allocation: 3,490 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 18,122 adult Klamath River fall Chinook.
5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 75% / 25%.

Cape Falcon to Humbug Mt.

- May 4-14 and 19-31;
- June 4-12 and 16-30;
- July 5-12 and 16-31;
- August 3-7, 13-17, and 25-29;
- September 1-October 31 (C.9.a).

Open seven days per week. All salmon except coho may be retained (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) and Oregon State regulations for a description of special regulations at the mouth of Tillamook Bay.

Beginning September 1 no more than 50 Chinook allowed per vessel per landing week (Thurs.-Wed.); and only open shoreward of the 40 fathom management line beginning October 1.

In 2019, 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 2018. This opening could be modified following Council review at its March 2019 meeting.

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

- May 4-14 and 19-31;
- June 4-12 and 16-30, or a 1,500 Chinook quota;
- July 5-12 and 16-31, or a 2,000 Chinook quota;
- August 3-7, 13-17, and 25-29, or a 500 Chinook quota; (C.9.a).

Open seven days per week. All salmon except coho may be retained (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 4 - August 29 weekly landing and possession limit of 50 Chinook per vessel per landing week (Thurs.-Wed.). Any remaining portion of a monthly Chinook quota may be transferred inseason on an impact neutral basis to the next open quota period (C.8.b).

All vessels fishing in this area from June through 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 541-867-0300 Ext. 252 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 2019, 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 2018. This opening could be modified following Council review at its March 2019 meeting.

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

- May 1 through the earlier of May 29, or a 3,600 Chinook quota;
- June 1 through the earlier of June 30, or a 4,000 Chinook quota;
- July 1 through the earlier of July 31, or a 4,000 Chinook quota;
- August 3 through the earlier of August 31, or a 4,000 Chinook quota (C.9.b).

Open five days per week (Fri.-Tue.). All salmon except coho may be retained (C.4, C.7). Chinook minimum size limit of 26 inches total length (B, C.1). Landing and possession limit of 20 Chinook per vessel per day (C.8.f). Any remaining portion of a monthly Chinook quota may be transferred inseason on an impact neutral basis to the next open quota period (C.8.g). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

All fish caught in this area must be landed within the area and within 24 hours of any closure of the fishery and prior to fishing outside the area (C.10). Klamath Control Zone closed (C.5.e). See California State regulations for additional closures adjacent to the Smith and Klamath rivers.

Humboldt South Jetty to Horse Mt.

- Closed.

For all commercial troll fisheries south of Cape Falcon 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. 2018 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 3 of 6)

A. SEASON DESCRIPTIONS

Horse Mt. to Point Arena (Fort Bragg)

- July 26-31;
- August 3-29;
- September 1-30 (C.9.b).

Open seven days per week. All salmon except coho may be retained (C.4, C.7). Chinook minimum size limit of 26 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.

All salmon caught in the area prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30 (C.6). When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6). During September, all fish must be landed north of Point Arena (C.6).

In 2019, the season will open April 16-30 for all salmon except coho, with a 27 inch Chinook minimum size limit and the same gear restrictions as in 2018. All salmon caught in the area must be landed in the area. This opening could be modified following Council review at its March 2019 meeting.

Point Arena to Pigeon Point (San Francisco)

- July 26-31;
- August 3-29;
- September 1-30 (C.9.b).

Open seven days per week. All salmon except coho may be retained (C.4, C.7). Chinook minimum size limit of 26 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.

All salmon caught in the area prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30 (C.6). When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6). During September, all fish must be landed south of Point Arena (C.6).

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

- October 1-5 and 8-12.

Open five days per week, Monday through Friday. All salmon except coho may be retained (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). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

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

- May 1-7;
- June 19-30 (C.9.b).

Open seven days per week. All salmon except coho may be retained (C.4, C.7). Chinook minimum size limit of 26 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.

All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., July 15 (C.6).

When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6).

For all commercial troll fisheries In California: 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-1. 2018 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 4 of 6)

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	28	21.5	16	12	None
Cape Falcon to Humbug Mt.	28	21.5	-	-	None
Humbug Mt. to OR/CA Border	28	21.5	-	-	None
OR/CA Border to Humboldt South Jetty	26	19.5	-	-	26
Horse Mt. to Pt. Arena	26	19.5	-	-	26
Pt. Arena to Pigeon Pt.	26	19.5	-	-	26
Pigeon Pt. to U.S./Mexico Border	26	19.5	-	-	26

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

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

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

C.2. Gear Restrictions:

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

C.3. Gear Definitions:

Trolling defined: Fishing from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.
Troll fishing gear defined: One or more lines that drag hooks behind a moving fishing vessel engaged in trolling. In that portion of the fishery management area off Oregon and Washington, the line or lines must be affixed to the vessel and must not be intentionally disengaged from the vessel at any time during the fishing operation.
Spread defined: A single leader connected to an individual lure and/or bait.
Circle hook defined: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90º angle.

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

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

C.5. Control Zone Definitions:

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

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.5.Control Zone Definitions (continued):

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).

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

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

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

C.7. Incidental Halibut Harvest: During authorized periods, the operator of a vessel that has been issued an incidental halibut harvest license may retain Pacific halibut caught incidentally in Area 2A while trolling for salmon. Halibut retained must be no less than 32 inches in total length, measured from the tip of the lower jaw with the mouth closed to the extreme end of the middle of the tail, and must be landed with the head on. When halibut are caught and landed incidental to commercial salmon fishing by an IPHC license holder, any person who is required to report the salmon landing by applicable state law must include on the state landing receipt for that landing both the number of halibut landed, and the total dressed, head-on weight of halibut landed, in pounds, as well as the number and species of salmon landed.

License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to mid-March 2018 for 2018 permits (*exact date to be set by the IPHC in early 2018*). Incidental harvest is authorized only during April, May, and June of the 2018 troll seasons, and after June 30 in 2018 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 35,620 pound preseason allocation or the total Area 2A non-Indian commercial Pacific halibut allocation, NMFS will take inseason action to prohibit retention of halibut in the non-Indian salmon troll fishery.

Incidental Pacific halibut catch regulations in the commercial salmon troll fishery adopted for 2018, prior to any 2018 inseason action, will be in effect when incidental Pacific halibut retention opens on April 1, 2019 unless otherwise modified by inseason action at the March 2019 Council meeting

May 1, 2018 until the end of the 2018 salmon troll season, and April 1-30, 2019, 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.

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

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 the June or July non-Indian commercial troll quotas in the Oregon KMZ may be transferred to the Chinook quota for the next open quota 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 2019 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2018).
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. Chinook remaining from the May, June, and /or July non-Indian commercial troll quotas in the 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.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. 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 Horse Mountain, California.

TABLE V-2. 2018 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: 55,000 Chinook and 47,600 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 27,500 Chinook and 42,000 marked coho; all retained coho must be marked. 3. No Area 4B add-on fishery. 4. Buoy 10 fishery opens August 1 with an expected landed catch of 25,000 marked coho in August and September.
U.S./Canada Border to Cape Alava (Neah Bay Subarea) • June 23 through earlier of September 3 or 4,370 marked coho subarea quota with a subarea guideline of 4,900 Chinook (C.5). Open seven days per week. All salmon may be retained, except no chum beginning August 1; 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). 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).
Cape Alava to Queets River (La Push Subarea) • June 23 through earlier of September 3 or 1,090 marked coho subarea quota with a subarea guideline of 1,500 Chinook (C.5). Open seven days per week. All salmon may be retained, 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).
Queets River to Leadbetter Point (Westport Subarea) • July 1 through earlier of September 3 or 15,540 marked coho subarea quota with a subarea guideline of 13,100 Chinook (C.5). Open five days per week (Sun. - Thurs.). All salmon may be retained; 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). Grays Harbor Control Zone closed beginning August 13 (C.4.b).
Leadbetter Point to Cape Falcon (Columbia River Subarea) • June 23 through earlier of September 3 or 21,000 marked coho subarea quota with a subarea guideline of 8,000 Chinook (C.5). Open seven days per week. All salmon may be retained; 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). 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. 2018 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 2 of 5)

A. SEASON DESCRIPTIONS

South of Cape Falcon

Supplemental Management Information

1. Sacramento River fall Chinook spawning escapement of 151,009 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 34.2%.
3. Klamath River recreational fishery allocation: 3,490 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 18,122 adult Klamath River fall Chinook.
5. Overall recreational coho TAC: 35,000 coho marked with a healed adipose fin clip (marked), and 3,500 coho in the non-mark-selective coho fishery.

Cape Falcon to Humbug Mt.

- March 15-October 31 (C.6), except as provided below during the mark-selective coho fishery and the non-mark-selective coho fishery (C.5).

Open seven days per week. All salmon except coho may be retained, 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).

October 1-31: The fishery is only open shoreward of the 40 fathom management line.

In 2019, 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 2018 (C.2, C.3). This opening could be modified following Council review at its March 2019 meeting.

Cape Falcon to Humbug Mt.

Mark-selective coho fishery:

- June 30 through the earlier of September 3, or a landed catch of 35,000 marked coho (C.6).

Open seven days per week. All salmon may be retained, except all retained coho must be marked with a healed adipose fin clip, two salmon per day (C.1). See minimum size limits (B). See gear restrictions and definitions (C.2, C.3, C.5.e).

Non-mark-selective coho fishery:

- September 7-8, and each Friday through Saturday thereafter through the earlier of September 29 or a landed catch of a 3,500 non-mark-selective coho quota (C.6). Open days may be modified inseason.

All salmon may be retained, 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)

- May 19-August 26 (C.6).

Open seven days per week. All salmon except coho may be retained, 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. 2018 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 3 of 5)

A. SEASON DESCRIPTIONS

OR/CA Border to Horse Mt. (California KMZ)

- June 1-September 3 (C.6).

Open seven days per week. All salmon except coho may be retained, 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.

Horse Mt. to Point Arena (Fort Bragg)

- June 17-October 31 (C.6).

Open seven days per week. All salmon except coho may be retained, 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 2019, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 20 inches total length (B); and the same gear restrictions as in 2018 (C.2, C.3). This opening could be modified following Council review at its March 2019 meeting.

Point Arena to Pigeon Point (San Francisco)

- June 17-October 31 (C.6).

Open seven days per week. All salmon except coho may be retained, 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 2019, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); and the same gear restrictions as in 2018 (C.2, C.3). This opening could be modified following Council review at its March 2019 meeting.

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

- April 7-July 2 (C.6).

Open seven days per week. All salmon except coho may be retained, 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 2019, season opens April 6 for all salmon except coho, two salmon per day (C.1). Chinook minimum size limit of 24 inches total length (B); and the same gear restrictions as in 2018 (C.2, C.3). This opening could be modified following Council review at its March 2019 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	24	16	None
Cape Falcon to Humbug Mt.	24	16	None
Humbug Mt. to OR/CA Border	24	-	None
OR/CA Border to Horse Mt.	20	-	20
Horse Mt. to Pt. Arena	20	-	20
Pt. Arena to Pigeon Pt.	20	-	20
Pigeon Pt. to U.S./Mexico Border	24	-	24

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. *Horse Mt., 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).

TABLE V-2. 2018 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council adopted.
(Page 5 of 5)

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

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

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

TABLE V-3. 2018 Treaty Indian ocean troll management measures for ocean salmon fisheries - Council adopted.

A. SEASON DESCRIPTIONS

Supplemental Management Information

1. Overall Treaty-Indian TAC: 40,000 Chinook and 12,500 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.

- May 1 through the earlier of June 30 or 16,000 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 24,000 Chinook quota, or 12,500 coho quota.

All Salmon. See size limit (B) and other restrictions (C).

B. MINIMUM SIZE (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.

** On March 5, 2018, the Federal District Court for the Western District of Washington issued an order to revise the western U&A boundaries for the Quileute and Quinault Tribes. Most notably, the western boundaries are at set distances from the coast, rather than following a line of longitude.*

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-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**. 2019 spawning escapement and exploitation rate estimates are based on preliminary 2019 preseason abundance forecasts and 2018 Council regulations.

	Estimated Adult Spawning Escapement									Total Exploitation Rate						
	2014	2015	2016	2017	2018[a/]	Forecast 2019[b/]	3-yr Geo Mean	MSST	S_{MSY}	2014	2015	2016	2017	2018[a/]	2019[b/]	MFMT
Chinook																
Sacramento Fall	212,468	114,085	89,699	42,714	105,739	230,486	101,348	91,500	122,000	0.61	0.55	0.56	0.68	0.53	0.39	0.78
Klamath River Fall	95,104	28,112	13,937	19,904	53,624	58,729	39,724	30,525	40,700	0.36	0.59	0.37	0.10	0.28	0.33	0.71
Southern Oregon[c/]	53,546	30,462	27,278	91,977	39,497	NA	46,276	20,500	34,992	NA	NA	NA	NA	NA	NA	0.54
Central and Northern OR	157	247	118	114	92	NA	107	30 fish/mi	60 fish/mi	0.43	0.42	0.47	NA	NA	NA	0.78
Upper River Bright - Fall[d/]	233,934	323,276	151,373	97,789	58,540	62,215	70,884	19,182	39,625	0.53	0.40	0.51	NA	NA	NA	0.86
Upper River - Summer[d/]	77,982	88,691	79,253	56,265	38,816	33,084	41,651	6,072	12,143	0.69	0.67	0.63	NA	NA	NA	0.75
Willapa Bay - Fall[e/]	2,075	2,824	1,887	3,078	NA	NA	2,541	1,696	3,393	0.57	0.47	0.59	NA	NA	NA	0.78
Grays Harbor Fall[e/]	11,893	17,305	11,248	17,145	NA	NA	14,944	5,694	13,326	0.57	0.47	0.59	NA	NA	NA	0.78
Grays Harbor Spring	1,583	1,841	926	1,384	493	NA	858	700	1,400	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall[d/]	3,820	5,313	2,915	2,702	NA	NA	3,472	1,250	2,500	0.57	0.47	0.59	NA	NA	NA	0.87
Queets - Sp/Su	377	532	704	NA	NA	NA	521	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall[e/]	1,933	1,795	2,831	1,808	NA	NA	2,094	600	1,200	0.57	0.47	0.59	NA	NA	NA	0.90
Hoh Sp/Su	744	1,070	1,144	1,364	NA	NA	1,186	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall[e/]	2,782	3,440	3,654	3,604	4,031	NA	3,758	1,500	3,000	0.57	0.47	0.59	NA	NA	NA	0.87
Quillayute - Sp/Su	608	794	900	1,097	1,232	NA	1,067	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa[d/]	1,760	2,877	1,324	1,188	2,179	NA	1,508	425	850	0.42	0.30	0.30	NA	NA	NA	0.78
Coho																
Willapa Bay	47,154	10,790	25,290	9,091	NA	50,124	22,587	8,600	17,200	0.51	0.44	0.38	0.33	NA	0.25	0.74
Grays Harbor	105,039	21,278	38,595	26,907	NA	57,788	39,151	18,320	24,426	0.45	0.49	0.12	0.32	NA	0.19	0.65
Queets	7,558	2,028	5,156	5,232	NA	9,331	6,314	4,350	5,800	0.41	0.26	0.15	0.23	NA	0.17	0.65
Hoh	4,565	1,794	5,009	4,478	NA	3,632	4,335	1,890	2,520	0.52	0.39	0.08	0.43	NA	0.48	0.65
Quillayute Fall	7,425	2,571	9,630	7,474	5,157	11,439	7,611	4,725	6,300	0.57	0.47	0.18	0.42	NA	0.22	0.59
Juan de Fuca	11,488	3,859	8,435	5,530	NA	8,314	7,292	7,000	11,000	0.17	0.18	0.03	0.06	NA	0.04	0.60
Hood Canal	26,787	26,926	24,313	22,519	NA	21,828	22,863	10,750	14,350	**0.68**	0.59	0.40	0.35	NA	0.46	0.65
Skagit	24,820	5,794	35,822	20,184	NA	40,551	30,836	14,875	25,000	0.52	**0.63**	0.20	0.09	NA	0.30	0.60
Stillaguamish	35,829	2,914	13,048	6,099	NA	16,420	10,933	6,100	10,000	0.27	0.48	0.16	0.12	NA	0.31	0.50
Snohomish	46,244	12,804	44,141	18,195	NA	42,477	32,433	31,000	50,000	0.31	0.55	0.18	0.21	NA	0.32	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/ CWT based exploitation rates from annual catch and escapement distribution from PSC-CTC 2013 Exploitation Rate Analysis.

e/ Queets River fall Chinook CWT exploitation rates used as a proxy. Exploitation rates in the terminal fisheries will differ from those calculated for Queets fall CWTs.

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	188,405	138,164	285,429	70,946	64,295	121,543	--	--	--
2013	260,867	191,302	406,846	52,021	47,144	59,156	--	--	--
2014	165,358	121,262	212,468	47,673	43,204	95,104	--	--	--
2015	76,670	56,225	114,085	22,209	20,127	28,112	9,183	7,958	17,086
2016	61,595	45,170	89,699	7,066	6,403	13,937	14,780	12,810	30,667
2017	40,636	29,800	42,714	7,111	6,444	19,904	9,183	7,958	10,878
2018	67,156	49,248	105,739	23,794	21,563	53,624	NA	NA	NA
2019	113,890	83,519	230,486	28,126	25,489	58,729	27,553	23,879	71,734

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 2018 Council-adopted regulations to 2018 and 2019 ocean abundance forecasts.[a/]

	Ocean Escapement and ER Estimates Under 2018 Regulations [b/]				
	2018 Abundance Forecasts		2019 Abundance Forecasts		
Stock	Ocean Escapement	Exploitation Rate	Ocean Escapement	Exploitation Rate	2019 FMP Conservation Objective [c/]
Natural Coho Stocks					
Skagit	57.0	31.3%	56.2	30.3%	Exploitation Rate ≤35.0% [d/]
Stillaguamish	18.5	34.5%	23.4	31.2%	Exploitation Rate ≤50.0% [d/]
Snohomish	64.3	33.5%	61.5	32.3%	Exploitation Rate ≤40.0% [d/]
Hood Canal	57.0	42.5%	38.8	45.7%	Exploitation Rate ≤45.0% [d/]
Strait of Juan de Fuca	6.9	6.7%	8.6	5.7%	Exploitation Rate ≤20.0% [d/]
Quillayute Fall	10.1	23.5%	14.3	22.4%	6.3 - 15.8 Spawners
Hoh	5.2	49.7%	6.5	48.0%	2.0 - 5.0 Spawners
Queets	6.1	19.6%	10.1	16.5%	5.8 - 14.5 Spawners
Grays Harbor	40.5	20.7%	69.4	19.4%	35.4 Spawners
LCN	19.1	16.2%	35.3	8.6%	Exploitation Rate ≤23.0 [e/]
OCN	48.1	12.9%	71.6	6.1%	Exploitation Rate ≤15.0% [e/]
R/K	2.5	5.5%	12.9	2.4%	Exploitation Rate ≤13.0% [e/]
Hatchery Coho Stocks					
Columbia Early	105.1	59.9%	472.7	42.2%	6.2 Hatchery Escapement
Columbia Late	81.0	43.6%	311.2	26.4%	14.2 Hatchery Escapement

a/ Quota levels include harvest and hooking mortality estimates used in planning the Council's 2018 ocean fisheries and a coho catch for the Canadian troll fishery off the West Coast of Vancouver Island (WCVI).

b/ 2018 preseason regulations with the following coho quotas: U.S. Canada Border to Cape Falcon: Treaty Indian troll-12,500; non-Indian troll-5,600 selective; recreational-42,000 selective; Cape Falcon to OR/CA border: recreational-35,000 selective and 3,500 non-selective; troll-none. 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. The 2019 marine fisheries exploitation rates are forecast at 4.0% compared to 9.9% in 2018; the total 2018 ESA limit was 18.0% including mainstem Columbia R. fisheries.

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 2019 ESA consultation standard.

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 2018 management measures and preliminary 2019 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	54	0.1%	327	0.4%	42	0.3%
PUGET SOUND/STRAITS	37	0.1%	23	0.0%	0	0.0%
NORTH OF CAPE FALCON						
Recreational	435	1.2%	160	0.2%	3	0.0%
Treaty Indian Troll	214	0.6%	100	0.1%	0	0.0%
Non-Indian Troll	162	0.4%	78	0.1%	0	0.0%
SOUTH OF CAPE FALCON						
Recreational:						
Cape Falcon to Humbug Mt.	477	1.3%	2,133	2.8%	22	0.2%
Humbug Mt. to Horse Mt. (KMZ)	11	0.0%	121	0.2%	75	0.6%
Fort Bragg	3	0.0%	44	0.1%	26	0.2%
South of Pt. Arena	0	0.0%	25	0.0%	11	0.1%
Troll:						
Cape Falcon to Humbug Mt.	66	0.2%	178	0.2%	5	0.0%
Humbug Mt. to Horse Mt. (KMZ)	17	0.0%	226	0.3%	115	0.9%
Fort Bragg	0	0.0%	29	0.0%	11	0.1%
South of Pt. Arena	1	0.0%	38	0.0%	3	0.0%
BUOY 10	272	0.7%	37	0.0%	0	0.0%
ESTUARY/FRESHWATER	1,441	3.9%	1,166	1.5%	NA	NA
TOTAL	3,190	8.6%	4,685	6.1%	313	2.4%

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	-	-	-	Low	-	-	Low	-
2021	2018	7,700	22,100	41,300	-	-	-	Low	-	-	Low	-

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 th 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.

CHAPTER VI: REFERENCES

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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 7)

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
Sacramento River 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. In addition to these season and minimum size limit restrictions, annual limits to the preseason-predicted age-3 impact rate south of Point Arena, defined by a control rule, were implemented beginning in 2012 and updated in 2018 (See Figure A-3).	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)	
Southern Oregon	At least 41,000 naturally-produced adults passing Huntley Park in the Rogue River to provide MSY spawning escapement. (PFMC 2015)	34,992	20,500	54% (PFMC 2015)	

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 7)

CHINOOK						
Stocks In The Fishery	**Conservation Objective**		S_{MSY}	MSST	MFMT (F_{MSY})	ACL
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 in the Chehalis and Humptulips Rivers combined. (PFMC 2015)	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% (PFMC 2015)	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)	
Willapa Bay Fall (hatchery)	WDFW spawning escapement objective of 3,525 hatchery spawners		Not applicable to hatchery stocks			
Quinault Fall (hatchery)	Hatchery production.					

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 7)

CHINOOK					
Stocks In The Fishery	**Conservation Objective**	S_{MSY}	MSST	MFMT (F_{MSY})	ACL
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	14,800 adults for hatchery egg-take. River mouth goal of 25,000.	Not applicable to hatchery stocks			
Columbia Lower River Hatchery Spring	3,500 adults to meet Cowlitz, Kalama, and Lewis Rivers broodstock needs.				
Columbia Mid-River Bright Hatchery Fall	7,900 for Little White Salmon Hatchery egg-take.				
Columbia Spring Creek Hatchery Fall	6,000 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 7)

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.	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.		Undefined		Undefined	
Mid Hood Canal Summer/Fall	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Nooksack Spring early	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Skagit Summer/Fall	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Skagit Spring	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Stillaguamish Summer/Fall	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Snohomish Summer/Fall	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Cedar River Summer/Fall	NMFS consultation standard/recovery plan.		Undefined		Undefined	
White River Spring	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Green River Summer/Fall	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Nisqually River Summer/Fall	NMFS consultation standard/recovery plan.		Undefined		Undefined	
Puyallup Summer/Fall	NMFS consultation standard/recovery plan.		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 7)

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 6,400 adults. River mouth goal of 9,700.				
Columbia River Early Hatchery	Hatchery rack return goal of 21,700 adults. River mouth goal of 77,200.				
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 7)

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 (Johnston 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 (Johnston 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)	

TABLE A-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes.[a/] (Page 7 of 7)

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	0.20	0.20	0.20	0.20	0.20
Low/normal runsize breakpoint	27,445	41,000	62,500	20,000	125,000
Low Exploitation Rate	0.40	0.45	0.35	0.35	0.40
Normal Exploitation Rate	0.60	0.65	0.60	0.50	0.60

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

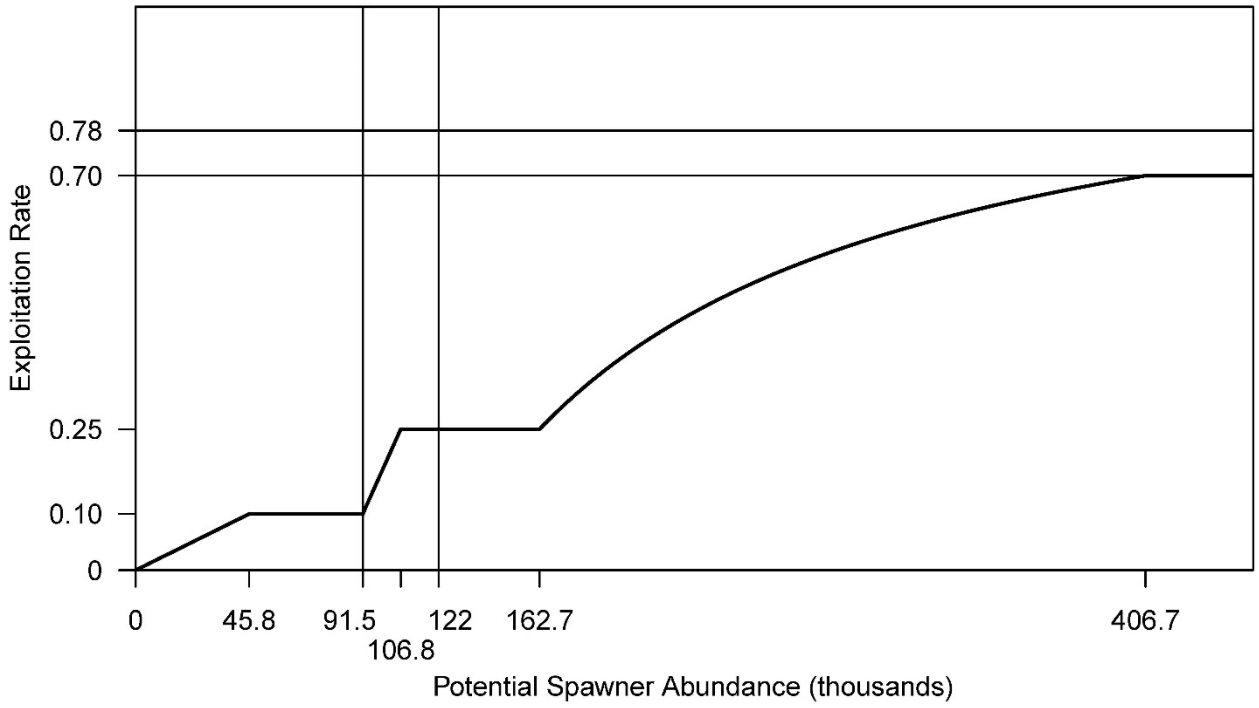

FIGURE A-1. Sacramento River fall Chinook control rule. Potential spawner abundance is the predicted hatchery and natural area adult spawners in the absence of fisheries, which is equivalent to the Sacramento Index. See the salmon FMP, Section 3.3.6, for control rule details.

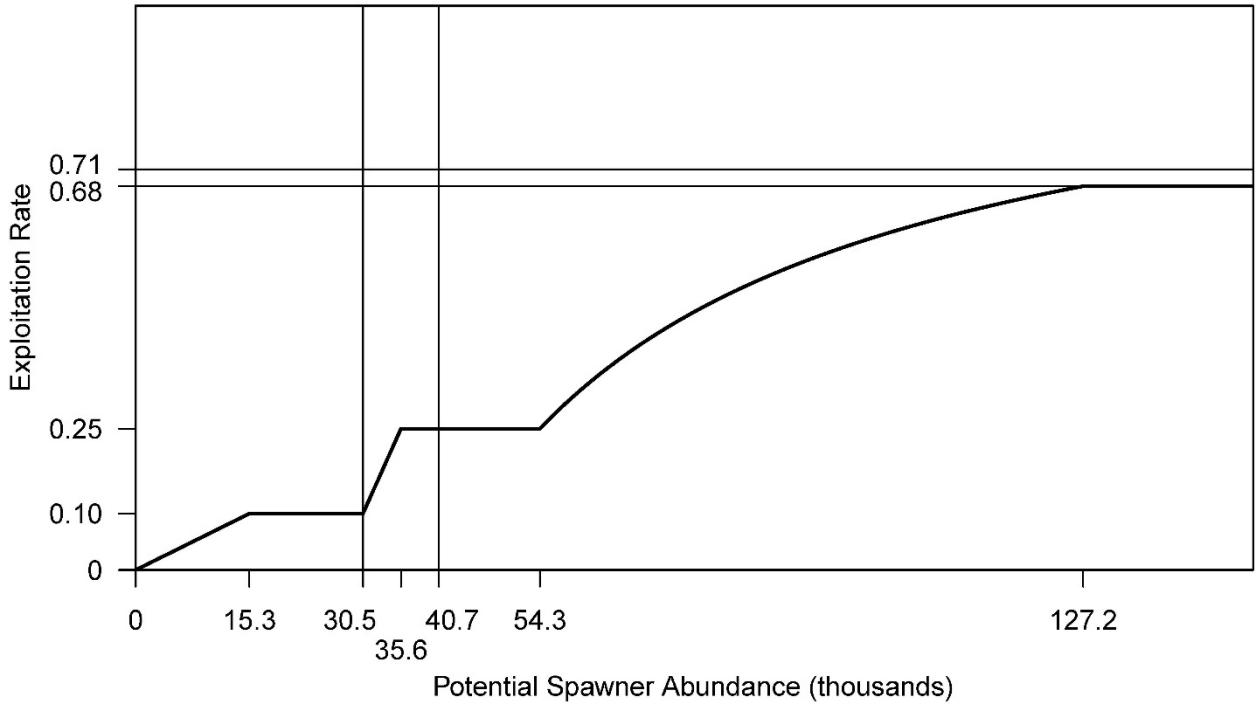

FIGURE A-2. Klamath River fall Chinook control rule. Potential spawner abundance is the predicted natural area adult spawners in the absence of fisheries. See the salmon FMP, Section 3.3.6, for control rule details.

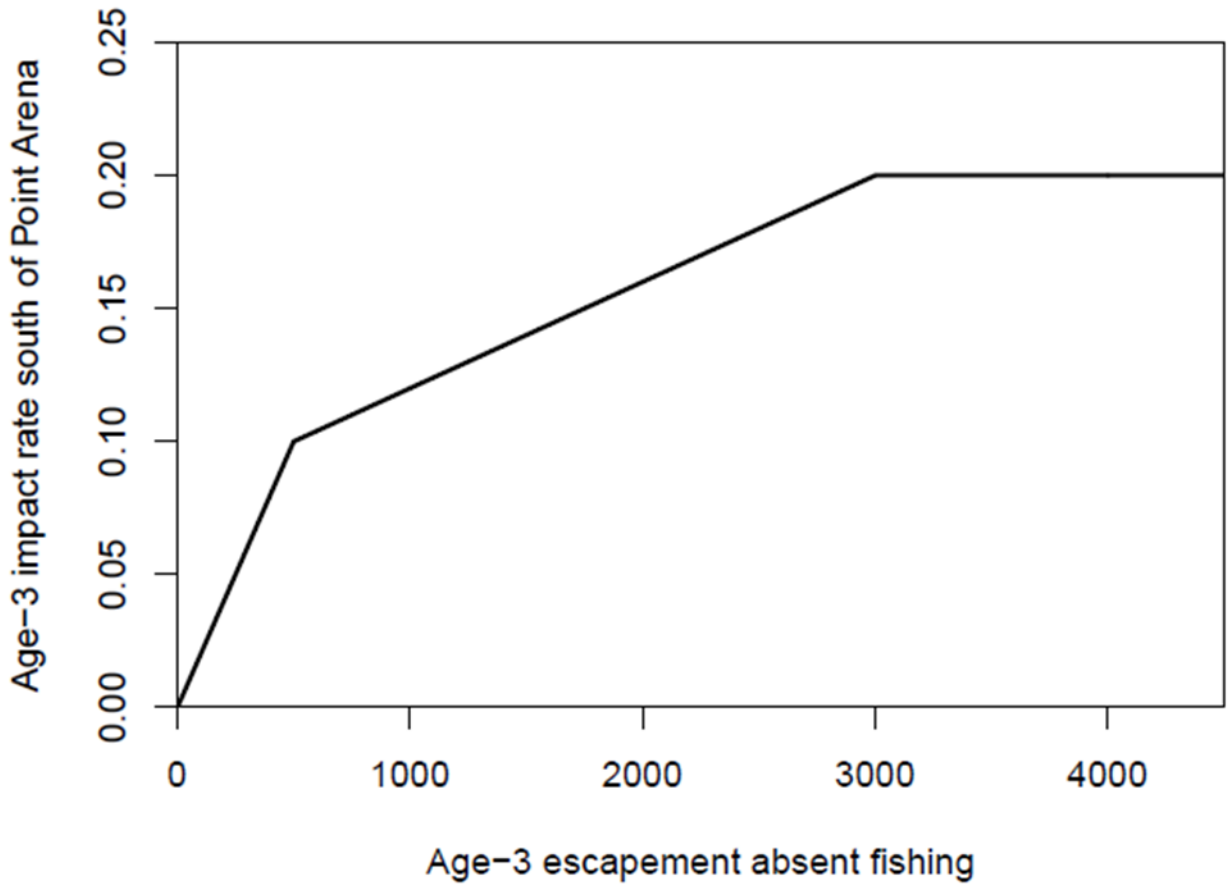

FIGURE A-3. Sacramento River winter Chinook impact rate control rule. The maximum forecast age-3 impact rate for the area south of Point Arena, California, is determined by the forecasted age-3 escapement absent fishing.

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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	Neah Bay Add-on	Neah Bay Total
50,000	25,000	18,500	1,300	5,200	25,000	19,900	1,400	3,700	8,000	11,700
150,000	75,000	55,500	3,900	15,600	75,000	57,600	4,000	13,600	12,000	25,600
300,000	150,000	111,000	7,800	31,200	150,000	114,500	8,000	27,500	20,000	47,500

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

Chinook

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

Inseason management actions may be taken by the NMFS NW Regional Administrator to assure that the primary objective of the Chinook harvest guidelines for each of the four recreational subareas north of Cape Falcon are met. Such actions might include: closure 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. Since 2008, two 10-year management agreements (2008-2017 and 2018-2027) were negotiated through the U.S. v. Oregon process. The 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

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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[c/]	6.1	2.1	7.3	9.4	3.6	19.2	0.3	-	0.3	0.3	19.8

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	254.7	39.6	37.0	2.6	19.4	16.9	1.5	3.0
2016	233.8	242.3	19.7	18.6	1.0	18.9	16.9	1.3	1.3
2017	284.8	284.8	22.9	22.4	0.4	18.4	16.5	1.3	1.6
2018	149.4	179.1	19.2	18.5	0.7	17.2	16.0	0.7	0.8
2019	-	933.5 [k/]	51.6	50.8	0.8	19.8	18.6	0.5	1.4

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/ 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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
NORTHERN														
Necanicum	2,534	750	431	1,055	3,827	4,445	2,120	902	798	5,727	847	936	529	393
Nehalem	20,159	11,614	14,033	17,205	21,753	32,215	15,322	2,963	4,539	30,577	3,079	7,549	5,486	3,989
Tillamook	6,563	8,774	2,295	4,828	16,251	14,890	19,250	1,686	4,402	20,090	1,345	7,102	2,927	1,976
Nestucca	7,287	1,876	394	1,844	4,252	1,947	7,857	1,751	946	6,369	1,029	2,412	4,495	1,075
Ind. Tribs.	573	1,121	376	639	2,052	1,473	1,341	218	271	4,607	440	699	206	264
TOTAL	37,116	24,135	17,529	25,571	48,135	54,970	45,890	7,520	10,956	67,370	6,740	18,698	13,643	7,697
NORTH CENTRAL														
Salmon	506	513	59	652	753	1,382	3,636	297	1,165	3,680	332	1,054	450	105
Siletz	6,902	5,205	2,197	20,634	24,070	6,283	33,094	4,495	7,660	19,496	2,216	3,015	5,202	4,040
Yaquina	10,571	4,247	3,158	10,913	11,182	8,589	19,074	6,268	3,553	25,582	2,400	3,730	2,491	4,672
Beaver Ck.	3,487	1,950	611	1,218	3,575	2,072	2,389	1,878	2,015	6,564	332	1,709	1,553	494
Alsea	8,344	1,972	2,146	13,320	14,638	9,688	28,337	8,470	9,283	25,855	6,185	7,375	4,377	5,112
Siuslaw	24,138	5,869	3,552	17,491	30,607	25,983	28,082	11,946	14,118	38,896	10,352	9,141	7,129	6,688
Ind. Tribs.	3,279	1,468	547	3,910	1,610	2,548	4,487	492	1,929	1,890	856	464	1,646	972
TOTAL	57,227	21,224	12,270	68,138	86,435	56,545	119,099	33,846	39,723	121,963	22,673	26,488	22,848	22,083
SOUTH CENTRAL														
Umpqua	37,165	18,092	11,783	37,868	57,984	70,019	94,655	20,969	27,016	66,272	14,860	7,494	15,492	21,987
Coos	26,572	11,266	1,329	14,881	26,979	27,658	10,999	9,414	6,884	38,880	3,030	4,624	2,689	7,074
Coquille	15,571	28,577	13,968	8,791	22,286	23,564	55,667	5,911	23,637	41,660	3,357	9,494	4,641	5,201
Floras Ck.	3,568	1,104	340	786	3,203	11,329	9,217	2,502	1,936	1,022	1,585	942	693	278
Sixes R.	157	294	97	43	176	92	334	34	567	410	168	120	69	95
Coastal Lakes	18,205	24,127	8,955	23,608	17,349	38,744	20,281	18,922	13,659	22,010	4,729	8,044	1,302	6,704
Ind. Tribs.	-	-	-	0	188	484	101	48	33	106	0	0	0	10
TOTAL	101,238	83,460	36,472	85,977	128,165	171,890	191,254	57,800	73,732	170,360	27,729	30,718	24,886	41,349
SOUTH														
Rogue[b/]	12,349	3,911	5,136	414	2,566	3,671	4,545	5,474	11,210	2,409	4,072	6,302	4,529	8,266
COASTWIDE	207,930	132,730	71,407	180,100	265,301	287,076	360,788	104,640	135,621	362,102	61,214	82,206	65,906	79,395

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/ 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	-0.5	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	0.5	85.0
1986-1990	153.8	28.9	0.1	29.6	-39.2	-91.0	11.6	10.4	0.4	82.0
1991-1995	150.7	27.0	0.3	29.3	-40.8	-77.9	11.6	10.4	0.7	89.0
1996-2000	131.8	25.2	0.5	31.2	-49.0	-61.7	11.7	10.8	0.6	94.8
2000	156.6	21.5	0.4	35.8	-26.8	-56.2	11.4	10.2	-0.6	72.0
2001	246.1	34.7	-0.4	47.1	-38.2	-126.2	10.7	10.1	-0.2	61.0
2002	227.3	61.0	-0.6	50.5	-25.9	-148.6	10.1	11.0	1.0	80.0
2003	164.0	143.1	-0.2	55.5	-26.4	-63.5	11.1	10.3	0.5	112.0
2004	146.3	236.4	0.0	27.0	4.3	-62.6	11.9	10.2	0.7	110.0
2005	113.3	213.3	0.5	51.8	-9.0	-25.7	12.5	11.5	-0.3	145.0
2006	64.9	154.1	0.8	53.6	-14.1	-36.4	11.2	9.8	1.1	112.0
2007	157.0	139.9	0.6	27.5	-9.9	-123.7	10.6	8.9	-1.2	74.0
2008	262.9	104.7	0.2	32.7	-10.7	-113.3	9.6	9.4	-0.6	89.0
2009	255.6	57.3	-0.3	24.3	-47.1	-96.0	10.5	10.8	1.0	82.0
2010	352.4	156.1	-0.5	34.2	-32.9	-48.5	11.7	10.1	-1.7	100.0
2011	98.1	245.4	-0.8	29.3	-26.3	-46.3	10.7	9.2	-0.9	100.0
2012	130.2	244.7	-0.7	53.6	-29.9	-34.5	11.0	9.9	0.1	121.0
2013	377.4	336.0	-0.8	35.3	-7.8	-106.6	10.7	9.1	0.0	100.0
2014	64.6	80.2	-0.4	41.3	-40.1	-30.1	11.2	12.3	0.6	101.0
2015	74.3	110.8	0.2	40.4	-7.9	-65.4	10.3	11.0	2.3	92.0
2017	67.4	337.7	1.0	48.0	-68.2	-127.4	11.6	9.9	-0.3	85.0
2018	73.6	52.4	1.3	46.1	-36.2	-63.9	11.2	11.0	-0.4	116.0
2019[b/]	70.1	67.9	1.0	41.1	-12.4	-116.2	10.8	11.1	0.6	107.0

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)

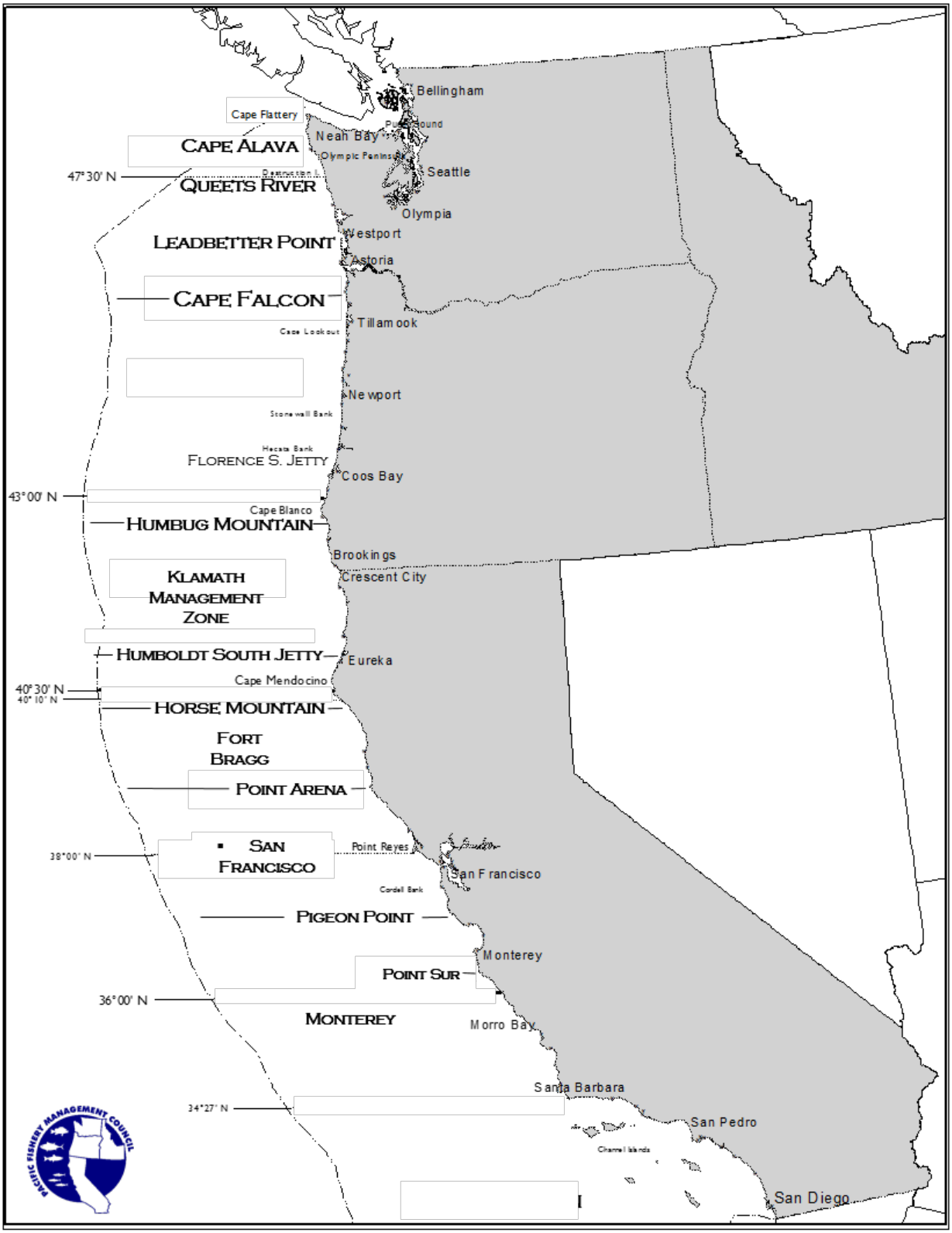
SSH - Sea surface height (South Beach, OR at 44º 37.5´ N, 124 º 02.6´ W)

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.



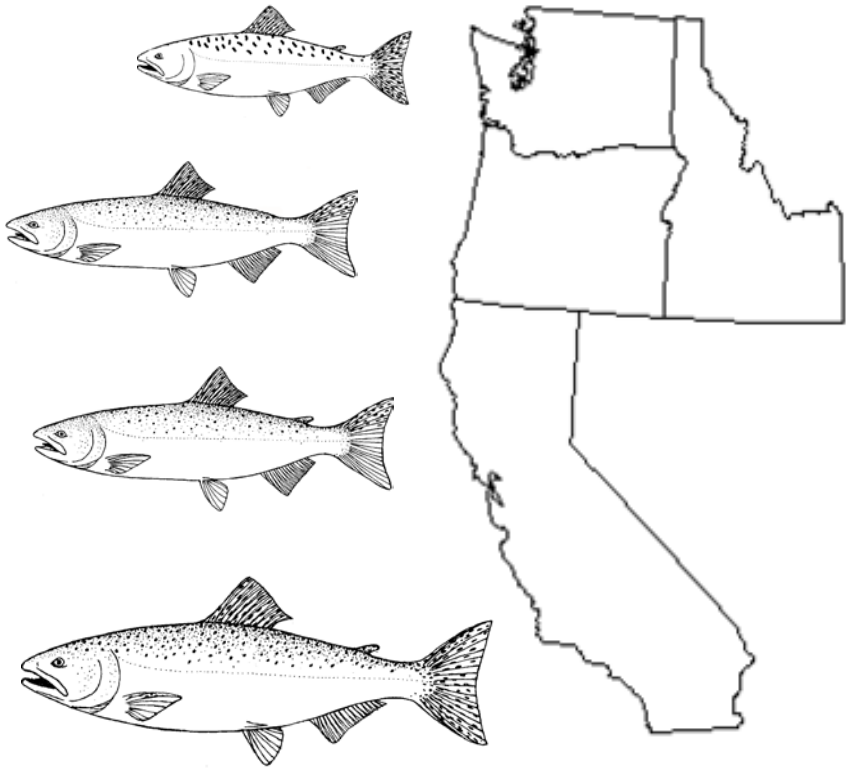
This map is for reference only and is not intended for use in navigation or fishery regulation.

ENVIRONMENTAL ASSESSMENT PART 2
FOR 2019
OCEAN SALMON FISHERY
REGULATIONS

REGULATION IDENTIFIER NUMBER 0648- BI05

BASED ON

PRESEASON REPORT II
PROPOSED ALTERNATIVES
AND



Pacific Fishery Management Council
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Portland, OR 97220-1384
(503) 820-2280
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MARCH 2019

PUBLIC HEARINGS ON SALMON ALTERNATIVES

Monday, March 25, 2019, 7:00 p.m.
Chateau Westport
Beach Room
710 Hancock
Westport, WA 98595
360.268.9101

Monday, March 25, 2019, 7:00 p.m.
Red Lion Coos Bay
South Umpqua Room
1313 N. Bayshore Drive
Coos Bay, OR 97420
541.267.4141

Tuesday, March 26, 2019, 7:00 p.m.
Hampton Inn by Hilton
Grand Ballroom
1160 Airport Park Blvd.
Ukiah, CA 95482
707.462.6555

Public comment on the Alternatives will also be accepted during the April Council meeting on Thursday, April 11, during the public comment period for Agenda Item F.1 at the Doubletree by Hilton Sonoma, One Doubletree Drive, Rohnert Park, CA 94928 Telephone: 707-584-5466. Written public comments may also be submitted to the PFMC Public Comment Electronic Portal (E-Portal). The supplemental public comment deadline is 5:00 p.m. Pacific Time, Monday, April 1, 2019.

This document may be cited in the following manner:
Pacific Fishery Management Council. 2019. *Preseason Report II: Proposed Alternatives and Environmental Assessment - Part 2 for 2019 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 FNA15NMF4410016.

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LIST OF ACRONYMS AND ABBREVIATIONS

AABM	Aggregate Abundance Based Management
ABC	acceptable biological catch
ACL	annual catch limit
AEQ	adult equivalent
BO	biological opinion
CDFW	California Department of Fish and Wildlife
CFGC	California Fish and Game Commission
CO	central Oregon (South end of Heceta Bank to Humbug Mt.)
Council	Pacific Fishery Management Council
CPUE	catch per unit effort
CWT	coded-wire tag
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 (Horse Mt. 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 Horse Mountain)
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).
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 Florence South Jetty)
NAO	National Oceanic and Atmospheric Administration Administrative Order
NOAA	National Oceanic and Atmospheric Administration
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
OY	optimum yield

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

PDO	Pacific (inter) Decadal Oscillation
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
RER	rebuilding exploitation rate
RMP	Resource Management Plan
RK	Rogue/Klamath (hatchery coho)
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
SET	spawning escapement target
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
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 is the third 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 describes the Council's proposed ocean salmon management alternatives for 2019 and characterizes the expected impacts on ocean salmon fisheries and the stocks which support them. The Council solicits public comments on the proposed management Alternatives in preparation for adopting final management recommendations at its April meeting. Oral and written comments may be presented at public hearings at the times and locations displayed on the inside front cover of this report. Additional comments will be accepted during the April Council meeting at the Doubletree by Hilton Sonoma Hotel in Rohnert Park, California. Written public comments may also be submitted to the PFMC Public Comment Electronic Portal (E-Portal). The supplemental public comment deadline is 5:00 p.m. Pacific Time, Monday, April 1, 2019.

This report also constitutes the second part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2019 ocean salmon regulations. An EA is used to determine whether an action being considered by a Federal agency has significant environmental impacts. This part of the EA includes a statement of the purpose and need, a description of the affected environment, a description of 2019 ocean salmon regulation alternatives being considered, and an analysis of the effects of those Alternatives on the affected environment. The first part of the EA (Preseason Report I; PFMC 2019b) included a description of the No-Action alternative and an analysis of the effects of the No-Action alternative on salmon stocks managed under the Pacific Coast Salmon Fishery Management Plan (FMP), which is one component of the affected environment. Along with the description and analysis of the Proposed Action in Preseason Report III (developed after the Council makes a final recommendation in April 2019), 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.

1.1 Purpose and Need

The purpose of this action, implementation of the 2019 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 consultation standards established for salmon stocks listed under the Endangered Species Act (ESA). In achieving this purpose, management measures must take into account the allocation of harvest among different user groups and port areas. Without this action, 2018 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 to achieve the most overall benefit to the nation.

The Salmon FMP 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, specified ESA consultation or recovery standards, or Council adopted rebuilding plans.

2. Fulfill obligations to provide for Indian harvest opportunity 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 that support 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 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 Pacific Salmon Treaty 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 National Standards Guidelines.

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 range of Alternatives presented in this report depending upon determination of allocations, allowable harvest levels, public comment, or the final impact analyses completed by the STT. 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 2019 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) abundance levels for Canadian Chinook and coho stocks identical to 2018 forecasts;
2) for Canadian Chinook fisheries managed under the aggregate abundance based management (AABM) provisions of the 2019 PST Agreement, fishing effort scalars from the final 2018 preseason model run for north-central British Columbia, and West Coast Vancouver Island (WCVI) fisheries;
3) for Canadian Chinook fisheries managed under individual stock based management (ISBM) regimes; the 2019 fishery inputs were modeled at 87.5 percent of the 2009 – 2015 average landed catch to reflect anticipated reductions resulting from the recently adopted 2019 PST Agreement;
4) for Canadian coho fisheries, single-year 2017 postseason fishing effort scalars from FRAM were used, except a 2015 postseason fishing effort scalar for Fraser Net; and
5) for Southern U.S. inside fisheries for Chinook and inside and coastal terminal fisheries for coho, the 2018 final preseason modeled fisheries were used.

In mid-March, U.S. and Canadian fishery managers exchange 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 will be adjusted in the Council's fishery planning models prior to the April Council meeting, and inside fisheries will be 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 NMFS.

3.0 SALMON TECHNICAL TEAM CONCERNS

The Salmon Technical Team has no concerns to report in this document for 2019.

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 MSY.

Administrative objectives are requirements for meeting other applicable law outside of the Salmon FMP. These requirements include ESA consultation standards, international treaties, and tribal trust responsibilities. The Salmon FMP defers to NMFS consultation standards for salmon stocks listed under the ESA in regard to biological conservation objectives. Section 5.0 of this document provides greater detail on ESA listed stocks, while impacts of the Council adopted salmon management measures on ESA listed stocks 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 salmon management measures 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.

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 also among recreational port subareas. South of Cape Falcon there are sharing formulas for coho between commercial and recreational sectors. Alternatives for the 2019 salmon management measures adopted by the Council meet the allocation requirements for Chinook fisheries north of Cape Falcon in the Salmon FMP. In response to conservation concerns for coho salmon stocks on the Washington coast and Puget Sound, Alternative III reduces impacts in the commercial troll fishery relative to those in the recreational fishery and allocates a greater portion of the recreational catch to the area south of Leadbetter Point relative to those areas north of Leadbetter Point; thus, Alternative III deviates from the FMP harvest allocation guidelines and therefore may require fisheries north of Cape Falcon to be implemented under a temporary rule for emergency action if the Alternative is selected.

In support of the adoption of these Alternatives for public review, the Council reviewed the criteria used to evaluate requests for emergency action by the Secretary from Council Operating Procedure 10 (*italics below*) and provided the following preliminary rationale for considering a deviation from the FMP harvest allocation guidelines:

The Council is required to consider proposals for emergency changes at the March meeting and decide whether or not a specific issue appears to meet all the applicable criteria.

1. The issue was not anticipated or addressed in the salmon plan, or an error was made.

The issue was not caused by an error. The recent poor status of many Washington coho stocks has presented circumstances not anticipated by the FMP. Although 2019 forecasts for key coho stocks caught in Council fisheries are much improved, there is a need to consider an alternative that is more precautionary for coho management. Because the recreational fishery North of Falcon is more dependent on coho than the commercial fishery, Alternative III allocates a larger share to the recreational fishery than is prescribed by the FMP. Because the recreational fishery focuses on hatchery stocks returning to the Columbia River, Alternative III also allocates a larger share to the recreational fishery in the Columbia River Area, to allow analysis of fishery options that are potentially more focused on those stocks.

2. Waiting for a plan amendment to be implemented would have substantial adverse biological or economic consequences.

If regulations that allocate coho differently than as described by the FMP are not considered, there could be significant economic consequences to the ports and communities of the Columbia River, Westport, La Push, and Neah Bay. Alternative III is being considered to allow consideration of alternate allocations of harvest that optimize harvest of hatchery coho while minimizing risk to rebuilding coho stocks.

3. In the case of allocation issues, the affected user representatives support the proposed emergency action.

Commercial troll and recreational fishery representatives were involved in developing all three Alternatives put before the Council. Their assistance was critical to the development of these Alternatives and there is full support from them for these Alternatives, including an Alternative that deviates from strict adherence to the FMP.

4. The action is necessary to meet FMP objectives.

The structure of the Alternative and the potential deviation from the strict terms of the FMP will allow consideration of fishery structures that optimize harvest while meeting conservation goals, and thereby more fully meet FMP objectives.

5. *If the action is taken, long-term yield from the stock complex will not be decreased.*

These Alternatives will not decrease long-term yield. The potential deviation from the FMP allocation guidelines in Alternative III is intended to optimize harvest while meeting conservation objectives and promoting rebuilding of stocks – it would reallocate, not increase allowable harvest.

5.0 SPECIES LISTED UNDER THE ENDANGERED SPECIES ACT

Since 1989, NMFS has listed the following 17 Evolutionarily Significant Units (ESUs) of salmon under the ESA:

Species	ESU	Status	Federal Register Notice			
			Most Recent		Original Listing	
	Chinook					
Chinook Salmon	Sacramento River Winter	Endangered	83 FR 18233	4/26/2018	54 FR 32085	8/1/1989
(*O. tshawytscha*)	Snake River Fall	Threatened	76 FR 50448	8/15/2011	57 FR 14653	4/22/1992
	Snake River Spring/Summer	Threatened	76 FR 50448	8/15/2011	57 FR 14653	4/22/1992
	Puget Sound	Threatened	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Lower Columbia River	Threatened	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Upper Willamette River	Threatened	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Upper Columbia River Spring	Endangered	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Central Valley Spring	Threatened	76 FR 50447	8/15/2011	64 FR 50394	9/16/1999
	California Coastal	Threatened	76 FR 50447	8/15/2011	64 FR 50394	9/16/1999
	Chum					
Chum Salmon	Hood Canal Summer-Run	Threatened	76 FR 50448	8/15/2011	64 FR 14508	3/25/1999
(*O. keta*)	Columbia River	Threatened	76 FR 50448	8/15/2011	64 FR 14508	3/25/1999
	Coho					
Coho Salmon	Central California Coastal	Endangered	76 FR 50447	8/15/2011	61 FR 56138	10/31/1996
(*O. kisutch*)	S. Oregon/ N. California Coastal	Threatened	76 FR 50447	8/15/2011	62 FR 24588	5/6/1997
	Oregon Coastal	Threatened	76 FR 50448	8/15/2011	63 FR 42587	8/10/1998
	Lower Columbia River	Threatened	76 FR 50448	8/15/2011	70 FR 37160	6/28/2005
	Sockeye					
Sockeye Salmon	Snake River	Endangered	76 FR 50448	8/15/2011	56 FR 58619	11/20/1991
(*O. nerka*)	Ozette Lake	Threatened	76 FR 50448	8/15/2011	64 FR 14528	3/25/1999

As the listings have occurred, NMFS has initiated formal consultations and issued biological opinions (BOs) that consider the impacts resulting from implementation of the Salmon FMP, 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 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 on March 5, 2019, NMFS provided guidance on protective measures for species listed under the ESA during the 2019 fishing season. The letter summarized the requirements of NMFS' BOs on the effects of potential actions under the salmon FMP on listed salmon and provided the anticipated consultation standards of the BOs in preparation for the 2019 management season, as well as further guidance and recommendations for the 2019 management season.

The ESA consultation standards, exploitation rates, and other criteria in place for the 2019 management season are presented in Table 5. Some listed stocks are either rarely caught in Council fisheries (e.g., spring Chinook from the upper Columbia River) or already receive sufficient protection from other salmon FMP and ESA standards (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 wild (SRW) fall Chinook, 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 Pacific Salmon Treaty.

6.1 Chinook Salmon Management

A new agreement under the PST was negotiated in 2018 and formally accepted by both the U.S. and Canada. The U.S. and Canada began managing fisheries in accordance with this new agreement on January 1, 2019.

The new agreement includes reductions to catch ceilings for SEAK and WCVI AABM fisheries relative to the prior 2009 agreement. These reductions for SEAK and WCVI range from 7.5 percent and 12.5 percent, respectively, in years of low abundances to 1.5 percent and 2.4 percent, respectively, in years of higher abundances. Under the terms of the 2019 PST Agreement, Council fisheries for Chinook salmon will be subject to a new set of ISBM fishery limits, identified in Attachment I of Chapter 3. 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).

Many Chinook stocks of concern to the Council are affected by fisheries off Canada and Alaska. Maximum allowable catches by Canadian AABM fishery complexes off the WCVI and Northern British Columbia are determined through the annual calibration of the PSC Chinook Model. Under the new Agreement, catch ceilings for Southeast Alaskan (SEAK) fisheries will be determined prior to February 1 in each year using estimated catch per unit effort (CPUE) from the winter power troll fishery. Canadian fisheries that are not included in AABM complexes are managed under ISBM constraints, which, similar to U.S. ISBM fisheries, require the CYER by Canadian ISBM fisheries on specific indicator stocks to be below some level of the average 2009 – 2015 CYER if they do not achieve their management objectives. Expectations for Canadian and Alaskan fisheries harvest and stock abundance forecasts are incorporated into the Chinook Fishery Regulation Assessment Model (FRAM) to estimate total exploitation rate impacts from all marine fisheries (Table 5).

Key considerations for Canadian domestic fishery management for Chinook in 2019 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, Interior Fraser (Thompson River) coho, and potentially Thompson and/or Chilcotin River Steelhead (depending on a listing decision under Canada's Species at Risk Act). Increasing the availability of Chinook salmon in key foraging areas of Southern Resident Killer Whales in the southern 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 2019, Puget Sound and Washington coast coho constraints are as follows:

FMP

FMP Stock	Total Exploitation Rate Constraint[a/]	Categorical Status[a/]
Skagit	35%	Low
Stillaguamish	50%	Normal
Snohomish	40%	Low
Hood Canal	45%	Low
Strait of Juan de Fuca	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	35%	Moderate
Stillaguamish	50%	Abundant
Snohomish	40%	Moderate
Hood Canal	45%	Moderate
Strait of Juan de Fuca	20%	Low
Quillayute Fall[c/]	57%	Abundant
Hoh[c/]	71%	Abundant
Queets[c/]	48%	Abundant
Grays Harbor	51%	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). This also becomes the maximum allowable rate unless the stock is in the "Low" status. In that case, an ER of up to 20% is allowed.

Key considerations for Canadian fishery management for coho in 2019 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 pink, Chinook, sockeye, and chum salmon; and (4) the desire to provide increased opportunity for sport fisheries through mark-selective retention regulations. 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.

In previous 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% 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 2019 indicates continuing concerns for the condition of Interior Fraser coho. The Interior Fraser coho management unit is anticipated to remain in low status, resulting in a requirement to constrain the total mortality fishery exploitation rate for 2019 Southern U.S. fisheries to a maximum of 10.0 percent.

7.0 DESCRIPTION OF THE ALTERNATIVES

Detailed information on the proposed ocean salmon regulation Alternatives are presented in Tables 1 (non-Indian commercial), 2 (recreational), and 3 (treaty Indian). Notable changes from recent seasons are highlighted below.

7.1 Commercial

Alternatives for the area north of Cape Falcon reflect a lower total abundance of Chinook and increased Columbia River hatchery and natural coho compared to 2018 forecasts. In 2019, allowable catch of Chinook will likely be similar to 2018 due to similar expected impacts in northern fisheries, and an identical total exploitation rate limit on LCR natural tule fall Chinook compared to 2018. Coho catch quotas will likely be greater than 2018 due to increased harvestable Columbia River hatchery coho.

Alternative I north of Cape Falcon assigns 67 percent of the troll Chinook quota to the May-June Chinook directed fishery, Alternative II assigns 60 percent to the May-June Chinook directed fishery, while Alternative III assigns 50 percent to the May-June Chinook directed fishery. In Alternatives I and II, the May-June fishery opens initially seven days per week with sub-quotas in the area north of the Queets River and in the area south of Leadbetter Point. Landing and possession limits per Thursday-Wednesday landing week are in place in the area north of the Queets River and in the area south of Leadbetter Point in Alternatives I and II. In Alternative III, the May-June fishery opens five days per week with landing and possession limits in all areas and sub-quotas 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 II opens seven days per week; Alternative II includes a Chinook sub-quota in the area north of the Queets River. Alternatives I and II include a weekly landing and possession limit for Chinook in the area north of the Queets River and in the area south of Leadbetter Point, and a weekly coho landing and possession limit in all areas. Alternative III includes sub-quotas in the area north of the Queets River and in the area south of Leadbetter Point, and includes landing and possession limits per open period for both Chinook and coho in all areas.

Commercial fisheries south of Cape Falcon will primarily be constrained by Sacramento River fall Chinook (SRFC), SRWC, California coastal Chinook, and LCR natural tule fall Chinook. Both SRFC and KRFC were declared overfished in 2018 and remain overfished in 2019. In an effort to make progress toward rebuilding these stocks, NMFS and the Council provided guidance to structure fisheries to achieve higher expected spawner escapement levels than those required by the FMP. These increased escapement goals for SRFC and KRFC are reflected in the three fishery Alternatives.

For the area between Cape Falcon and Humbug Mountain, Alternative I for Chinook fisheries would be open on April 20 and run through August 29. The fishery re-opens on September 1 and remains open through October. The fishery under Alternatives II and III would be open in most of May, June, July, and about half of August. The fishery re-opens on September 1 and remains open through October. The September and October fishery would be only open shoreward of the 40 fathom line under Alternative II and only open seaward of this line under Alternative III.

In the Oregon portion of the Klamath Management Zone (KMZ) under Alternative I, the season would open on April 20 and run through the end of May. June, July, and August would be managed under monthly quotas of 3,500, 2,500, and 1,200 Chinook, respectively, with weekly landing and possession limits of 50 Chinook. Under Alternative II, the season would open in May with open periods through the end of the month. June, July, and August would be managed under monthly quotas of 2,500, 2,000, and 1,000 Chinook, respectively, with weekly landing and possession limits of 50 Chinook. Under Alternative III,

open periods would be the same as Alternative II with June, July, and August monthly quotas of 1,500, 1,000, and 1,000 Chinook, respectively, with weekly landing and possession limits of 30 Chinook.

For the California portion of the KMZ, Alternative I allows for a quota of 2,500 Chinook in June and quotas of 2,000 Chinook in July and August. Alternative II allows for monthly Chinook quotas of 3,000 in June, July, and August. Alternative III allows for monthly Chinook quotas of 6,000 in June, July and August. Under each of the Alternatives, the fishery would be open five days per week with variable landing and possession limits. The minimum size limit is 27 inches in Alternatives I and II, and 26 inches in Alternative III.

In the Fort Bragg area, under Alternative I, the fishery would be open for the month of June and the second half of July. There is more fishing opportunity under Alternative II, with variable portions of May through July open, along with nearly all of August. Under Alternative III, the fishery would be open for approximately three weeks in June and July, and nearly all of August. The minimum size limit is 27 inches in Alternatives I and II, and 26 inches in Alternative III.

In the San Francisco area under Alternative I, the fishery would be open for all of May and June, about half of July, and nearly all of August and September. The Fall Area Target Zone fishery would be open Monday through Friday in early October. For Alternative II, the fishery would be open for approximately half of May, all of June, most of July and August, and half of September. Alternative III allows for approximately three weeks open in each of June and July, and nearly all of August. The minimum size limit is 26 inches under each of the Alternatives.

In the Monterey area, the fishery would be open for all of May and June, and variable portions of July under Alternatives I and II. For Alternative III, the area would be open for all of May and approximately three weeks in each of June and July. The minimum size limit is 26 inches under each of the Alternatives.

7.2 Recreational

North of Cape Falcon: In Alternative I, the sub-areas north of the Queets River open June 15 for all salmon species, seven days per week, while the sub-areas south of the Queets River open June 22 for all salmon species, seven days per week. The closing date in all sub-areas is September 30 with the exception of the area between Cape Alava and the Queets River, which closes September 22. This Alternative includes a late-season opportunity in the area between Cape Alava and the Queets River September 28 through October 13.

In Alternative II, the area between the Queets River and Leadbetter Point opens for all salmon species seven days per week on June 29. All other sub-areas open for all salmon species seven days per week on June 22. The scheduled ending date in the area between the Queets River and Leadbetter Point is September 22; all other sub-areas close on September 30.

In Alternative III, the area between the Queets River and Leadbetter Point opens for all salmon species five days per week (Sunday through Thursday) on June 16. All other sub-areas open for all salmon species seven days per week on June 29. The scheduled ending date in the area between the Leadbetter Point and Cape Falcon is September 30; all other sub-areas close on September 15.

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 12 in all Alternatives.

South of Cape Falcon, for the North and Central Oregon coast: Chinook fisheries are open March 15 through October 31 under each of the Alternatives. Each Alternative also features a mark-selective coho quota fishery in the summer, with different quota sizes and closing dates for those Alternatives. A non-mark-selective coho fishery exists for the Cape Falcon to Humbug Mountain area beginning on August 31 under Alternative I and September 6 under Alternative II.

In the Oregon KMZ, Alternatives I and II would open for Chinook fishing on May 18 and would open May 25 under Alternative III. The seasons continue through late August under Alternative I and September 2 under Alternatives II and III. Under Alternative I, a mark-selective coho fishery would open June 22.

In the California KMZ, the fishery opens on May 25 and runs into September under each of the Alternatives. Closing dates in September vary by Alternative. The minimum size limit will be 20 inches.

In the Fort Bragg area, Alternatives I and II have identical seasons, running from April 13 through the end of October. Under Alternative III, the fishery would be open from April 13 through the end of May. After a three week closure, the fishery would re-open on June 22 and run through the end of September. The minimum size limit is 20 inches under each of the Alternatives.

The Alternatives for the San Francisco area are identical to those described above for Fort Bragg, with one exception. The minimum size limit is 24 inches through the end of May, then 20 inches thereafter for each of the Alternatives.

For the Monterey area, from Pigeon Point to the U.S./Mexico border, the fishery opens on April 6 and runs into August, with closing dates that vary by Alternative. The minimum size limit is 24 inches under each of the Alternatives.

7.3 Treaty Indian

Alternatives are similar in structure to past years. All three Alternatives include a Chinook directed fishery in the May-June time period and an all-species fishery targeting coho and Chinook occurring from July to September 15. The proposed Chinook quota would be split 50/50 between each fishing season. Any balance of fish remaining from the May-June fishery may be transferred to the July – September fishery.

8.0 AFFECTED ENVIRONMENT AND ANALYSIS OF IMPACTS

Based on National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-6 Section 6.02, the affected environment may consist of the following components:

- Target (FMP) species
- Social or economic environments
- Non-target species
- Essential Fish Habitat
- Public health or safety
- ESA listed (non-salmon) species or critical habitat
- 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 2018b), which includes several ESA listed Chinook and coho stocks. These ESA listed stocks 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 2018 Ocean Salmon Fisheries (PFMC 2019a). A more general description of salmon life history and population characteristics is presented in PFMC 2006. The current status (2019 ocean abundance forecasts) of the environmental components expected to be affected by the 2019 ocean salmon fisheries regulation Alternatives (FMP salmon stocks) are described in PFMC 2019b. 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 yield from West Coast salmon fisheries as required by the MSA. The ESA consultation standards are likewise based on the best available science and are intended to ensure that fishery impacts do not appreciably reduce the likelihood of survival and recovery of listed species in the wild. 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 referred to in NAO 216-6, Section 6.02.

8.1.1 Chinook Salmon

8.1.1.1 North of Cape Falcon

Abundance projections important to Chinook harvest management north of Cape Falcon in 2019 are:

- *Columbia River hatchery tules*. Combined production of Lower River Hatchery (LRH) and Spring Creek Hatchery (SCH) stocks returning to the Columbia River is forecasted to be 100,500, which is lower than the 2018 preseason expectation of 112,500. The 2019 LRH forecast is 54,500, which is below the forecast of 62,400 in 2018. The 2019 SCH forecast is 46,000, which is below the 2018 forecast of 50,100.

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 Snake River Wild (SRW) fall Chinook.

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 LCR natural tule 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 exploitation rate on LCR natural tule fall Chinook in Alternative I is over the 38.0 percent NMFS consultation standard maximum in 2019, assuming the same preseason river fishery harvest rates as last year. Additional shaping of PSC and inriver fisheries prior to the April Council meeting may result in minor changes to the anticipated ERs presented in the Alternatives. LCR tules are the constraining Chinook stock for fisheries north of Cape Falcon in 2019.

- *LRW fall Chinook*. Alternatives have ocean escapement values ranging from 14,000 to 14,400, which exceeds the ESA consultation standard of 6,900 minimum ocean escapement. LRW Chinook will not constrain ocean fisheries north of Cape Falcon in 2019.

- *SRW fall Chinook*. Alternatives have ocean exploitation rates of 67.1 percent or less of the base period exploitation rates, 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 2019.

Alternatives II and III for 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). The NMFS ESA consultation standard for LCR natural tule fall Chinook is exceeded in Alternative I. Meeting the ESA consultation standard for natural tules under Alternative I may be achievable following updates in PSC fisheries and shaping of inriver fisheries.

8.1.1.2 South of Cape Falcon

Status of Chinook stocks important to 2019 Chinook harvest management south of Cape Falcon are:

- *SRFC*. The Sacramento Index forecast is 379,632, which is higher than last year's preseason forecast of 229,432.

- *KRFC*. The ocean abundance forecast for this stock is 167,504 age-3, 106,119 age-4, and 599 age-5 fish. Last year's preseason forecast was 330,049 age-3, 28,415 age-4, and 767 age-5 fish.

- *SRWC*. The forecast of age-3 escapement absent fishing is 1,924, which is higher than last year's preseason forecast of 1,594.

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

- SRFC hatchery and natural area spawner escapement of at least 122,000 adults, which is produced, in expectation, by a maximum exploitation rate of 67.9 percent (FMP control rule). Council guidance provided at the March meeting included meeting minimum escapement levels of 151,000 under Alternatives I and II, and 180,000 under Alternative III. This was following guidance provided by NMFS to target an escapement around the upper end of the SRFC conservation objective range of 122,000 – 180,000 hatchery and natural area adults, with at least one of the Alternatives targeting an escapement of 180,000 adult spawners.

- KRFC natural area spawner escapement of at least 40,700 adults, which is produced, in expectation, by a maximum exploitation rate of 53.7 percent (FMP control rule). NMFS guidance included targeting spawner escapement levels greater than 40,700 (S_{MSY}), and the Council provided further

guidance for one Alternative to target a natural area escapement of 45,000 adults while the other two Alternatives target S_{MSY} escapement.

- 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.

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 LCR tule Chinook. Appendix A presents tables of adult SRFC impacts, KRFC age-4 harvest, and the SRWC age-3 impact rate, stratified by fishery/month/management area, under the three Alternatives. Descriptions pertaining to the achievement of key objectives for Chinook salmon management south of Cape Falcon are found below.

- *SRFC*. The control rule-defined minimum of 122,000 hatchery and natural area adult spawners is met by each of the Alternatives. Alternatives I and II meet Council guidance for achieving a minimum of 151,000 hatchery and natural area adult spawners. Alternative III meets Council guidance for achieving a minimum of 180,000 hatchery and natural area adult spawners.

- *KRFC*. The control rule-defined minimum of 40,700 natural area adult spawners is met by each of the Alternatives. Alternative III meets Council guidance for meeting a minimum of 45,000 natural area adult spawners.

- *SRWC*. The ESA consultation standard that (1) limits the forecast age-3 impact rate in 2019 fisheries south of Point Arena to a maximum of 15.7 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*. The ESA consultation standard that limits the forecast KRFC age-4 ocean harvest rate to a maximum of 16.0 percent is met by each of the Alternatives.

- *SRW fall Chinook*. SRW Chinook will not constrain ocean fisheries south of Cape Falcon in 2019.

Alternatives II and III 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. Alternative I does not meet the ESA consultation standard and guidance for LCR natural tule fall Chinook (Table 5).

8.1.2 Coho Salmon

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

- *OPI Hatchery coho.* The 2019 forecast for hatchery coho from the Columbia River and the coast south of Cape Falcon of 933,500 is substantially higher than the 2018 forecast of 294,100. The Columbia River early coho forecast is 545,000 compared to the 2018 forecast of 164,700 and the Columbia River late coho forecast is 360,600, compared to the 2018 forecast of 121,500.

- *OCN coho.* The 2019 OCN forecast is 76,100 compared to the 2018 forecast of 54,900.

- *LCN coho.* The 2019 LCN forecast is 36,900 compared to the 2018 forecast of 21,900.

- *Puget Sound coho.* Among Puget Sound natural stocks, Strait of Juan de Fuca coho are in the critical category in 2019. Skagit, Snohomish, and Hood Canal coho are in the low category. Stillaguamish coho are in the normal category.

- *Interior Fraser (Thompson River) coho.* This Canadian stock continues to be depressed, and will continue to constrain ocean coho fisheries north of Cape Falcon in 2019.

- *Washington coastal coho.* Forecasts for most Washington coastal coho stocks are higher than in 2018. Quillayute fall, Hoh, Queets, and Grays Harbor coho are 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), Southern Oregon/Northern California Coastal (SONCC) coho, OCN coho, and LCN coho. The maximum allowable exploitation rates for 2019 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 marine exploitation rate not to exceed 13.0 percent for Rogue/Klamath hatchery coho, used as a surrogate for 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 several Puget Sound and Interior Fraser coho stocks in 2019 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.

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 LCN, OCN, and RK coho. Table 8 provides expected coho mark rates for west coast fisheries by month.

- *LCN coho.* All Alternatives satisfy the maximum 23.0 percent exploitation rate when 2019 projected marine impacts are combined with preliminary 2019 preseason modeled impacts for mainstem Columbia River fisheries. Total exploitation rates projected for 2019 Alternatives range from 18.5 percent in Alternative I to 12.6 percent in Alternative III.

- *Queets wild coho.* The FMP MSY adult spawner objective for Queets wild coho is 5,800; projected ocean escapement values for the 2019 Alternatives range from 8,900 in Alternative I to 9,700 in Alternative III.

- *Interior Fraser coho*. The Southern U.S. exploitation rate in Alternative III is less than the 10.0 percent maximum required by the PST Southern Coho Management Plan when 2019 projected marine impacts are combined with the 2018 preseason modeled impacts for Puget Sound fisheries. Alternatives I and II are above the maximum exploitation rate. Shaping of the State and Tribal inside fisheries will occur during the North of Falcon process, and ocean fisheries may require further shaping before final management measures are adopted in order to comply with the PST limit.

- *Puget Sound coho*. Total exploitation rates for all Puget Sound stocks except Hood Canal coho are less than the maximum required by the FMP matrix in all Alternatives when 2019 projected marine impacts are combined with the 2018 preseason modeled impacts for Puget Sound fisheries. The total exploitation rate for Hood Canal coho exceeds the maximum required by the FMP matrix in all Alternatives; Exploitation rates on Hood Canal coho in Council area fisheries range from 6.3 percent in Alternative I to 2.9 percent in Alternative III. 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 merit management consideration in 2019. Impacts on Chinook and coho in pink-directed fisheries may be part of negotiations to reach a final agreement in North of Cape Falcon ocean and Puget Sound fisheries.

8.1.4 Summary of Environmental Impacts on Target Stocks

Stock forecasts for some Canadian stocks and the actual PST limits on AABM fisheries are not known at this time, and preliminary values have been used in the analyses presented in this report. These forecasts and limits will 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 2019 Council area ocean salmon fisheries.

8.1.4.1 Targeted Salmon Stocks

Based on current assumptions regarding Canadian, Alaskan, and inside fishery impacts, all target salmon stocks (non-ESA listed) meet their FMP conservation objectives under Alternatives I, II, and III with the

exception of Interior Fraser (Thompson River) coho under Alternatives I and II (Table 5). Impacts on Interior Fraser coho in Council area fisheries range from 6.3% in Alternative I to 3.0% in Alternative III, and there appears to be sufficient flexibility within Council and inside area fisheries as a whole to comply with requirements of the PST Southern Coho Management Plan.

8.1.4.2 ESA Listed Salmon Stocks

Based on current assumptions regarding Canadian and inside fishery impacts, all ESA listed salmon stocks meet their ESA consultation standards under Alternatives II and III (Table 5). Under Alternative I, ESA consultation standards are met, except the total exploitation rate for LCN tule Chinook exceeds the allowable rate (Table 5). Changes in the impacts in northern fisheries from current assumptions and further shaping of ocean and inside fisheries may result in compliance with the ESA consultation standards; however, additional restrictions to Council area fisheries may be necessary to meet both consultation standards and inside fishery needs.

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, 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 Klamath Management Zone (KMZ), which covers ocean waters from Humbug Mountain in southern Oregon to the Oregon/California border (42° N. lat.); (4) the California Klamath Management Zone (California KMZ), which includes the area from the Oregon/California border to Horse Mountain (40°05' N. lat.) in northern California; (5) from Horse Mountain 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. A map of the boundaries of these areas, also showing the main salmon ports, appears on the inside back cover of this report.

Tribal ocean fisheries (including Washington State statistical area 4B) occur only in the area north of Cape Falcon. The 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 following analysis of impacts on the user of the resource and fishing communities is organized around the seven broad management areas.

The Review of 2018 Ocean Salmon Fisheries (PFMC 2019a) 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 economic 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. 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. 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 commercial troll and recreational fishery Alternatives, respectively, compared to historical impacts in real (inflation-adjusted) dollars. In general, income impacts are estimates of the amount of income generated by the economic linkages associated with a particular activity (see Chapter IV of the Review of 2018 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 2018 fishery indicate the expected impact of the Alternative compared with not taking action, (i.e., if 2018 regulations were to remain in place). While reductions in income impacts associated with an activity may not necessarily reflect net losses, they are likely to indicate losses to businesses and individuals in a community that depends on that activity for 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. 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 catch per unit effort (CPUE) (i.e., lower costs for commercial harvesters and/or higher success rates for recreational fishers). Harvest forgone by both ocean fisheries and inside fisheries may impact future production, although the magnitude of that effect is uncertain depending 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.

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 though management measures may actually be relatively more constraining, or *vice-versa*. Estimated recreational effort includes relatively small amounts occurring in state waters only (SWO) fisheries off central and southern Oregon. Recreational fishery effort north of Cape Falcon was estimated using historical CPUE estimates ("success rates") applied to salmon quotas and expected harvest levels under the Alternatives. Projections of recreational catch north of Cape Falcon under each of the Alternatives were made by multiplying the proposed quotas for the two species 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.

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 are made based on historical patterns. The patterns are typically inferred from the most recent year's catch and landings data. For example, in 2018 there were deliveries of salmon: (1) caught between Cape Falcon and Humbug Mountain to landing ports in the Oregon KMZ region, (2) caught between Point Arena and Pigeon Point to landing ports in the Fort Bragg region, and (3) 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 include relatively small amounts occurring in SWO fisheries off central and southern Oregon. 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 in the coming season. Coastwide average Chinook weight per fish in 2018 was three percent higher than the prior year but slightly lower than the recent five year average; while coastwide average Chinook exvessel prices in 2018 were 14 percent lower than the prior year but the fourth highest in inflation-adjusted terms since 1976. If this year's actual average weight per fish or exvessel prices diverge significantly from what was observed in 2018, then salmon exvessel revenues and resulting commercial fisheries income impacts projected in this document may prove to be correspondingly biased. 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 more than double last year's (2018) level and above the recent (2014-2018) inflation-adjusted average by 53 percent. Coastwide income impacts from recreational fishing are projected to be 75 percent above last year's level and above the recent (2014-2018) inflation-adjusted average by 35 percent.

South of Cape Falcon, overall commercial fishery income impacts are projected to exceed last year's level by 123 percent and the recent (2014-2018) inflation-adjusted average by 63 percent.

Commercial fishery income impacts north of Cape Falcon are projected to be 58 percent above last year and seven percent above the recent (2014-2018) inflation-adjusted average.

Areas south of Cape Falcon, except the California KMZ (between the Oregon/California border and Horse Mountain), would see commercial fishery income impacts considerably above last year's levels. Areas between Cape Falcon and Humbug Mountain, between Humbug Mountain and the Oregon/California border, and between Horse Mountain and Point Arena would see projected increases of more than 100 percent compared with last year's levels. Areas between Point Arena and Pigeon Point and south of Pigeon Point would see projected increases of 88 percent and 32 percent, respectively, compared with last year. All areas south of Cape Falcon would see projected increases in commercial fishery income impacts compared to the recent (2014-2018) inflation-adjusted average.

Projected income impacts from recreational fisheries north of Cape Falcon are nearly triple (198 percent above) last year and 61 percent above the recent (2014-2018) inflation-adjusted average.

Overall recreational fishery income impacts south of Cape Falcon are projected to be 38 percent above last year's and 22 percent above the recent (2014-2018) inflation-adjusted average. Recreational income

impacts are projected be above last year's levels in all areas south of Cape Falcon except between Point Arena and Pigeon Point. Recreational fishery income impacts are projected to be above the recent (2014-2018) inflation-adjusted average in all areas south of Cape Falcon, except between Point Arena and Pigeon Point.

Tribal ocean fisheries north of Cape Falcon would be allocated 45,000 Chinook and 65,000 coho for ocean area harvest, compared to the 2018 actual allocation of 40,000 Chinook and 12,500 coho.

Under Alternative I income impacts for combined non-Indian commercial and recreational salmon fisheries are projected to be above last year's levels overall coastwide and in all management areas. Income impacts for combined non-Indian commercial and recreational salmon fisheries under Alternative I are also projected to be above the 2014-2018 inflation-adjusted average overall coastwide and in all management areas.

8.2.2 Alternative II

Under Alternative II, coastwide community personal income impacts from commercial salmon fisheries are projected to exceed last year's (2018) level by 80 percent and the recent (2014-2018) inflation-adjusted average by 29 percent. Coastwide income impacts from recreational fishing are projected to be 67 percent above last year's level and 29 percent above the recent (2014-2018) inflation-adjusted average.

South of Cape Falcon, overall commercial fishery income impacts are projected to exceed last year's level by 89 percent and the recent (2014-2018) inflation-adjusted average by 38 percent.

Commercial fishery income impacts north of Cape Falcon are projected to be 36 percent above last year's level but nine percent below the recent (2014-2018) inflation-adjusted average.

All areas south of Cape Falcon would see projected commercial fishery income impacts above last year's levels. Areas between Cape Falcon and Humbug Mountain, between Humbug Mountain and the Oregon/California border, between Horse Mountain and Point Arena, between Point Arena and Pigeon Point and South of Pigeon Point would see projected increases of at least 46 percent compared with last year's levels. All areas south of Cape Falcon, except between Cape Falcon and Humbug Mountain, would see projected increases in commercial fishery income impacts compared with the recent (2014-2018) inflation-adjusted average.

Projected income impacts from recreational fisheries north of Cape Falcon are 175 percent above last year, and 48 percent above the recent (2014-2018) inflation-adjusted average.

Under Alternative II overall recreational fishery income impacts south of Cape Falcon are projected to be 35 percent above last year's level and 20 percent above the recent (2014-2018) inflation-adjusted average. Recreational fishery income impacts are projected to be above last year's levels in all areas south of Cape Falcon, except between Point Arena and Pigeon Point. Recreational fishery income impacts are also projected to be above the recent (2014-2018) inflation-adjusted average in all areas south of Cape Falcon, except between Point Arena and Pigeon Point.

Tribal ocean fisheries north of Cape Falcon would be allocated 35,000 Chinook and 55,000 coho for ocean area harvests, compared to the 2018 actual allocation of 40,000 Chinook and 12,500 coho.

Income impacts for combined non-Indian commercial and recreational salmon fisheries under Alternative II are projected to be above last year's level overall coastwide and in all areas along the coast. Compared with the recent (2014-2018) inflation-adjusted average, income impacts for combined non-Indian commercial and recreational salmon fisheries under Alternative II are projected to be higher overall coastwide, and in six of the seven management areas, i.e., all except Cape Falcon to Humbug Mountain.

8.2.3 Alternative III

Under Alternative III, overall coastwide community personal income impacts from commercial salmon fisheries are projected to exceed last year's (2018) level by 52 percent and the recent (2014-2018) inflation-adjusted average by nine percent. Coastwide income impacts from recreational fisheries are projected to be exceed last year's level by 35 percent and the recent (2014-2018) inflation-adjusted average by five percent.

South of Cape Falcon, overall commercial fishery income impacts are projected to exceed last year's level by 63 percent and the recent (2014-2018) inflation-adjusted average by 19 percent.

Commercial fishery income impacts north of Cape Falcon are projected to be three percent below last year's level, and 34 percent below the recent (2014-2018) inflation-adjusted average.

All areas south of Cape Falcon would see commercial fisheries income impacts above last year's levels. Areas between Cape Falcon and Humbug Mountain, between Humbug Mountain and the Oregon/California border, between the Oregon/California border and Horse Mountain, between Horse Mountain and Point Arena, and south of Pigeon Point would see projected increases of at least 40 percent compared with last year's levels, while the area between Point Arena and Pigeon Point would see a projected increase of six percent compared with last year. All areas south of Cape Falcon, except between Cape Falcon and Humbug Mountain, would see at least some projected increase in commercial fishery income impacts compared with recent (2014-2018) inflation-adjusted averages, although the increase for the area between Humbug Mountain and the Oregon/California border is less than two percent. The area between Cape Falcon and Humbug Mountain would see a projected decrease of 31 percent compared with the recent (2014-2018) inflation-adjusted average.

Projected income impacts from recreational fisheries north of Cape Falcon exceed last year by 67 percent but fall below the recent (2014-2018) inflation-adjusted average by 10 percent.

Overall recreational fishery income impacts south of Cape Falcon are projected to exceed last year's level by 26 percent and the recent (2014-2018) inflation-adjusted average by 12 percent. Recreational fishery income impacts are projected to be above last year's levels in all areas south of Cape Falcon, except between Point Arena and Pigeon Point where they are projected to fall 22 percent below last year's level. Recreational fishery income impacts are projected to be above the recent (2014-2018) inflation-adjusted average in all areas south of Cape Falcon except between Point Arena and Pigeon Point the where they are projected to fall by 24 percent.

Tribal ocean fisheries north of Cape Falcon would be allocated 25,000 Chinook and 35,000 coho for ocean area harvests, compared to the 2018 actual allocation of 40,000 Chinook and 12,500 coho.

Income impacts from combined non-Indian commercial and recreational salmon fisheries under Alternative III are projected to be above last year's levels overall coastwide and in all management areas except between Point Arena and Pigeon Point where they are projected to fall by 13 percent. Compared with the recent (2014-2018) inflation-adjusted average, income impacts for combined non-Indian commercial and

recreational salmon fisheries under Alternative III are projected to be higher overall coastwide and in five of the seven management areas, i.e., all areas except Cape Falcon to Humbug Mountain and between Point Arena and Pigeon Point where they are projected to fall by seven percent and 11 percent, respectively.

8.2.4 Summary of Impacts on the Socioeconomic Environment

The commercial salmon fishery Alternatives are projected to generate coastwide income impacts ranging from 112 percent above (Alternative I) to 52 percent above (Alternative III) last year's levels. These corresponding levels also range from 53 percent above to nine percent above the recent (2014-2018) inflation-adjusted averages. Compared with last year all areas, except from the Oregon/California border to Horse Mountain under Alternative I and North of Cape Falcon under Alternative III, would see projected increases in commercial fisheries income impacts under all three Alternatives.

North of Cape Falcon, commercial salmon fisheries income impacts are projected to be above last year and the 2014-2018 inflation-adjusted average under Alternative I, above last year but below the 2014-2018 inflation-adjusted average under Alternative II, and below last year and the 2014-2018 inflation-adjusted average under Alternative III. Among the Alternatives, projections for Alternative III show the lowest relative commercial fisheries income impacts overall and for three of the seven management areas: North of Cape Falcon, Humbug Mountain to the Oregon/California border, and Point Arena to Pigeon Point. Projections for Alternative I show the lowest relative commercial fisheries income impacts for three of the seven management areas: Oregon/California border to Horse Mountain, Horse Mountain to Point Arena, and south of Pigeon Point. Projections show Alternative II with the lowest relative commercial fisheries income impacts for one area: Cape Falcon to Humbug Mountain.

Total coastwide income impacts from recreational salmon fisheries are projected to be higher than last year under all three alternatives, with increases of 75 percent under Alternative I, 67 percent under Alternative II, and 35 percent under Alternative III. Compared with the recent (2014-2018) inflation-adjusted average, increases in coastwide recreational fishery income impacts are also projected under Alternative I (35 percent), Alternative II (29 percent), and Alternative III (5 percent). Compared with last year, all management areas would see projected increases in recreational fishery income impacts under Alternatives I, II and III, with the exception of reductions in the area from Point Arena to Pigeon Point under all three Alternatives. Compared with the recent (2014-2018) inflation-adjusted average, all areas are projected to see increases in recreational fishery income impacts under all three alternatives, with the exception of projected decreases for Point Arena to Pigeon Point under Alternatives I, II and III, and north of Cape Falcon under Alternative III.

Total coastwide income impacts from combined non-Indian commercial and recreational salmon fisheries are projected to be higher than last year (2018) and the recent (2014-2018) inflation-adjusted average under all three Alternatives. With respect to last year, coastwide increases of 86 percent under Alternative I, 71 percent under Alternative II, and 40 percent under Alternative III are projected. Compared with the recent (2014-2018) inflation-adjusted average, the increases in coastwide combined commercial and recreational salmon fishery income impacts are projected to be 41 percent under Alternative I, 29 percent under Alternative II, and six percent under Alternative III. All seven management areas would see projected increases in combined commercial and recreational salmon fishery income impacts compared with last year under Alternatives I and II, and six of seven management areas (all except Point Arena to Pigeon Point) are projected to see increases under Alternative III. Compared with the recent (2014-2018) inflation-adjusted average, all management areas are projected to see increases in combined commercial and recreational salmon fishery income impacts under Alternative I, all areas except Cape Falcon to Humbug Mountain under Alternative II, and all except, and north of Cape Falcon, Cape Falcon to Humbug Mountain, and Point Arena to Pigeon Point under Alternative III.

Ocean tribal fisheries occurring only north of Cape Falcon would be allocated a maximum of 45,000 Chinook under Alternative I and a minimum of 25,000 Chinook under Alternative III. Ocean tribal fisheries would be allocated a maximum of 65,000 coho under Alternative I and a minimum of 35,000 coho under Alternative III.

8.3 Non-target Fish Species

Prior NEPA analyses have considered the effects of the ocean salmon fisheries on non-target 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 2019 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. (NMFS 2003; Appendix B). The 2019 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 (NMFS 2003; Appendix B). The 2019 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 2019 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 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 (83 FR 5349). 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 2019 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

There is no record of injury or mortality of Guadalupe fur seals in Pacific Coast salmon fisheries (NMFS 2003; Appendix B). 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 (NMFS 2003; Appendix B). There is no discernible difference between the effects of the alternatives on these resources.

Salmon fisheries have the potential to affect Southern Resident killer whales by removing Chinook salmon, an important prey species for the whales. NMFS issued a biological opinion evaluating the effects of the Pacific Coast salmon fisheries on the Southern Resident killer whale distinct population segment in 2009 (NMFS 2009; Appendix B); this opinion concluded that ocean salmon fisheries were not likely to jeopardize the continued existence of the Southern Resident killer whales or adversely modify their critical habitat. NMFS completed a five-year review of the Southern Resident killer whale ESA listing in September 2016. There is new information that indicates Chinook salmon abundance may be related to Southern Resident killer whale population trends. NMFS is reassessing the effects of salmon fisheries in light of this new information, and plans to reinitiate consultation on the effects of Council fisheries. At the March 2019 Council meeting, NMFS expressed its intent to work with the Council to reassess the effects of Council salmon fisheries on Southern Resident killer whales and, as needed, to develop a long-term approach to managing the effects of the fisheries on the whales. This effort will take some time, and will not be completed in time to inform the 2019 preseason process. NMFS is evaluating available information about the potential effects of the 2019 fishery alternatives on Southern Residents and plans to report on the results of that evaluation at the April 2019 Council meeting.

Other ESA listed salmonid species present in Council area waters include sockeye and chum salmon, and steelhead trout. These species are rarely encountered in ocean salmon fisheries, and Alternatives for 2018 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.

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 (NMFS 2003; Appendix B). 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 (NMFS 2003; Appendix B). 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 (PFMC 2006; Appendix B). 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 2019 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 (PFMC 2006; Appendix B). There are also no discernible differences between the effects of the Alternatives on the risk to human health or safety at sea.

8.10 Cumulative Impacts

A cumulative effects analysis is required by the Council on Environmental Quality (CEQ) (40 CFR part 1508.7). The purpose of a cumulative effects 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. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective, but rather, the intent is to focus on those effects that are truly meaningful. A formal cumulative impact assessment is not necessarily required as part of an EA under NEPA as long as the significance of cumulative impacts has been considered (U.S. EPA 1999). The following addresses the significance of the expected cumulative impacts as they relate to the Pacific Coast salmon fishery.

8.10.1 Consideration of the Effected 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 the cumulative effects 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 Pacific Salmon Treaty (PFMC and NMFS 2014). 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. However, NMFS' Northwest and Southwest Fisheries Science Centers presented information to the Council indicating that the broods that will contribute to 2019 harvest and escapement encountered generally poor to intermediate ocean conditions in the California Current Ecosystem.

Within the California Current itself, Mendelssohn et al, (2003) 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

In determining the magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions, must be taken into account. The following section presents the effects 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 Pacific Salmon Treaty (PFMC and NMFS 2014). 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 magnitude and significance of cumulative 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 biological opinions 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 Environmental Impact Statement (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/); these documents are incorporated herein by reference. 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 2018a) 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 2019 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 1-8, 2018:	**Pacific Fishery Management Council meeting**, San Diego, California.
January 22-25:	**Salmon Technical Team (Review preparation)**, Portland, Oregon.
February 6:	California Fish and Game Commission meeting, Sacramento, California.
February 19-22:	**Salmon Technical Team (Preseason Report I preparation)**, Portland, Oregon.
February 27:	Washington Department of Fish and Wildlife public meeting, Olympia, Washington.
February 27:	California Department of Fish and Wildlife public meeting, Santa Rosa, California.
February 28:	Oregon Ocean Salmon Industry Group meeting, Newport, Oregon.
March 6-12:	**Pacific Fishery Management Council meeting**, Vancouver, Washington.
March 15:	Oregon Fish and Wildlife Commission meeting, Salem, Oregon.
March 19:	North of Falcon, Ocean fisheries, Puget Sound, and *U.S.* v. *Oregon* Forums, Olympia, Washington.
March 25-26:	**Public hearings on management options** in Westport, Washington; Coos Bay, Oregon; and Ukiah, California.
April 2:	North of Falcon, Ocean fisheries and Columbia River fisheries, Ridgefield, Washington.
April 3:	North of Falcon, Puget Sound forum, Lynnwood, Washington.
April 11-16:	**Pacific Fishery Management Council meeting**, Rohnert Park, California.
April 17:	California Fish and Game Commission meeting, Santa Monica, California.
April 19	Oregon Fish and Wildlife Commission meeting, St. Helens, Oregon.
April 19:	Washington Fish and Wildlife Commission meeting, Teleconference.

The following organizations were consulted and/or participated in preparation of supporting documents:

California Department of Fish and Wildlife
Oregon Department of Fish and Wildlife
Washington Department of Fish and Wildlife

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

Northwest Indian Fisheries Commission
Columbia River Intertribal Fish Commission
West Coast Indian Tribes

11.0 REFERENCES

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PFMC. 2019a. Review of 2018 ocean salmon fisheries. Pacific Fishery Management Council, Portland, Oregon.

PFMC. 2019b. Preseason Report I: Stock abundance analysis and environmental assessment part 1 for 2019 ocean salmon fishery management measures. Pacific Fishery Management Council, Portland, Oregon.

U.S. Environmental Protection Agency. 1999. Consideration of Cumulative Impacts in EPA Review of NEPA Documents. Office of Federal Activities (2252A). EPA 315-R-99-002/May 1999.

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. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council adopted. **(**Page 1 of 11)

A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
North of Cape Falcon	**North of Cape Falcon**	**North of Cape Falcon**
Supplemental Management Information	**Supplemental Management Information**	**Supplemental Management Information**
Model #: Coho-1911, Chinook 1019	Model #: Coho-1912, Chinook 1119	Model #: Coho-1913, Chinook 1219
1. Overall non-Indian TAC: 65,000 Chinook and 205,000 coho marked with a healed adipose fin clip (marked). 2. Non-Indian commercial troll TAC: 32,500 Chinook and 32,800 marked coho. 3. Trade: May be considered at the April Council meeting. 4. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.	1. Overall non-Indian TAC: 55,000 Chinook and 190,000 coho marked with a healed adipose fin clip (marked). 2. Non-Indian commercial troll TAC: 27,500 Chinook and 30,400 marked coho. 3. Trade: 4. Same as Alternative 1	1. Overall non-Indian TAC: 45,000 Chinook and 100,000 coho marked with a healed adipose fin clip (marked). 2. Non-Indian commercial troll TAC: 22,500 Chinook and 5,600 coho. 3. Trade: 4. Same as Alternative 1
U.S./Canada Border to Cape Falcon • May 1 through the earlier of June 30, or 21,700 Chinook. No more than 4,825 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 3,780 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 60 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 60 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 28 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, approximately 75% of the Chinook subarea guideline has been landed in the area between the U.S./Canada border and the Queets River, or approximately 75% of the Chinook subarea guideline has been landed in the area between Leadbetter Pt. and Cape Falcon, inseason action will be considered to ensure the guideline is not exceeded.	**U.S./Canada Border to Cape Falcon** • May 1 through the earlier of June 28, or 16,500 Chinook. No more than 5,200 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 4,400 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 50 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 50 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6). Same as Alternative 1 When it is projected that approximately 60% of the overall Chinook guideline has been landed, approximately 60% of the Chinook subarea guideline has been landed in the area between the U.S./Canada border and the Queets River, or approximately 60% of the Chinook subarea guideline has been landed in the area between Leadbetter Pt. and Cape Falcon, inseason action will be considered to ensure the guideline is not exceeded.	**U.S./Canada Border to Cape Falcon** • May 1 through the earlier of June 25, or 11,300 Chinook. No more than 3,550 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 3,000 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 40 Chinook per vessel per open period (C.1, C.6). In the area between the Queets River and Leadbetter Pt. a landing and possession limit of 200 Chinook per vessel per open period (C.1, C.6). In the area between Leadbetter Pt. and Cape Falcon the landing and possession limit is 40 Chinook per vessel per open period (C.1, C.6). Same as Alternative 1 When it is projected that approximately 60% of the overall Chinook guideline has been landed, approximately 60% of the Chinook subarea guideline has been landed in the area between the U.S./Canada border and the Queets River, or approximately 60% of the Chinook subarea guideline has been landed in the area between Leadbetter Pt. and Cape Falcon, inseason action will be considered to ensure the guideline is not exceeded.

TABLE 1. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 2 of 11)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
U.S./Canada Border to Cape Falcon • July 1 through the earlier of September 30, or 10,800 Chinook or 32,800 coho (C.8).	**U.S./Canada Border to Cape Falcon** • July 1 through the earlier of September 24, or 11,000 Chinook or 30,400 coho; no more than 5,200 Chinook may be caught in the area between the U.S./Canada border and the Queets River (C.8).	**U.S./Canada Border to Cape Falcon** • July 1 through the earlier of September 24, or 11,200 Chinook or 5,600 coho; no more than 5,300 Chinook may be caught in the area between the U.S./Canada border and the Queets River, and no more than 1,325 Chinook may be caught in the area between Leadbetter Point and Cape Falcon (C.8). • Open July 1-2 then; • July 5-September 24; open five days per week (Fri. - Tues.) (C.1).
Open seven days per week. All salmon. Chinook minimum size limit of 28 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	All salmon. Chinook minimum size limit of 28 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).
In the area between the U.S./Canada border and the Queets River, a landing and possession limit of 60 Chinook per vessel per landing week (Thurs.-Wed.) will be in place (C.1, C.6). In the area between Leadbetter Pt. to Cape Falcon landing and possession limit of 60 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6). Landing and possession limit of 150 marked coho per vessel per landing week (Thurs.-Wed.) (C.1).	In the area between the U.S./Canada border and the Queets River, a landing and possession limit of 50 Chinook per vessel per landing week (Thurs.-Wed.) will be in place (C.1, C.6). In the area between Leadbetter Pt. to Cape Falcon landing and possession limit of 50 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6). Landing and possession limit of 100 marked coho per vessel per landing week (Thurs.-Wed.) (C.1).	In the area between the U.S./Canada border and the Queets River, a landing and possession limit of 40 Chinook per vessel per open period (C.1, C.6). In the area between the Queets River and Leadbetter Pt. a landing and possession limit of 100 Chinook per vessel per open period (C.1, C.6). In the area between Leadbetter Pt. to Cape Falcon a landing and possession limit of 40 Chinook per vessel per open period (C.1, C.6). Landing and possession limit of 10 marked coho per vessel per open period (C.1).
For all commercial troll fisheries north of Cape Falcon: Vessels fishing, or in possession of salmon while fishing, north of Leadbetter Point must land and deliver all species of fish in a Washington port and must possess a Washington troll 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 line may be fished (C.11).	**For all commercial troll fisheries north of Cape Falcon**: Vessels fishing, or in possession of salmon while fishing, north of Leadbetter Point must land and deliver all species of fish within the area and north of Leadbetter Point (C.11).	**For all commercial troll fisheries north of Cape Falcon**: Vessels fishing, or in possession of salmon while fishing, north of Leadbetter Point must land and deliver all species of fish within the area and north of Leadbetter Point (C.11).

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 12, 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 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 541-867-0300 ext. 271 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). 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. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - **Council Adopted**. (Page 3 of 11)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
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 152,272 hatchery and natural area adults. 2. Sacramento Index exploitation rate of 59.9%. 3. Klamath River recreational fishery allocation: 7,899 adult Klamath River fall Chinook. 4. Klamath tribal allocation: 32,405 adult Klamath River fall Chinook. 5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 69% / 31%. 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 California Fish and Game Commission.	1. Sacramento River fall Chinook spawning escapement of 163,939 hatchery and natural area adults. 2. Sacramento Index exploitation rate of 56.8%. 3. Klamath River recreational fishery allocation: 7,767 adult Klamath River fall Chinook. 4. Klamath tribal allocation: 32,456 adult Klamath River fall Chinook. 5.CA/OR share of Klamath River fall Chinook commercial ocean harvest: 80% / 20%. 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 California Fish and Game Commission.	1. Sacramento River fall Chinook spawning escapement of 180,085 hatchery and natural area adults. 2. Sacramento Index exploitation rate of 52.6%. 3. Klamath River recreational fishery allocation: 5,230 adult Klamath River fall Chinook. 4. Klamath tribal allocation: 29,993 adult Klamath River fall Chinook. 5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 81% / 19%. 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 California Fish and Game Commission.
Cape Falcon to Humbug Mt. • April 20-30; • May 1-August 29; • 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 75 Chinook allowed per vessel per landing week (Thurs.-Wed.). In 2020, 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 2019. This opening could be modified following Council review at its March 2020 meeting.	**Cape Falcon to Humbug Mt.** • May 4-14; 19-31; • June 4-12, 16-30; • July 5-12, 16-31; • August 3-7, 13-17, 25-29; • September 1-October 31 (C.9.a). Same as Alternative 1 Beginning September 1 only open shoreward of the 40 fathom management line and no more than 50 Chinook per vessel per landing week (Thurs.-Wed.). In 2020, same as Alternative 1	**Cape Falcon to Humbug Mt.** • May 4-14; 19-31; • June 4-12, 16-30; • July 5-12, 16-31; • August 3-7, 13-17, 25-29; • September 1-October 31 (C.9.a). Same as Alternative 1 Beginning September 1 only open seaward of the 40 fathom management line and no more than 50 Chinook per vessel per landing week (Thurs.-Wed.). In 2020, same as Alternative 1

TABLE 1. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 4 of 11)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Humbug Mt. to OR/CA Border (Oregon KMZ) • April 20-30; • May 1-31; • June 1 through the earlier of June 30, or a 3,500 Chinook quota; • July 1 through the earlier of July 31, or a 2,500 Chinook quota; • August 1 through the earlier of August 29, or a 1,200 Chinook quota (C.9.a).	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • May 4-14; 19-31; • June 4 through the earlier of June 12, June 16 through the earlier of June 30, or a 2,500 Chinook quota; • July 5 through the earlier of July 12, July 16 through the earlier of July 31, or a 2,000 Chinook quota; • August 3 through the earlier of August 7, August 13 through the earlier of August 17, August 25 through the earlier of August 29, or a 1,000 Chinook quota (C.9.a).	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • May 4-14; 19-31; • June 4 through the earlier of June 12, June 16 through the earlier of June 30, or a 1,500 Chinook quota; • July 5 through the earlier of July 12, July 16 through the earlier of July 31, or a 1,000 Chinook quota; • August 3 through the earlier of August 7, August 13 through the earlier of August 17, August 25 through the earlier of August 29, or a 1,000 Chinook quota (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). 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 29 weekly landing and possession limit of 50 Chinook per vessel per landing 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).	June 4-August 29 weekly landing and possession limit of 50 Chinook per vessel per landing 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).	June 4-August 29 weekly landing and possession limit of 30 Chinook per vessel per landing 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.	Same as Alternative 1	Same as Alternative 1
For all quota managed seasons (June, July, and August), 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 541-867-0300 Ext. 252 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.	Same as Alternative 1	Same as Alternative 1
In 2020, 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 2019. This opening could be modified following Council review at its March 2020 meeting.	In 2020, same as Alternative 1	In 2020, same as Alternative 1

TABLE 1. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 5 of 11)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
OR/CA Border to Humboldt South Jetty (California KMZ) • June 1 through the earlier of June 30, or a 2,500 Chinook quota; • July 1 through the earlier of July 30, or a 2,000 Chinook quota; • August 2 through the earlier of August 31, or a 2,000 Chinook quota (C.9.b). Open five days per week (Fri.-Tue.). All salmon except coho (C.4, C.7). 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). 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, 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 additional closures adjacent to the Smith and Klamath rivers.	**OR/CA Border to Humboldt South Jetty (California KMZ)** • June 1 through the earlier of June 30, or a 3,000 Chinook quota; • July 1 through the earlier of July 30, or a 3,000 Chinook quota; • August 2 through the earlier of August 31, or a 3,000 Chinook quota (C.9.b). Same as Alternative 1 Same as Alternative 1 Landing and possession limit of 25 Chinook per vessel per day (C.8.f). Same as Alternative 1 Same as Alternative 1	**OR/CA Border to Humboldt South Jetty (California KMZ)** • June 1 through the earlier of June 30, or a 6,000 Chinook quota; • July 1 through the earlier of July 30, or a 6,000 Chinook quota; • August 2 through the earlier of August 31, or a 6,000 Chinook quota (C.9.b). Same as Alternative 1 Chinook minimum size limit of 26 inches total length (B, C.1). Landing and possession limit of 30 Chinook per vessel per day (C.8.f). Same as Alternative 1 Same as Alternative 1
Humboldt South Jetty to Horse Mt. Closed.	**Humboldt South Jetty to Horse Mt.** Closed.	**Humboldt South Jetty to Horse Mt.** Closed.

TABLE 1. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 6 of 11)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Horse Mt. to Point Arena (Fort Bragg) • June 1-30; • July 13-31 (C.9.b).	**Horse Mt. to Point Arena (Fort Bragg)** • May 17-31; • June 1-20; • July 11-31; • August 1-28 (C.9.b).	**Horse Mt. to Point Arena (Fort Bragg)** • June 11-30; • July 11-31; • August 1-29 (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). All salmon must be landed in California.	Same as Alternative 1	Same as Alternative 1
Chinook minimum size limit of 27 inches total length (B, C.1).	Same as Alternative 1	Chinook minimum size limit of 26 inches total length (B, C.1).
All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., August 5 (C.6).	All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., August 30 (C.6).	All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., August 30 (C.6).
When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6).	Same as Alternative 1	Same as Alternative 1
All fish must be landed north of Point Arena (C.6).	All fish must be landed north of Point Arena (C.6).	
In 2020, the season will open April 16-30 for all salmon except coho, with a 27 inch Chinook minimum size limit and the same gear restrictions as in 2019. All salmon caught in the area must be landed in the area. This opening could be modified following Council review at its March 2020 meeting.	In 2020, same as Alternative 1	In 2020, 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. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 7 of 11)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Pt. Arena to Pigeon Pt. (San Francisco) • May 1-31; • June 1-30; • July 13-31; • August 1-29; • September 1-30 (C.9.b). Open seven days per week. All salmon except coho (C.4, C.7). Chinook minimum size limit of 26 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. All salmon caught in the area prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30 (C.6). During May, June, and July, all salmon must be landed south of Point Arena (C.6). When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6). **Point Reyes to Point San Pedro (Fall Area Target Zone)** • October 1-4, 7-11. 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). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).	**Pt. Arena to Pigeon Pt. (San Francisco)** • May 17-31; • June 1-30; • July 11-31; • August 1-28; • September 1-15 (C.9.b). Same as Alternative 1 Same as Alternative 1 During May, June, July, and August, all salmon must be landed south of Point Arena (C.6). Same as Alternative 1 **Point Reyes to Point San Pedro (Fall Area Target Zone)** • Closed	**Pt. Arena to Pigeon Pt. (San Francisco)** • June 11-30; • July 11-31; • August 1-29 (C.9.b). Same as Alternative 1 All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., August 30 (C.6). Same as Alternative 1 **Point Reyes to Point San Pedro (Fall Area Target Zone)** • Closed
Pigeon Point to U.S./Mexico Border (Monterey) • May 1-31; • June 1-30; • July 13-31 (C.9.b). Open seven days per week. All salmon except coho (C.4, C.7). Chinook minimum size limit of 26 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 south of Point Arena (C.6). When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours. All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., August 5 (C.6)	**Pigeon Point to U.S./Mexico Border (Monterey)** • May 1-31; • June 1-30; • July 11-31 (C.9.b). Same as Alternative 1 Same as Alternative 1 Same as Alternative 1	**Pigeon Point to U.S./Mexico Border (Monterey)** • May 1-31; • June 11-30; • July 11-31 (C.9.b). Same as Alternative 1 All salmon must be landed in California. 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).

TABLE 1. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 8 of 11)

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	28	21.5	16	12	None
Cape Falcon to Humbug Mt.	28	21.5	-	-	None
Humbug Mt. to OR/CA Border	28	21.5	-	-	None
OR/CA Border to Humboldt South Jetty (Alt. 1 and Alt. 2)	27	20.5	-	-	27
OR/CA Border to Humboldt South Jetty (Alt. 3)	26	19.5			26
Horse Mt. to Pt. Arena (Alt. 1 and Alt. 2)	27	20.5	-	-	27
Horse Mt. to Pt. Arena (Alt. 3)	26	19.5			26
Pt. Arena to Pigeon Pt.	26	19.5	-	-	26
Pigeon Pt. to U.S./Mexico Border	26	19.5	-	-	26

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.

TABLE 1. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council adopted. (Page 9 of 11)

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)..

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.

TABLE 1. 2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council adopted. (Page 10 of 11)

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: During authorized periods, the operator of a vessel that has been issued an incidental halibut harvest license may retain Pacific halibut caught incidentally in Area 2A while trolling for salmon. Halibut retained must be no less than 32 inches in total length, measured from the tip of the lower jaw with the mouth closed to the extreme end of the middle of the tail, and must be landed with the head on. When halibut are caught and landed incidental to commercial salmon fishing by an IPHC license holder, any person who is required to report the salmon landing by applicable state law must include on the state landing receipt for that landing both the number of halibut landed, and the total dressed, head-on weight of halibut landed, in pounds, as well as the number and species of salmon landed.

License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to mid-March 2019 for 2019 permits (*exact date to be set by the IPHC in early 2019*). Incidental harvest is authorized only during April, May, and June of the 2019 troll seasons, and after June 30 in 2019 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 44,899 pound 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.

Alternative I - May 1, 2019 until the end of the 2019 salmon troll season, and April 1-30, 2020, 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).
Alternative II - - May 1, 2019 until the end of the 2019 salmon troll season, and April 1-30, 2020, 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).
Alternative III - - May 1, 2019 until the end of the 2019 salmon troll season, and April 1-30, 2020, 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 15 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 2019, prior to any 2019 inseason action, will be in effect when incidental Pacific halibut retention opens on April 1, 2020 unless otherwise modified by inseason action at the March 2020 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.

TABLE 1.2019 Commercial troll management Alternatives for non-Indian ocean salmon fisheries - Council adopted. (Page 11 of 11)

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 2020 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2019).
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.

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 Horse Mountain, California.

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.	Horse Mountain, CA	40°05′00″ N lat.
Queets River, WA	47°31′42″ N lat.	Point Arena, CA	38°57′30″ N lat.
Leadbetter Point, WA	46°38′10″ N lat.	Point Reyes, CA	37°59′44″ N lat.
Cape Falcon, OR	45°46′00″ N lat.	Point San Pedro, CA	37°35′40″ N lat.
Florence South Jetty, OR	44°00′54″ N lat.	Pigeon Point, CA	37°11′00″ N lat.
Humbug Mountain, OR	42°40′30″ 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. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council adopted. **(**Page 1 of 7)

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 205,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 32,500 Chinook and 172,200 marked coho; all retained coho must be marked. 3. A trade with commercial troll may be considered in April. 4. No Area 4B add-on fishery. 5. Buoy 10 fishery opens August 1 with an expected landed catch of 40,000 marked coho in August and September. 6. 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: 55,000 Chinook and 190,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 27,500 Chinook and 159,600 marked coho; all retained coho must be marked. 3. Trade: 4. No Area 4B add-on fishery. 5. Buoy 10 fishery opens August 1 with an expected landed catch of 45,000 marked coho in August and September. 6. Same as Alternative I	Overall non-Indian TAC: 45,000 Chinook and 100,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 22,500 Chinook and 94,400 marked coho; all retained coho must be marked. 3. Trade: 4. No Area 4B add-on fishery. 5. Buoy 10 fishery opens August 1 with an expected landed catch of 50,000 marked coho in August and September. 6. Same as Alternative I
U.S./Canada Border to Cape Alava (Neah Bay) • June 15 through earlier of September 30, or 17,910 marked coho subarea quota, with a subarea guideline of 6,500 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 22 through earlier of September 30, or 16,600 marked coho subarea quota, with a subarea guideline of 5,500 Chinook (C.5). Open seven days per week. All salmon, except no chum beginning August 1; 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). Same as Alternative 1	**U.S./Canada Border to Cape Alava (Neah Bay**) • June 29 through earlier of September 15, or 4,370 marked coho subarea quota, with a subarea guideline of 4,400 Chinook (C.5). Open seven days per week. All salmon, except no chum beginning August 1; 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). Same as Alternative 1

TABLE 2. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 2 of 7)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Cape Alava to Queets River (La Push Subarea) • June 15 through earlier of September 22, or 4,380 marked coho subarea quota, with a subarea guideline of 1,400 Chinook (C.5) • September 28 through earlier of October 13, or 100 marked coho quota, or 100 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. All salmon, 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). 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 22 through earlier of September 30, or 4,150 marked coho subarea quota, with a subarea guideline of 1,300 Chinook (C.5). Same as Alternative 1 Same as Alternative 1	**Cape Alava to Queets River (La Push Subarea)** • June 29 through earlier of September 15, or 1,090 marked coho subarea quota, with a subarea guideline of 1,100 Chinook (C.5). Open seven days per week. All salmon, two salmon per day, no more than one of which may be a Chinook. All coho must be marked with a healed adipose fin clip (see C.1). See gear restrictions and definitions (C.2, C.3). Same as Alternative 1
Queets River to Leadbetter Point (Westport Subarea) • June 22 through earlier of September 30, or 63,710 marked coho subarea quota, with a subarea guideline of 15,700 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). Grays Harbor Control Zone closed beginning August 12 (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 29 through earlier of September 22, or 59,050 marked coho subarea quota, with a subarea guideline of 13,300 Chinook (C.5) Same as Alternative 1 Same as Alternative 1	**Queets River to Leadbetter Point (Westport Subarea)** • June 16 through earlier of September 15, or 15,540 marked coho subarea quota, with a subarea guideline of 10,900 Chinook (C.5). Open five days per week (Sunday through Thursday). 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). Same as Alternative 1
Leadbetter Point to Cape Falcon (Columbia River Subarea) • June 22 through earlier of September 30, or 86,100 marked coho subarea quota, with a subarea guideline of 8,800 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). 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).	**Leadbetter Point to Cape Falcon (Columbia River Subarea)** • June 22 through earlier of September 30, or 79,800 marked coho subarea quota, with a subarea guideline of 7,400 Chinook (C.5). Same as Alternative 1	**Leadbetter Point to Cape Falcon (Columbia River Subarea)** • June 29 through earlier of September 30, or 73,400 marked coho subarea quota, with a subarea guideline of 6,100 Chinook (C.5). Same as Alternative 1

TABLE 2. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 3 of 7)

A. SEASON ALTERNATIVE DESCRIPTIONS

South of Cape Falcon	**South of Cape Falcon**	**South of Cape Falcon**
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Supplemental Management Information	**Supplemental Management Information**	**Supplemental Management Information**
1. Sacramento River fall Chinook spawning escapement of 152,272 hatchery and natural area adults. 2. Sacramento Index exploitation rate of 59.9%. 3. Klamath River recreational fishery allocation: 7,899 adult Klamath River fall Chinook. 4. Klamath tribal allocation: 32,405 adult Klamath River fall Chinook. 5. Overall recreational coho TAC: 95,000 coho marked with a healed adipose fin clip (marked), and 10,000 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.	1. Sacramento River fall Chinook spawning escapement of 163,939 hatchery and natural area adults. 2. Sacramento Index exploitation rate of 56.8%. 3. Klamath River recreational fishery allocation: 7,767 adult Klamath River fall Chinook. 4. Klamath tribal allocation: 32,456 adult Klamath River fall Chinook. 5. Overall recreational coho TAC: 80,000 coho marked with a healed adipose fin clip (marked), and 8,000 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.	1. Sacramento River fall Chinook spawning escapement of 180,085 hatchery and natural area adults. 2. Sacramento Index exploitation rate of 52.6%. 3. Klamath River recreational fishery allocation: 5,230 adult Klamath River fall Chinook. 4. Klamath tribal allocation: 29,993 adult Klamath River fall Chinook. 5. Overall recreational coho TAC: 105,000 coho marked with a healed adipose fin clip (marked), and 0 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-October 31 (C.6), except as provided below during the all-salmon mark-selective fishery and the non-mark-selective coho fishery (C.5). Open seven days per week. All salmon except coho, 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 2020, 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 meeting	**Cape Falcon to Humbug Mt.** • March 15-October 31 (C.6), except as provided below during the all-salmon mark-selective fishery and the non-mark-selective coho fishery (C.5). Same as Alternative 1 October 1-31: The fishery is only open shoreward of the 40 fathom management line. In 2020, same as Alternative 1	**Cape Falcon to Humbug Mt.** • March 15-October 31 (C.6), except as provided below during the all-salmon mark-selective fishery (C.5). Open seven days per week. All salmon except coho, two fish per day; beginning September 1 the daily bag limit may include only one Chinook (C.1). Chinook minimum size limit of 24 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2020, 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. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 4 of 7)

A. SEASON ALTERNATIVE DESCRIPTIONS

ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
Cape Falcon to OR/CA Border All-salmon mark-selective coho fishery: • June 22 through the earlier of August 28, or 95,000 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 Humbug Mt.** Non-mark-selective coho fishery: • August 31-September 30, open each Friday through Sunday, or 10,000 non-mark-selective coho quota (C.6). Open days may be modified inseason. 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.** All-salmon mark-selective coho fishery: • June 29 through the earlier of August 18, or 80,000 marked coho quota (C.6). Same as Alternative 1 Same as Alternative 1 Non-mark-selective coho fishery: • September 6-30, open each Friday and Saturday, or 8,000 non-mark-selective coho quota (C.6). Open days may be modified inseason Same as Alternative 1	**Cape Falcon to Humbug Mt.** All-salmon mark-selective coho fishery: • June 22 through the earlier of September 30, or 105,000 marked coho quota (C.6). Same as Alternative 1 Same as Alternative 1 Non-mark-selective coho fishery: • No season 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).		
Humbug Mt. to OR/CA Border (Oregon KMZ) • May 18-August 28 (C.6). Open seven days per week. All salmon except coho, except as described above in the "Cape Falcon to OR/CA Border all-salmon mark-selective coho fishery." 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)** • May 18-September 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).	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • May 25-September 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).

TABLE 2. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 5 of 7)

A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
OR/CA Border to Horse Mt. (California KMZ) • May 25-September 8 (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.	**OR/CA Border to Horse Mt. (California KMZ)** • May 25-September 4 (C.6). Same as Alternative 1 Same as Alternative 1	**OR/CA Border to Horse Mt. (California KMZ)** • May 25-September 2 (C.6). Same as Alternative 1 Same as Alternative 1
Horse Mt. to Point Arena (Fort Bragg) • April 13-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 2020, season opens April 4 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 meeting.	**Horse Mt. to Point Arena (Fort Bragg)** • April 13-October 31 (C.6). Same as Alternative 1 In 2020, same as Alternative 1	**Horse Mt. to Point Arena (Fort Bragg)** • April 13-May 31; • June 22-September 30 (C.6). Same as Alternative 1 In 2020, same as Alternative 1
Point Arena to Pigeon Point (San Francisco) • April 13-October 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 through May 31, then 20 inches thereafter (B). See gear restrictions and definitions (C.2, C.3). In 2020, season opens April 4 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 meeting.	**Point Arena to Pigeon Point (San Francisco)** • April 13-October 31 (C.6). Same as Alternative 1 In 2020, same as Alternative 1	**Point Arena to Pigeon Point (San Francisco)** • April 13-May 31; • June 22-September 30 (C.6). Same as Alternative 1 In 2020, same as Alternative 1
Pigeon Point to U.S./Mexico Border (Monterey) • April 6-August 28 (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 2020, season opens April 4 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 meeting.	**Pigeon Point to U.S./Mexico Border (Monterey)** • April 6-August 22 (C.6). Same as Alternative 1 In 2020, same as Alternative 1	**Pigeon Point to U.S./Mexico Border (Monterey)** • April 6-August 18 (C.6). Same as Alternative 1 In 2020, 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).		

TABLE 2. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council Adopted. (Page 6 of 7)

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

Area (when open)	Chinook	Coho	Pink
North of Cape Falcon	24	16	None
Cape Falcon to Humbug Mt.	24	16	None
Humbug Mt. to OR/CA Border	24	16	None
OR/CA Border to Horse Mt.	20	-	20
Horse Mt. to Pt. Arena	20	-	20
Pt. Arena to Pigeon Pt. (April 13-May 31)	24	-	24
Pt. Arena to Pigeon Pt. (June 1-October 31)	20	-	20
Pigeon Pt. to U.S./Mexico Border	24	-	24

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. *Horse Mt., 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.

TABLE 2. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council adopted. (Page 7 of 7)

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 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 Oregon/California 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.

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TABLE 3. 2019 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: 45,000 Chinook and 65,000 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.	1. Overall Treaty-Indian TAC: 35,000 Chinook and 55,000 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.	1. Overall Treaty-Indian TAC: 25,000 Chinook and 35,000 coho. 2. Overall Chinook and/or coho TAC 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.
• May 1 through the earlier of June 30 or 22,500 Chinook quota. All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C). • July 1 through the earlier of September 15, or 22,500 Chinook quota, or 65,000 coho quota. All Salmon. See size limit (B) and other restrictions (C).	• May 1 through the earlier of June 30 or 17,500 Chinook quota. All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C). • July 1 through the earlier of September 15, or 17,500 Chinook quota or 55,000 coho quota All salmon. See size limit (B) and other restrictions (C).	• May 1 through the earlier of June 30 or 12,500 Chinook quota. All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C). • July 1 through the earlier of September 15, or 12,500 Chinook quota or 35,000 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

TABLE 3. 2019 Treaty Indian troll management Alternatives for ocean salmon fisheries - Council adopted**.** (Page 2 of 2)

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

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

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

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

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

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

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

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

C.3. Quotas
- a. The quotas include troll catches by the S'Klallam and Makah Tribes in Washington State Statistical Area 4B from May 1 through September 15.
- b. The Quileute Tribe may continue a ceremonial and subsistence fishery during the time frame of October 1 through October 15 in the same manner as in 2004-2015. Fish taken during this fishery are to be counted against treaty troll quotas established for the 2019 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. 2019 Chinook and coho harvest quotas and guidelines (*) for ocean salmon fishery management Alternatives - Council adopted.

	Chinook for Alternative			Coho for Alternative		
Fishery or Quota Designation	I	II	III	I	II	III
			NORTH OF CAPE FALCON			
TREATY INDIAN OCEAN TROLL[a/]						
U.S./Canada Border to Cape Falcon (All Except Coho)	22,500	17,500	12,500	-	-	-
U.S./Canada Border to Cape Falcon (All Species)	22,500	17,500	12,500	65,000	55,000	35,000
Subtotal Treaty Indian Ocean Troll	45,000	35,000	25,000	65,000	55,000	35,000
NON-INDIAN COMMERCIAL TROLL[b/]						
U.S./Canada Border to Cape Falcon (All Except Coho)	21,700	16,500	11,300	-	-	-
U.S./Canada Border to Cape Falcon (All Species)	10,800	11,000	11,200	32,800	30,400	5,600
Subtotal Non-Indian Commercial Troll	32,500	27,500	22,500	32,800	30,400	5,600
RECREATIONAL						
U.S./Canada Border to Cape Alava[b/]	6,500 *	5,500 *	4,400	17,910	16,600	4,370
Cape Alava to Queets River[b/]	1,500 *	1,300 *	1,100	4,480	4,150	1,090
Queets River to Leadbetter Pt.[b/]	15,700 *	13,300 *	10,900	63,710	59,050	15,540
Leadbetter Pt. to Cape Falcon[b/c/]	8,800 *	7,400 *	6,100	86,100	79,800	73,400
Subtotal Recreational	32,500	27,500	22,500	172,200	159,600	94,400
TOTAL NORTH OF CAPE FALCON	110,000	90,000	70,000	270,000	245,000	129,400
			SOUTH OF CAPE FALCON			
COMMERCIAL TROLL[a/]						
Humbug Mt. to OR/CA Border	7,200	5,500	3,500	-	-	-
OR/CA Border to Humboldt South Jetty	6,500	9,000	18,000	-	-	-
Subtotal Commercial Troll	13,700	14,500	21,500	-	-	-
RECREATIONAL						
Cape Falcon to OR/CA Border	-	-	-	105,000 [d/]	88,000 [e/]	105,000 [f/]
TOTAL SOUTH OF CAPE FALCON	13,700	14,500	21,500	105,000	88,000	105,000

a/ Quotas are non-mark selective for both Chinook and coho.
b/ Quotas are non-mark-selective for Chinook and mark-selective for coho.
c/ Does not include Buoy 10 fishery. Expected catch in August and September: Alternative I - 40,000 marked coho; Alternative II - 45,000 marked coho; Alternative III - 50,000 marked coho.
d/ The quota consists of both mark-selective and non-mark-selective coho quotas: 95,000 and 10,000 respectively.
e/ The quota consists of both mark-selective and non-mark-selective coho quotas: 80,000 and 8,000 respectively.
f/ Quota is mark-selective.

TABLE 5. 2019 Projected key stock escapements (thousands of fish) or management criteria for ocean fishery Alternatives - Council adopted [a/] (Page 1 of 2)

Key Stock/Criteria	PROJECTED Alt I	Alt II	Alt III	2019 Criteria	Spawner Objective or Other Comparative Standard as Noted[b/]
CHINOOK		**CHINOOK**			**CHINOOK**
Columbia Upriver Brights	160.7	163.4	165.1	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	65.6	66.7	67.4	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	53.9	55.2	56.2	25.0	Minimum ocean escapement to attain 14.8 adults for hatchery egg-take, with average conversion and no lower river mainstem or tributary harvest.
Columbia Lower River Natural Tules[c/] (threatened)	**39.2%**	36.7%	34.8%	≤ 38.0%	Total adult equivalent fishery exploitation rate (2019 NMFS ESA guidance).
Columbia Lower River Wild[e/] (threatened)	14.0	14.2	14.4	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	46.0	48.1	49.5	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	35.1	36.0	36.7	29.0	Aggregate escapement to mouth of Columbia River (2019 NMFS guidance).
Snake River Fall (threatened) SRFI	67.1%	59.7%	53.7%	≤ 70.0%	Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard).
Klamath River Fall	40.7	40.7	--	≥ 40.7	2019 minimum natural area adult escapement (FMP control rule).
	--	--	45.0	≥ 45.0	2019 minimum natural area adult escapement (Council guidance).
Federally recognized tribal harvest	50.0%	50.0%	50.0%	50.0%	Equals 32.4, 32.5, and 30.0 (thousand) adult fish for Yurok and Hoopa Valley tribal fisheries.
Exploitation (spawner reduction) rate	53.7%	53.7%	48.8%	≤ 53.7%	FMP control rule.
Adult river mouth return	98.2	98.1	98.5	NA	Total adults in thousands.
Age-4 ocean harvest rate	15.9%	16.0%	15.3%	≤ 16.0%	NMFS ESA consultation standard for threatened California Coastal Chinook.
KMZ sport fishery share	6.9%	6.9%	7.0%	NA	Includes 0.0 (thousand) adult fish impacted in the KMZ sport fishery during fall (Sept.-Dec.) 2018.
River recreational fishery share	24.4%	23.9%	17.4%	NA	Equals 7.9, 7.8, and 5.2 (thousand) adult fish for recreational inriver fisheries.
Sacramento River Winter (endangered)	15.7%	15.6%	13.5%	≤ 15.7%	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 2019 ESA Guidance).
Sacramento River Fall	152.3	163.9	--	≥ 151.0	Alternatives I & II: 2019 minimum hatchery and natural area adult escapement (Council guidance).
	--	--	180.1	≥ 180.0	Alternative III: 2019 minimum hatchery and natural area adult escapement (Council guidance).
Sacramento Index Exploitation Rate	59.9%	56.8%	52.6%	≤ 67.9%	FMP control rule.
Ocean commercial impacts	149.6	136.1	121.0		Includes fall (Sept-Dec) 2018 impacts (6.2 thousand SRFC).
Ocean recreational impacts	50.9	50.7	46.8		Includes fall 2018 impacts (7.7 thousand SRFC).
River recreational impacts	26.9	28.9	31.8	NA	Equals 11.8%, 13.4%, and 15.9% of the total allowable harvest.

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2019 ocean fishery management measures - Council Adopted.[a/] (Page 2 of 2)

Key Stock/Criteria	PROJECTED Alt I	Alt II	Alt III	2019 Criteria	Spawner Objective or Other Comparative Standard as Noted[b/]
COHO	**COHO**				**COHO**
Interior Fraser (Thompson River)	**11.0%(6.3%)**	**10.1%(5.4%)**	7.7%(3.0%)	≤ 10.0%	2019 Southern U.S. exploitation rate ceiling; PSC coho agreement.
Skagit	33.8%(5.7%)	33.2%(4.9%)	31.4%(2.7%)	≤ 35.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Stillaguamish	32.5%(4.1%)	31.9%(3.4%)	30.5%(1.9%)	≤ 50.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Snohomish	33.7%(4.1%)	33.1%(3.4%)	31.6%(1.9%)	≤ 40.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Hood Canal	**48.8%(6.3%)**	**48.2%(5.4%)**	**46.8%(2.9%)**	≤ 45.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Strait of Juan de Fuca	9.6%(5.0%)	8.9%(4.3%)	7.0%(2.4%)	≤ 20.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Quillayute Fall	13.6	13.7	14.1	6.3	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Hoh	5.6	5.8	6.2	2.0	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Queets Wild	8.9	9.1	9.7	5.8	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Grays Harbor	65.3	66.1	68.1	24.4	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Willapa Bay Natural	55.5	56.3	58.5	17.2	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Lower Columbia River Natural (threatened)	18.5%	16.6%	12.6%	≤ 23.0%	Total marine and mainstem Columbia R. fishery exploitation rate (2019 NMFS ESA guidance).
Upper Columbia[c/]	64%	66%	71%	≥ 50%	Minimum percentage of the run to Bonneville Dam.
Columbia River Hatchery Early	337.2	351.0	372.0	77.2	Minimum ocean escapement to attain hatchery egg-take goal of 21.7 early adult coho, with average conversion and no mainstem or tributary fisheries.
Columbia River Hatchery Late	204.9	217.4	250.6	9.7	Minimum ocean escapement to attain hatchery egg-take goal of 6.4 late adult coho, with average conversion and no mainstem or tributary fisheries.
Oregon Coastal Natural	14.6%	13.0%	10.4%	≤ 15.0%	Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard).
Southern Oregon/Northern California Coast (threatened)	5.8%	5.8%	6.2%	≤ 13.0%	Marine fishery exploitation rate for R/K hatchery coho (NMFS ESA consultation standard).

a/ Projections in the table assume a combination of 2015 and 2017 post season fishing effort scalars for coho in Canadian fisheries. Model results for Chinook in this table used 2018 preseason catches and fishing effort scalers, and are updated with 2018 post season data if available. 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 exploitation rates 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 and OCN coho represent marine and freshwater impacts. 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.

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2019 ocean salmon fishery management Alternatives - Council adopted. (Page 1 of 2)

Area and Fishery	2019 Catch Projection			2019 Bycatch Mortality[a/] Projection			2019 Bycatch Projection[b/]			Observed in 2018	
	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	45.0	35.0	25.0	4.6	3.6	2.6	11.6	9.0	6.4	23.7	2.5
Non-Indian Commercial Troll	32.5	27.5	22.5	14.4	13.3	10.5	51.6	48.2	38.0	23.9	11.8
Recreational	32.5	27.5	22.5	5.3	4.5	3.6	27.8	23.4	19.1	10.6	1.8
CAPE FALCON TO HUMBUG MT.[c/]											
Commercial Troll	64.9	42.9	43.8	22.0	14.6	14.9	66.7	44.2	45.1	20.2	8.2
Recreational	7.7	6.6	7.9	1.2	1.0	1.2	4.9	4.2	5.0	2.7	0.2
HUMBUG MT. TO OR/CA BORDER[c/]											
Commercial Troll	8.5	6.6	4.6	2.9	2.2	1.6	8.8	6.8	4.7	3.9	1.9 [e/]
Recreational	3.6	3.7	3.7	0.6	0.6	0.6	2.3	2.3	2.3	1.6	0.5 [e/]
OR/CA BORDER TO HORSE MT.[d/]											
Commercial Troll	6.5	9.0	18.0	2.2	3.1	6.1	6.7	9.3	18.5	9.0	4.4 [e/]
Recreational	8.7	8.6	8.6	1.4	1.3	1.3	5.6	5.5	5.5	3.7	1.2 [e/]
HORSE MT. TO PT. ARENA											
Commercial Troll	58.3	69.3	61.3	19.8	23.5	20.8	60.0	71.3	63.0	10.6	4.9 [e/]
Recreational	7.3	7.3	6.0	1.1	1.1	0.9	4.6	4.6	3.8	5.6	1.0 [e/]
PT. ARENA TO PIGEON PT.											
Commercial Troll	79.7	58.7	39.1	27.0	19.9	13.3	82.0	60.4	40.2	39.5	15.5 [e/]
Recreational	36.9	36.9	30.8	5.8	5.8	4.8	22.6	22.6	18.9	72.0	10.8 [e/]
SOUTH OF PIGEON PT.											
Commercial Troll	25.6	28.3	28.0	8.7	9.6	9.5	26.3	29.1	28.8	19.4	1.8 [e/]
Recreational	10.6	10.6	10.5	1.7	1.6	1.6	6.5	6.5	6.4	5.7	0.6 [e/]
TOTAL OCEAN FISHERIES											
Commercial Troll	321.0	277.3	242.3	101.5	89.7	79.1	313.6	278.2	244.8	150.1	51.0
Recreational	107.3	101.1	90.0	17.0	16.0	14.2	74.2	69.1	61.1	101.9	16.1
INSIDE FISHERIES:											
Area 4B	-	-	-	-	-	-	-	-	-	-	-
Buoy 10	NA	NA	NA	NA	NA	NA	NA	NA	NA	11.6	5.0 [e/]

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2018 ocean salmon fishery management Alternatives adopted by the Council. (Page 2 of 2)

Area and Fishery	2019 Catch Projection			2019 Bycatch Mortality[a/] Projection			2019 Bycatch Projection[b/]			Observed in 2018	
	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[f/]	65.0	55.0	35.0	4.1	3.4	2.2	6.6	5.4	3.5	11.3	0.7
Non-Indian Commercial Troll	32.8	30.4	5.6	12.6	11.2	3.3	40.3	35.6	11.4	1.4	0.4
Recreational	172.2	159.6	94.4	27.1	24.7	13.3	110.5	100.5	52.3	41.8	11.3
SOUTH OF CAPE FALCON											
Commercial Troll	-	-	-	11.6	9.8	10.2	44.6	37.6	39.2	-	1.9
Recreational[f/]	105.0	88.0	105.0	21.0	19.3	22.2	91.5	88.3	98.6	18.5	9.4
TOTAL OCEAN FISHERIES											
Commercial Troll	97.8	85.4	40.6	16.8	14.7	5.5	46.9	40.9	14.8	12.7	3.0
Recreational	277.2	247.6	199.4	48.1	44.0	35.6	202.0	188.7	150.9	60.3	20.7
INSIDE FISHERIES:											
Area 4B	-	-	-	-	-	-	-	-	-	-	-
Buoy 10	40.0	45.0	50.0	7.0	28.9	8.4	26.4	28.9	31.2	6.8	1.5 [e/]

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: 15% (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/ The commercial fishery in this area is closed between Humboldt South Jetty and Horse Mountain.

e/ Based on reported released Chinook or coho. Reported releases in California fisheries are used as a surrogate in Oregon fisheries.

f/ Includes fisheries that allow retention of all legal sized coho.

TABLE 7. Expected coastwide lower Columbia Natural (LCN), Oregon coastal natural (OCN), and Rogue/Klamath (RK) coho, and Lower Columbia River (LCR) natural tule Chinook exploitation rates by fishery for 2019 ocean fisheries management Alternatives - Council adopted.

	Exploitation Rate (Percent)											
	LCN Coho			OCN Coho			RK Coho			LCR Tule Chinook		
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%	1.6%	1.7%	1.7%
BRITISH COLUMBIA	0.2%	0.2%	0.2%	0.5%	0.5%	0.5%	0.3%	0.3%	0.3%	12.3%	12.7%	12.9%
PUGET SOUND/STRAIT	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%	0.6%
NORTH OF CAPE FALCON												
Treaty Indian Ocean Troll	3.2%	2.7%	1.7%	0.7%	0.6%	0.4%	0.0%	0.0%	0.0%	2.6%	2.0%	1.5%
Recreational	5.4%	4.9%	3.1%	0.9%	0.9%	0.5%	0.1%	0.1%	0.0%	5.6%	4.8%	4.0%
Non-Indian Troll	1.8%	1.6%	0.4%	0.4%	0.3%	0.1%	0.0%	0.0%	0.0%	7.1%	5.6%	4.6%
SOUTH OF CAPE FALCON												
Recreational:										0.2%	0.2%	0.2%
Cape Falcon to Humbug Mt.	3.6%	3.1%	3.1%	7.6%	6.6%	4.6%	0.4%	0.4%	0.4%	-	-	-
Humbug Mt. to OR/CA border (KMZ)	0.1%	0.0%	0.0%	0.4%	0.2%	0.2%	0.7%	0.4%	0.4%	-	-	-
OR/CA border to Horse Mt. (KMZ)	0.0%	0.0%	0.0%	0.3%	0.3%	0.3%	1.1%	1.1%	1.1%	-	-	-
Fort Bragg	0.0%	0.0%	0.0%	0.3%	0.3%	0.2%	0.7%	0.7%	0.5%	-	-	-
South of Pt. Arena	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	-	-	-
Troll:										1.6%	1.3%	1.3%
Cape Falcon to Humbug Mt.	0.7%	0.5%	0.5%	0.9%	0.7%	0.7%	0.2%	0.1%	0.1%	-	-	-
Humbug Mt. to OR/CA border (KMZ)	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.1%	0.1%	-	-	-
OR/CA border to Horse Mt. (KMZ)	0.0%	0.0%	0.1%	0.2%	0.3%	0.6%	0.8%	1.1%	2.0%	-	-	-
Fort Bragg	0.0%	0.0%	0.0%	0.4%	0.5%	0.4%	0.9%	1.0%	0.9%	-	-	-
South of Pt. Arena	0.0%	0.0%	0.0%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	-	-	-
BUOY 10	1.5%	1.6%	1.7%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	7.5%	7.8%	8.1%
ESTUARY/FRESHWATER	NA	NA	NA	1.4%	1.4%	1.5%	NA	0.2%	NA			
TOTAL[a/]	15.3%	13.4%	9.3%	14.6%	13.0%	10.4%	5.8%	5.8%	6.2%	**39.2%**	36.7%	34.8%

a/ Totals do not include Buoy 10 and estuary/freshwater for LCN and RK coho; estuary/freshwater catch is included in the total for OCN. Bolded values identify ocean exploitation rates that, when combined with 2018 freshwater harvest rates, would exceed the total allowable exploitation rate.

TABLE 8. Projected coho mark rates for 2019 fisheries under base period fishing patterns (percent marked).

Area	Fishery	June	July	August	Sept
Canada					
Johnstone Strait	Recreational	-	47%	42%	-
West Coast Vancouver Island	Recreational	58%	47%	58%	62%
North Georgia Strait	Recreational	58%	59%	59%	57%
South Georgia Strait	Recreational	42%	61%	53%	59%
Juan de Fuca Strait	Recreational	59%	58%	60%	55%
Johnstone Strait	Troll	65%	60%	45%	56%
NW Vancouver Island	Troll	51%	48%	45%	40%
SW Vancouver Island	Troll	49%	52%	51%	55%
Georgia Strait	Troll	62%	61%	62%	58%
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	67%	61%	58%	60%
Strait of Juan de Fuca (Area 6)	Recreational	67%	59%	60%	56%
San Juan Island (Area 7)	Recreational	47%	60%	56%	45%
North Puget Sound (Areas 6 & 7A)	Net	-	67%	57%	50%
Council Area					
Neah Bay (Area 4/4B)	Recreational	47%	63%	57%	63%
LaPush (Area 3)	Recreational	70%	64%	73%	59%
Westport (Area 2)	Recreational	77%	72%	67%	66%
Columbia River (Area 1)	Recreational	81%	81%	74%	77%
Tillamook	Recreational	72%	66%	64%	65%
New port	Recreational	68%	64%	63%	55%
Coos Bay	Recreational	65%	62%	57%	48%
Brookings	Recreational	62%	51%	45%	17%
Neah Bay (Area 4/4B)	Troll	54%	59%	58%	62%
LaPush (Area 3)	Troll	48%	59%	59%	62%
Westport (Area 2)	Troll	66%	63%	64%	59%
Columbia River (Area 1)	Troll	75%	74%	70%	65%
Tillamook	Troll	62%	62%	67%	61%
New port	Troll	64%	62%	63%	63%
Coos Bay	Troll	64%	62%	59%	48%
Brookings	Troll	57%	54%	57%	66%
Columbia River					
Buoy 10	Recreational	-	-	-	71%

TABLE 9. Preliminary projected exvessel value under Council-adopted 2019 non-Indian commercial troll regulatory Alternatives compared to 2018 and the 2014-2018 average (in inflation adjusted dollars).

		Exvessel Value (thousands of dollars)[a/]				
Management Area	Alternative	2019 Projected[b/]	2018 Actual	Percent Change from 2018	2014-2018 Average	Percent Change From 2014-2018 Average
North of Cape Falcon	I	3,800	2,371	+60%	3,240	+17%
	II	3,262		+38%		+1%
	III	2,331		-2%		-28%
Cape Falcon to Humbug Mt.	I	6,193	1,908	+225%	5,497	+13%
	II	4,098		+115%		-25%
	III	4,182		+119%		-24%
Humbug Mt. to OR/CA Border	I	975	441	+121%	432	+126%
	II	756		+71%		+75%
	III	527		+20%		+22%
OR/CA Border to Horse Mt.	I	519	709	-27%	154	+237%
	II	719		+1%		+367%
	III	1,438		+103%		+834%
Horse Mt. to Pt. Arena	I	4,698	848	+454%	2,591	+81%
	II	5,577		+557%		+115%
	III	4,934		+482%		+90%
Pt. Arena to Pigeon Pt.	I	7,980	3,918	+104%	3,960	+101%
	II	5,883		+50%		+49%
	III	3,918		-0%		-1%
South of Pigeon Pt.	I	3,189	2,390	+33%	1,439	+122%
	II	3,522		+47%		+145%
	III	3,486		+46%		+142%
Total South of Cape Falcon	I	23,553	10,213	+131%	14,073	+67%
	II	20,555		+101%		+46%
	III	18,485		+81%		+31%
West Coast Total	I	27,353	12,584	+117%	17,312	+58%
	II	23,817		+89%		+38%
	III	20,816		+65%		+20%

a/ Values are inflation-adjusted to 2018 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 2018 average weights and exvessel prices.

TABLE 10. Preliminary projected angler trips and coastal community income impacts generated under Council-adopted 2019 recreational ocean salmon fishery regulatory Alternatives compared to 2018 and the 2014-2018 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	2018 Actual	2014-2018 Avg.	Estimates Based on the Options	2018 Actual	2014-2018 Avg.	Compared to 2018	Compared to 2014-2018 Avg.
North of Cape Falcon[b/]	I	166.0	55.7	80.1	29,793	9,993	18,538	+198%	+61%
	II	152.8			27,433			+175%	+48%
	III	92.8			16,654			+67%	-10%
Cape Falcon to Humbug Mt.	I	72.0	49.1	50.4	7,071	4,826	5,705	+47%	+24%
	II	62.7			6,156			+28%	+8%
	III	73.0			7,170			+49%	+26%
Humbug Mt. to OR/CA Border	I	13.7	7.0	7.8	1,785	587	767	+204%	+133%
	II	14.4			1,882			+220%	+145%
	III	14.1			1,836			+213%	+139%
OR/CA Border to Horse Mt.	I	18.7	7.4	9.2	2,438	1,288	1,976	+89%	+23%
	II	18.4			2,401			+86%	+22%
	III	18.3			2,383			+85%	+21%
Horse Mt. to Pt. Arena	I	18.5	9.9	10.7	3,999	2,126	2,777	+88%	+44%
	II	18.5			3,999			+88%	+44%
	III	15.6			3,358			+58%	+21%
Pt. Arena to Pigeon Pt.	I	65.9	65.3	52.8	20,136	21,807	22,496	-8%	-10%
	II	65.9			20,136			-8%	-10%
	III	55.7			16,999			-22%	-24%
South of Pigeon Pt.	I	32.6	13.9	15.9	9,968	2,378	3,380	+319%	+195%
	II	32.3			9,864			+315%	+192%
	III	32.1			9,795			+312%	+190%
Total South of Cape Falcon	I	221.5	152.6	146.7	45,396	33,013	37,101	+38%	+22%
	II	212.3			44,438			+35%	+20%
	III	208.6			41,541			+26%	+12%
West Coast Total	I	387.4	208.2	226.8	75,189	43,006	55,639	+75%	+35%
	II	365.1			71,871			+67%	+29%
	III	301.4			58,196			+35%	+5%

a/ Income impacts are not comparable to the exvessel values shown in Table 9. All dollar values are expressed in inflation-adjusted 2018 dollars.
b/ Does not include Buoy 10 fishery.

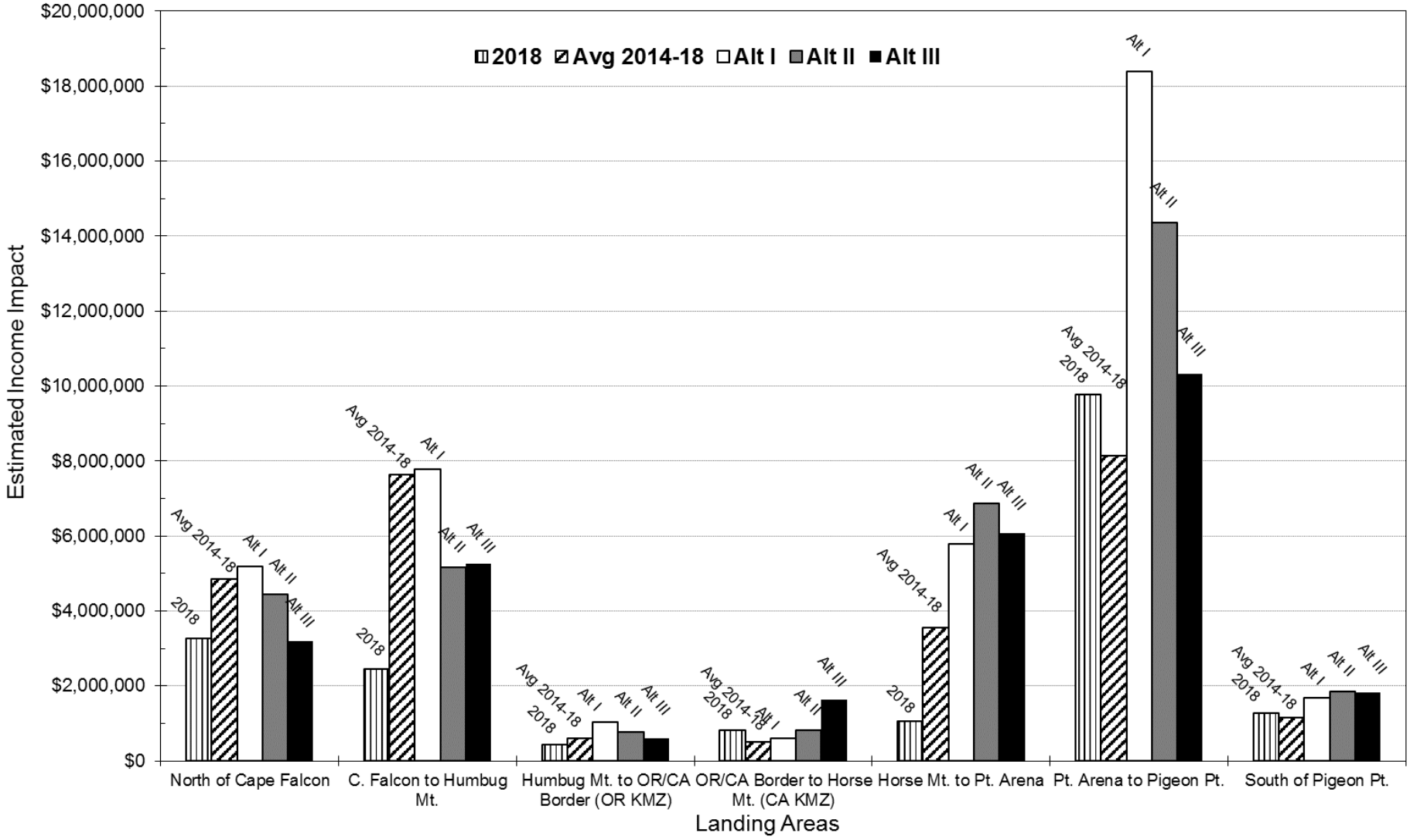


FIGURE 1. Projected community income impacts associated with landings projected under the Council adopted 2019 commercial fishery Alternatives compared to 2018 and the 2014-2018 average (in inflation-adjusted dollars).

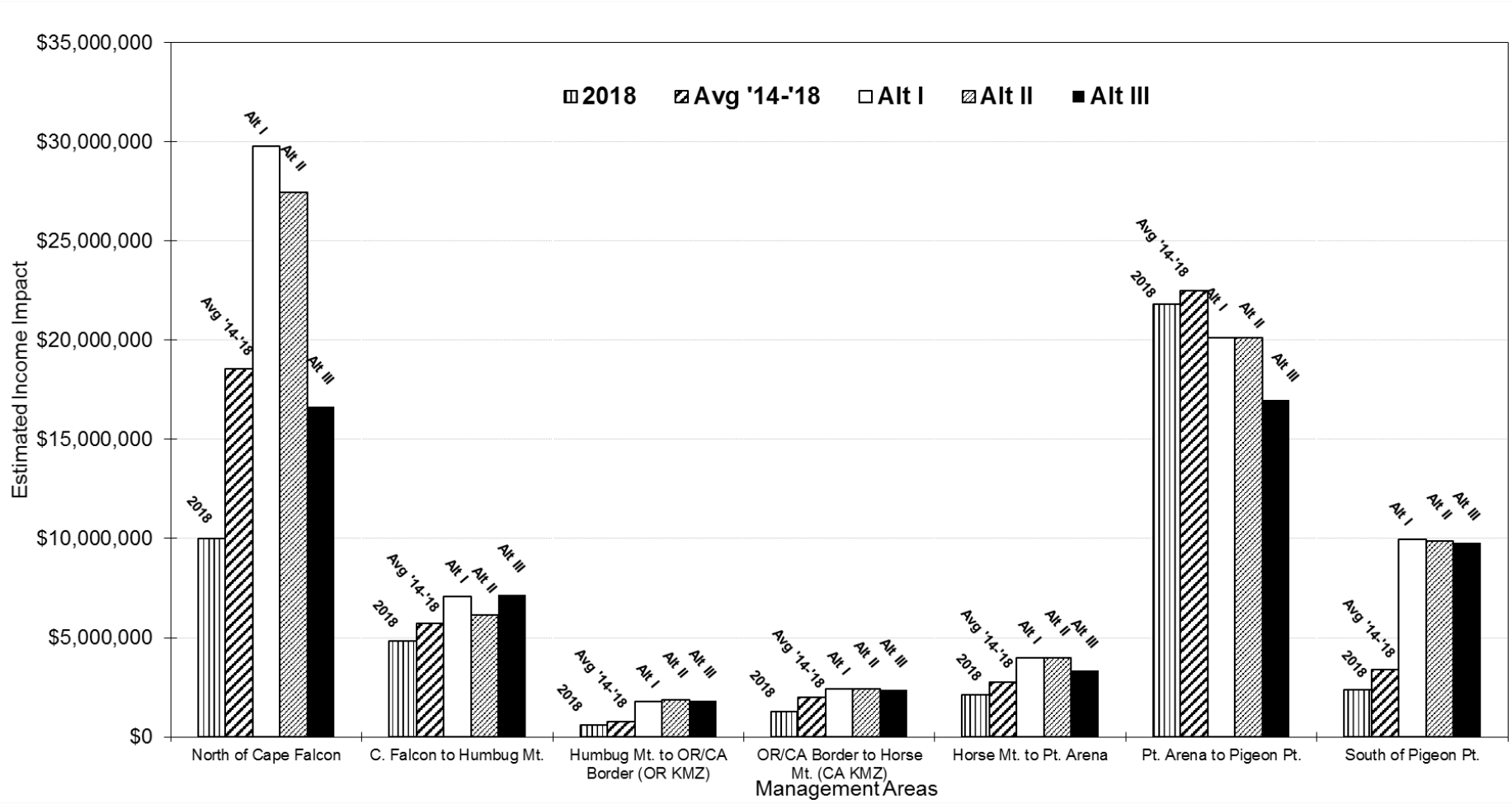


FIGURE 2. Projected community income impacts associated with angler effort projected under the Council adopted 2019 recreational fishery Alternatives compared to 2018 and the 2014-2018 average (in inflation-adjusted dollars).

APPENDIX A: PROJECTED IMPACTS FOR AGE-3 SACRAMENTO RIVER WINTER CHINOOK, AGE-4 KLAMATH RIVER FALL CHINOOK, AND ADULT SACRAMENTO RIVER FALL CHINOOK.

Table A-1. Sacramento River winter run Chinook age-3 ocean impact rate south of Pt. Arena by fishery and Alternative. The age-3 SRWC impact rate was projected for each of the proposed 2019 fishing season Alternatives. The impacts are displayed as a percent for each Alternative by fishery, port area, and month. Max rate: 15.7.

Commercial

Alternative I 15.7 Total

Port Area	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.15	0.59	0.38	0.95	0.14	0.06			2.28
MO	0.44	1.19	0.66						2.28
Total	0.59	1.78	1.04	0.95	0.14	0.06			4.56

Alternative II 15.6 Total

Port Area	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.05	0.68	0.41	0.72	0.07				1.94
MO	0.42	1.59	0.73						2.74
Total	0.48	2.27	1.14	0.72	0.07				4.68

Alternative III 13.5 Total

Port Area	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.00	0.40	0.42	0.77					1.58
MO	0.58	0.79	0.74						2.11
Total	0.58	1.19	1.17	0.77					3.70

Recreational

Alternative I

Port Area	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.20	0.40	1.27	1.97	0.75	0.10	0.22			4.90
MO	1.09	0.57	1.10	2.57	0.92					6.26
Total	1.29	0.97	2.37	4.54	1.66	0.10	0.22			11.15

Alternative II

Port Area	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.20	0.40	1.27	1.96	0.74	0.10	0.22			4.88
MO	1.09	0.57	1.10	2.56	0.72					6.05
Total	1.29	0.97	2.37	4.52	1.46	0.10	0.22			10.93

Alternative III

Port Area	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
SF	0.20	0.40	0.38	2.01	0.76	0.11				3.84
MO	1.09	0.57	1.10	2.61	0.60					5.98
Total	1.29	0.97	1.48	4.62	1.35	0.11				9.82

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 age-4 ocean harvest by fishery and Alternative. In 2019, a harvest of 16979 age-4 KRFC results in a 16% ocean harvest rate.

Commercial

Alternative I 15.9% Total

Port	Fall 2018		Summer 2019						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	85	0		53	278	102	116	472	1,021	1,106
CO	0	0		166	466	484	540	1,126	2,782	2,782
KO		0		0	115	392	362	171	1,040	1,040
KC						517	352	379	1,248	1,248
FB	44					3,652	2,557		6,209	6,253
SF	0	0			587	852	826	356	2,621	2,621
MO					206	106	84		396	396
Total	129			219	1,653	6,105	4,836	2,503	15,316	15,445
										14.6%

Alternative II 16.0% Total

Port	Fall 2018		Summer 2019						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	85	0			216	81	90	244	631	716
CO	0	0			362	382	419	581	1,744	1,744
KO		0			89	279	289	142	799	799
KC						618	528	568	1,714	1,714
FB	44				1,885	2,403	2,833	633	7,754	7,798
SF	0	0			204	965	915	271	2,355	2,355
MO					201	140	93		434	434
Total	129				2,957	4,868	5,169	2,439	15,433	15,562
										14.7%

Alternative III 15.3% Total

Port	Fall 2018		Summer 2019						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	85	0			216	83	92	249	640	725
CO	0	0			362	391	430	593	1,776	1,776
KO		0			89	168	146	144	547	547
KC						1,187	1,012	1,087	3,286	3,286
FB	44					2,540	2,966	676	6,182	6,226
SF	0	0				574	939	287	1,800	1,800
MO					275	72	96		443	443
Total	129				941	5,016	5,680	3,035	14,672	14,801
										13.9%

Recreational

Alternative I

Port	Fall 2018			Summer 2019						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	31	0		0	0	0	0	11	17	28	59
CO	0	0	0	0	0	2	13	23	25	63	63
KO		0				1	30	59	181	271	271
KC	0					29	173	151	266	619	619
FB	0	0			3	27	62	95	21	208	208
SF	0	0			19	19	66	80	6	190	190
MO					20	4	7	14	1	46	46
Total	31				41	83	350	432	517	1,423	1,454
											1.4%

Alternative II

Port	Fall 2018			Summer 2019						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	31	0		0	0	0	0	11	12	23	54
CO	0	0	0	0	0	2	7	23	22	54	54
KO		0				1	29	59	200	289	289
KC	0					29	171	151	265	616	616
FB	0	0			3	27	61	95	21	207	207
SF	0	0			19	19	65	80	6	189	189
MO					20	4	6	14	1	45	45
Total	31				41	83	339	434	528	1,425	1,456
											1.4%

Alternative III

Port	Fall 2018			Summer 2019						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	31	0		0	0	0	0	11	18	29	60
CO	0	0	0	0	0	2	13	24	26	65	65
KO		0				1	30	60	204	295	295
KC	0					29	175	155	271	630	630
FB	0	0			3	27	19	97	22	168	168
SF	0	0			19	19	20	82	6	146	146
MO					20	4	7	14	1	46	46
Total	31				41	83	264	445	548	1,381	1,412
											1.3%

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 Horse Mt. (California KMZ)
FB Horse Mt. 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 200,488 Total

Port	Fall 2018		Summer 2019						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0		762	3,376	2,246	3,467	5,077	14,928	14,928
CO	15	0		1,130	2,806	3,182	1,697	2,933	11,748	11,763
KO		0			597	1,241	1,049	300	3,187	3,187
KC						551	897	512	1,960	1,960
FB	44					15,248	12,884		28,132	28,176
SF	5,067	1,088			18,346	14,304	9,949	17,089	59,688	65,843
MO					13,315	7,428	2,951		23,694	23,694
Total	5,126	1,088		1,892	38,440	44,201	32,894	25,911	143,338	149,552

Alternative II 186,761 Total

Port	Fall 2018		Summer 2019						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0			2,613	1,797	2,684	2,626	9,720	9,720
CO	15	0			2,173	2,545	1,314	1,517	7,549	7,564
KO		0			462	887	839	250	2,438	2,438
KC						661	1,345	768	2,774	2,774
FB	44				4,241	10,165	14,240	5,708	34,354	34,398
SF	5,067	1,088			6,365	16,408	10,996	13,063	46,832	52,987
MO					12,959	9,956	3,262		26,177	26,177
Total	5,126	1,088			28,814	42,419	34,680	23,932	129,845	136,059

Alternative III 167,768 Total

Port	Fall 2018		Summer 2019						Summer	Year
Area	Sep	Oct-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	0	0			2,613	1,797	2,684	2,626	9,720	9,720
CO	15	0			2,173	2,545	1,314	1,517	7,549	7,564
KO		0			462	532	419	250	1,663	1,663
KC						1,322	2,690	1,535	5,547	5,547
FB	44					10,165	14,240	5,912	30,317	30,361
SF	5,067	1,088				9,536	10,996	13,530	34,062	40,217
MO					17,675	4,952	3,262		25,889	25,889
Total	5,126	1,088			22,923	30,850	35,606	25,370	114,749	120,963

Recreational

Alternative I

Port	Fall 2018			Summer 2019						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	36	0		7	4	7	49	249	210	526	562
CO	23	0	0	1	3	9	144	287	327	771	794
KO		0				72	165	300	204	741	741
KC	0					269	888	859	632	2,648	2,648
FB	0	0			135	518	958	1,949	683	4,243	4,243
SF	4,685	2,964			1,494	3,083	4,806	9,832	5,215	24,430	32,079
MO					4,545	1,395	1,582	2,069	279	9,870	9,870
Total	4,744	2,964		8	6,181	5,353	8,591	15,545	7,550	43,228	50,936

Alternative II

Port	Fall 2018			Summer 2019						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	36	0		7	4	7	19	249	148	434	470
CO	23	0	0	1	3	9	74	287	293	667	690
KO		0				72	165	300	226	763	763
KC	0					269	888	859	632	2,648	2,648
FB	0	0			135	518	958	1,949	683	4,243	4,243
SF	4,685	2,964			1,494	3,083	4,806	9,832	5,215	24,430	32,079
MO					4,545	1,395	1,582	2,069	220	9,811	9,811
Total	4,744	2,964		8	6,181	5,353	8,492	15,545	7,415	42,994	50,702

Alternative III

Port	Fall 2018			Summer 2019						Summer	Year
Area	Sep	Oct	Nov-Dec	Mar	Apr	May	Jun	Jul	Aug	Total	Total
NO	36	0		7	4	7	49	249	222	538	574
CO	23	0	0	1	3	9	144	287	333	777	800
KO		0				36	165	300	226	727	727
KC	0					269	888	859	632	2,648	2,648
FB	0	0			135	518	288	1,949	683	3,573	3,573
SF	4,685	2,964			1,494	3,083	1,442	9,832	5,215	21,066	28,715
MO					4,545	1,395	1,582	2,069	180	9,771	9,771
Total	4,744	2,964		8	6,181	5,317	4,556	15,545	7,490	39,097	46,805

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 Horse Mt. (California KMZ)
FB Horse Mt. to Pt. Arena (Fort Bragg)
SF Pt. Arena to Pigeon Pt. (San Francisco)
MO Pigeon Pt. to U.S./Mexico Border (Monterey)

APPENDIX B: NEPA AND ESA ANALYSES INCORPORATED BY REFERENCE

Several documents supporting the analyses of effects to the environment from the Alternatives have been incorporated by reference. Those documents are described and passages relevant to analyses contained in this EA are excerpted below.

NMFS 2003: West Coast Salmon Harvest Programmatic EIS

This document evaluates how NMFS reviews annual salmon fishery plans in three jurisdictions, the North Pacific Fishery Management Council for Southeast Alaska; the Pacific Fishery Management Council for the Washington, Oregon, and California coast; and *U.S. v. Oregon* for the Columbia River Basin. In general, NMFS seeks to implement fisheries that are consistent with a variety of statutory and legal obligations related to resource conservation, socioeconomic benefits associated with resource use, and treaty trust obligations. Fishery plans are developed annually within the context of framework plans to meet the year-specific circumstances related to the status of stocks affected by the fisheries. This final PEIS evaluates different ways to balance these objectives and different strategies that can be used that may provide better solutions for meeting the obligations and objectives of the respective framework plans. The Alternatives considered in this final PEIS are programmatic in nature and are designed to provide an overview of fishery management methods and strategies that can be implemented as part of the annual planning processes.

This document includes the following statements relative to Council area salmon fisheries:

> *While the levels of salmon catch fluctuate from year to year, the amount of groundfish taken as incidental catch is very low so that changes in the salmon fishery do not substantially alter the projections for harvest-related mortality in the groundfish fishery.*
>
> *Other Council managed species such as halibut, highly migratory species (draft FMP), and coastal pelagic species are also landed jointly with salmon. For all of these stocks, fish caught on the same trip with salmon are documented. Data on the commercial segment of these fisheries show the co-occurrence rates for salmon and these other Council-managed species is low, as well as for non-Council-managed species. Changes in the salmon fishery are not expected to have a substantial impact on the directed fisheries for the non-salmon stocks.*
>
> *The commercial troll fishery off the coasts of Washington, Oregon, and California is classified as a Category III fishery, indicating a remote or no likelihood of known incidental mortality or serious injury of marine mammals. In general, recreational fishery uses the same gear and techniques as the commercial fisheries and can be assumed to have similar rates of encounters and results.*
>
> *After excluding ESA listed marine mammals, only three species of marine mammals are defined as strategic under MMPA within the coverage area: short-finned pilot whales, mesoplodont beaked whales, and Minke whales (Barlow et al. 1997). This strategic classification denotes that projected human-caused mortality exceeds the species' annual potential biological removal estimate under MMPA standards. As with ESA listed marine mammal species, there is no record of these three species being affected by the ocean salmon fisheries managed by the Council.*
>
> *Steller sea lion interaction with the Pacific Coast salmon fisheries is rare and NMFS has determined mortality and serious injury incidental to commercial fishing operations would have a negligible effect.* [1]*Available information indicates that Pacific Coast salmon fisheries are not likely*

[1] The eastern DPS of Steller sea lions was delisted under the ESA on November 4, 2013 (78 *FR* 66140).

to jeopardize the existence of the Guadalupe fur seal. No sea turtles have been reported taken by the ocean salmon fisheries off Washington, Oregon, or California. NMFS has determined that commercial fishing by Pacific Coast fisheries would pose a negligible threat to the Pacific species.

Short-term effects on seabirds are minimal, if any. The types of vessels used in the fishery and the conduct of the vessels are not conducive to collisions or the introduction of rats other non-indigenous species to seabird breeding colonies. Anecdotal information suggests accidental bird encounters are a rare event for commercial and recreational ocean salmon fisheries (Council 1999a). Long-term effects on seabirds from the ocean salmon fisheries are also minimal.

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.

PFMC 2006: EA for 2006 Ocean Salmon Management Measures

The 2006 regulations EA analyzes the environmental and socioeconomic impacts of proposed management measures for ocean salmon fisheries occurring off the coasts of Washington, Oregon, and California. The document evaluated the 2006 annual ocean salmon harvest management measures with respect to compliance with the terms of the Salmon FMP, obligations under the Pacific Salmon Treaty (PST), and the level of protection required by all consultation standards for salmon species listed under the ESA. The range of alternatives analyzed in the 2006 Regulations EA included the effects of three levels of *de minimis* fishing strategies on KRFC when the stock was projected to fall below the 35,000 natural spawner floor for the third consecutive year. The escapement floor for naturally spawning KRFC was projected to not be attained even with complete closure of ocean salmon fisheries between Cape Falcon, Oregon, and Point Sur, California; therefore, the management measures required implementation by emergency rule. The NMFS-recommended 2006 salmon fishery management measures did not completely close fisheries between Cape Falcon and Point Sur, but limited fisheries to provide a minimum of 21,100 natural spawning adult KRFC in 2006. The 2006 EA supported NMFS' Finding of No Significant Impacts (FONSI) for the 2006 ocean salmon regulations.

Appendix A of Amendment 18 (EFH Appendix A) describes salmon EFH and fishing and non-fishing impacts to this habitat. It found no evidence of direct gear effects on this habitat from Council-managed salmon fisheries. ... Because EFH impacts are extensively described and analyzed in EFH Appendix A, and this analysis demonstrates the fishery has no significant impacts, EFH will not be considered further in this environmental assessment.

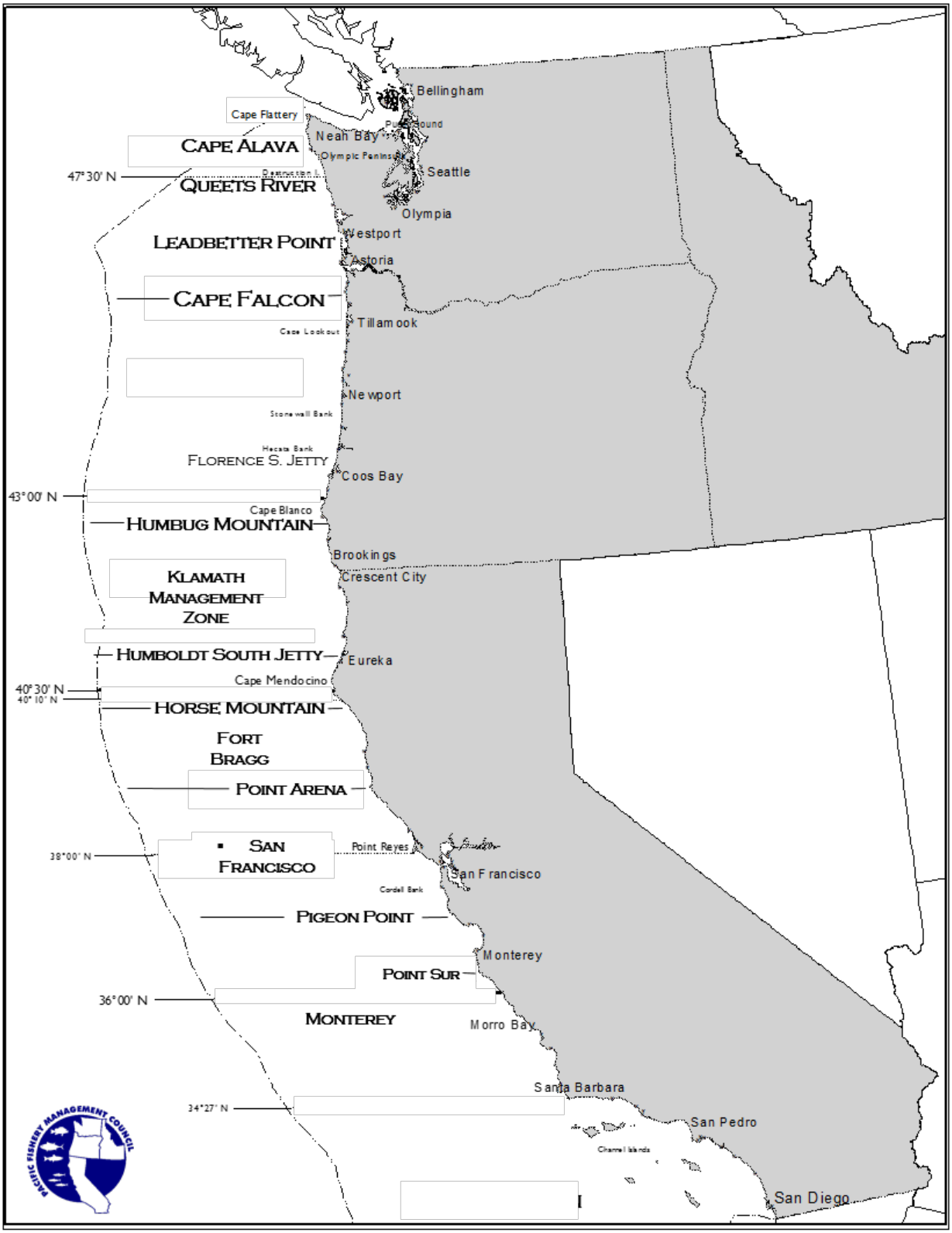
Fisheries management can affect safety if, for example, season openings make it more likely that fishermen will have to go out in bad weather because fishing opportunities are limited. The EA incorporated into Amendment 8 to the Salmon FMP analyzed alternatives to adjust management measures if unsafe weather affected fishery access. The range of management measures considered for the proposed action would be within the range described in that EA. Since these types of potential impacts have been previously analyzed and found not to be significant, they are not discussed in this EA.

NMFS 2009: Biological Opinion on Ocean Fisheries Effects on Southern Resident Killer Whales

This document constitutes the National Marine Fisheries Service's (NMFS) biological opinion (Opinion) regarding the effects of proposed Pacific coast ocean salmon fisheries conducted under the Pacific Coast Salmon Plan on the Southern Resident killer whale (*Orcinus orca*) distinct population segment. The fisheries assessed by this Opinion would be conducted in the U.S. Exclusive Economic Zone (EEZ) of the

Pacific Ocean. These fisheries are managed under the jurisdiction of the Pacific Fishery Management Council (PFMC) and target primarily Chinook (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*), although pink salmon (*O. gorbuscha*) are taken incidentally during odd-numbered years (e.g., 2005, 2007).

> *After reviewing the current status of the endangered population of Southern Resident killer whales and their critical habitat, the environmental baseline for the action area, the effects of the proposed actions, and cumulative effects, it is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Southern Resident killer whales or adversely modify critical habitat.*

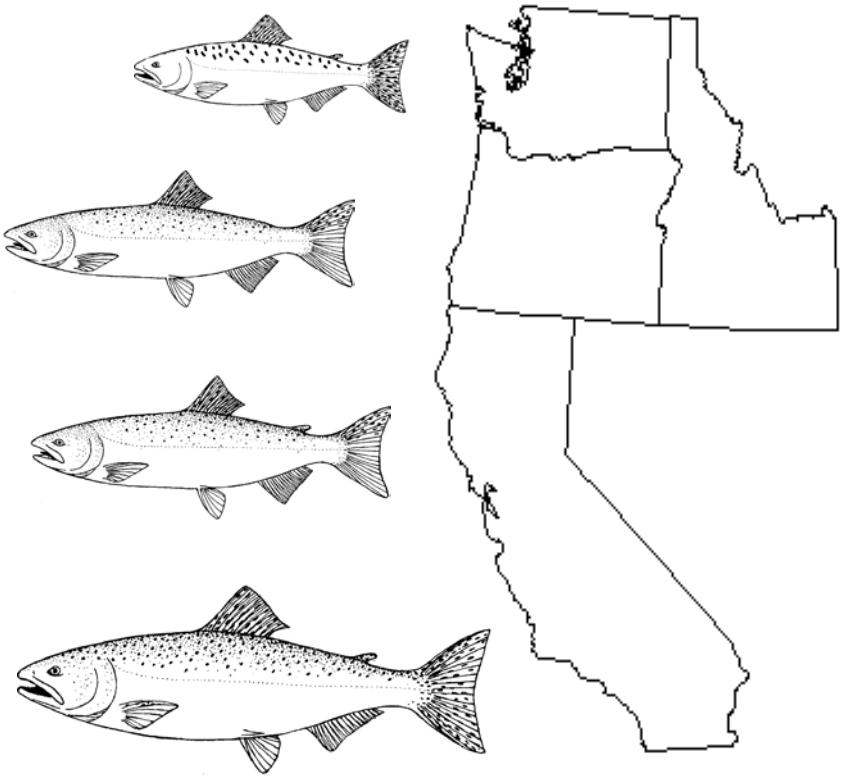


This map is for reference only and is not intended for use in navigation or fishery regulation.

ENVIRONMENTAL ASSESSMENT PART 3
FOR
2019 OCEAN SALMON FISHERY REGULATIONS
REGULATION IDENTIFIER NUMBER 0648-BI05

BASED ON

PRESEASON REPORT III
COUNCIL ADOPTED MANAGEMENT MEASURES
AND



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This document may be cited in the following manner:
Pacific Fishery Management Council. 2019. *Preseason Report III: Council Adopted Management Measures and Environmental Assessment Part 3 for 2019 Ocean Salmon Fishery Regulations: RIN 0648-XD843.* (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 FNA15NMF4410016.

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LIST OF ACRONYMS AND ABBREVIATIONS

AABM	Aggregate Abundance Based Management
AEQ	adult equivalent
BO	biological opinion
CDFW	California Department of Fish and Wildlife
Council	Pacific Fishery Management Council
CPUE	catch per unit effort
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).
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
ODFW	Oregon Department of Fish and Wildlife
OCN	Oregon coastal natural (coho)
OPI	Oregon Production Index
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
RER	rebuilding exploitation rate
RMP	Resource Management Plan
RK	Rogue/Klamath (hatchery coho)
SAS	Salmon Advisory Subpanel
SCH	Spring Creek Hatchery (Col. R. tule fall Chinook returning to Spring Creek Hatchery [above Bonneville Dam])
SONCC	Southern Oregon/Northern California Coast (coho ESU)
SRFC	Sacramento River fall Chinook
SRFI	Snake River fall (Chinook) index
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)
WCVI	West Coast Vancouver Island
WDFW	Washington Department of Fish and Wildlife

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1.0 INTRODUCTION

This is the last in an annual series of four reports prepared by the Salmon Technical Team (STT) of the Pacific Fishery Management Council (Council). The reports document and help guide salmon ocean fishery management off the coasts of Washington, Oregon, and California. This report describes the Council's 2019 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 2019 ocean salmon regulations and includes a description and analysis of a Proposed Action. An EA is used to determine whether an action being considered by a Federal agency has significant environmental impacts. The second part of the EA (Preseason Report II) presented a statement of the purpose and need, a description of the affected environment, a description of 2019 ocean salmon regulation alternatives being considered, and an analysis of the effects of those alternatives on the affected environment. The first part of the EA (Preseason Report I) included a description of the No-Action alternative and an analysis of the effects of the No-Action alternative on salmon stocks managed under the Pacific Coast Salmon Fishery Management Plan (FMP), which is one component of the affected environment. 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 recommendations for the 2019 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 salmon fisheries, salmon stocks originating from Washington, Oregon, and California meet all of the applicable conservation objectives in the FMP.

Sacramento River fall Chinook, Klamath River fall Chinook, Queets coho, Strait of Juan de Fuca coho, and Snohomish coho salmon stocks were classified as overfished in 2018, and remain in that category for 2019.

2.0 SELECTION OF FINAL MANAGEMENT MEASURES

The following figures and tables describe the Council-adopted management measures covering the period from May 1, 2019, to April 30, 2020:

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 2019 seasons are constrained primarily by: (1) Sacramento River fall Chinook (SRFC) and California coastal Chinook south Cape Falcon, (2) Oregon coastal natural coho and Columbia River summer Chinook north of the OR/CA border, and (3) and lower Columbia River natural tule and Puget Sound Chinook north of Cape Falcon.

Regulations and expected fishing patterns for the treaty Indian ocean fisheries were developed by the Hoh, S'Klallam, Makah, Quileute, and Quinault tribes for their respective fisheries.

2.1 Inseason Management

Inseason changes are made to meet the preseason intent of the management measures described in this document, but must also meet the Council's FMP goals, especially in regard to conservation and allocation goals, Federally-recognized Indian fishing rights, consultation standards for ESA-listed salmon stocks, and obligations under the PST.

Inseason actions that are anticipated for the 2019-2020 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 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, 2020, if necessary to meet 2020 management objectives.
8. Closing or postponing California recreational fisheries scheduled to open April 4, 2020, or commercial fisheries scheduled to open April 16, 2020, if necessary to meet 2020 management objectives.
9. 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 state and tribal 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 include commercial and recreational fisheries at the mouths of the Chetco, Elk, and other rivers. Washington may also establish limited recreational salmon fisheries in state marine waters if additional impacts on critical coho and/or Chinook stocks can be accommodated within management constraints. California will not establish any additional state marine water salmon fisheries in 2019.

3.0 SALMON FISHERY MANAGEMENT PLAN REQUIREMENTS

The Council's 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 three west coast states and impacted by Council area ocean fisheries are listed in Table 3-1 of the 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 MSY. Impacts on these stocks relative to the applicable objectives are described in Table 5.

Administrative objectives are requirements for meeting other applicable law outside of the FMP. These requirements include ESA consultation standards, international treaties, and tribal trust responsibilities. The FMP defers to NMFS consultation standards for salmon stocks listed under the ESA in regards to biological conservation objectives. Section 4.0 of this document provides greater detail on ESA-listed stocks, while impacts of the Council-adopted salmon management measures on ESA-listed stocks are included in Table 5.

The FMP requires compliance with relevant terms of the PST. Section 5.0 of this document provides greater detail on PST provisions and stocks, while impacts of the Council-adopted salmon management measures on those stocks are included in Table 5.

The FMP also requires compliance with treaty fishing rights as described in 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 inform the Council's adoption of final management measure recommendations while meeting its biological, administrative, and allocation objectives.

The Columbia River treaty tribes establish periodic management agreements with the state comanagers 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-tribal 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 between commercial and recreational sectors, and among recreational port subareas, and for coho south of Cape Falcon between commercial and recreational sectors. The 2019 salmon management measures adopted by the Council meet all these allocation requirements.

4.0 SPECIES LISTED UNDER THE ENDANGERED SPECIES ACT

Since 1989, NMFS listed 17 Evolutionarily Significant Units (ESUs) of salmon under the ESA:

Species	ESU	Status	Most Recent		Original Listing	
	Chinook					
Chinook Salmon	Sacramento River Winter	Endangered	83 FR 18233	4/26/2018	54 FR 32085	8/1/1989
(*O. tshawytscha*)	Snake River Fall	Threatened	76 FR 50448	8/15/2011	57 FR 14653	4/22/1992
	Snake River Spring/Summer	Threatened	76 FR 50448	8/15/2011	57 FR 14653	4/22/1992
	Puget Sound	Threatened	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Lower Columbia River	Threatened	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Upper Willamette River	Threatened	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Upper Columbia River Spring	Endangered	76 FR 50448	8/15/2011	64 FR 14308	3/24/1999
	Central Valley Spring	Threatened	76 FR 50447	8/15/2011	64 FR 50394	9/16/1999
	California Coastal	Threatened	76 FR 50447	8/15/2011	64 FR 50394	9/16/1999
	Chum					
Chum Salmon	Hood Canal Summer-Run	Threatened	76 FR 50448	8/15/2011	64 FR 14508	3/25/1999
(*O. keta*)	Columbia River	Threatened	76 FR 50448	8/15/2011	64 FR 14508	3/25/1999
	Coho					
Coho Salmon	Central California Coastal	Endangered	76 FR 50447	8/15/2011	61 FR 56138	10/31/1996
(*O. kisutch*)	S. Oregon/ N. California Coastal	Threatened	76 FR 50447	8/15/2011	62 FR 24588	5/6/1997
	Oregon Coastal	Threatened	76 FR 50448	8/15/2011	63 FR 42587	8/10/1998
	Lower Columbia River	Threatened	76 FR 50448	8/15/2011	70 FR 37160	6/28/2005
	Sockeye					
Sockeye Salmon	Snake River	Endangered	76 FR 50448	8/15/2011	56 FR 58619	11/20/1991
(*O. nerka*)	Ozette Lake	Threatened	76 FR 50448	8/15/2011	64 FR 14528	3/25/1999

As the listings have occurred, NMFS has initiated formal consultations and issued biological opinions (BOs) that consider the impacts resulting from implementation of the 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 FMP on the stocks. The consultation standards referred to in this document 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 on March 5, 2019, NMFS provided guidance on protective measures for species listed under the ESA during the 2019 fishing season. The letter summarized the requirements of NMFS' BOs on the effects of potential actions under the salmon FMP on listed salmon and provided the anticipated consultation standards of the BOs in preparation for the 2019 management season, as well as further guidance and recommendations for the 2019 management season. Additional guidance was provided during the April Council meeting.

The ESA consultation standards, exploitation rates, and other criteria in place for the 2019 management season are presented in Table 5. Some listed stocks are either rarely caught in Council area fisheries (e.g., spring Chinook from the upper Columbia River) or already receive sufficient protection from other salmon FMP and ESA standards (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 ESA-listed Chinook and coho, Council-managed fisheries have substantive impacts on Sacramento River winter Chinook (SRWC), Central Valley spring Chinook, California coastal Chinook, Snake River wild (SRW) fall Chinook, lower Columbia River (LCR) fall Chinook, and all of the coho stocks. Impacts to Puget Sound Chinook are relatively low in Council area ocean fisheries, but may be a constraining stock when structuring both ocean and inside fisheries during the North of Falcon process.

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)	

The Southern Resident Killer Whale distinct population segment (SRKW) is listed under the Endangered Species Act as endangered (70 FR 69903, November 18, 2005). NMFS issued a biological opinion analyzing the effects of the ocean salmon fisheries on SRKW in 2009; the opinion concluded that fisheries are not likely to jeopardize SRKW. Since the 2009 biological opinion was issued, there has been considerable research on the status of SRKW and the importance of the availability of Chinook salmon, their primary prey, to their survival and recovery. NMFS reinitiated consultation on the effects of the ocean salmon fisheries to SRKW on April 12, 2019. To inform the new consultation, the Council formed an ad hoc workgroup including salmon and SRKW experts at its April 2019 meeting and endorsed a schedule for the workgroup culminating in final Council action for adoption of a preferred alternative recommendation on the fishery assessment and any conservation measure(s) or management tool(s) to address the impacts of the fishery to SRKW in November 2019. NMFS would expect to complete the reinitiated consultation in time to inform the 2020 management measures for the fisheries.

Pending completion of the reinitiated consultation, NMFS assessed the potential effects of the 2019 fisheries on SRKW and reported on that assessment at the April Council meeting. The assessment included consideration of all information currently available relating to the impacts of the alternatives the Council was considering for the 2019 ocean salmon fisheries on the overall abundance of Chinook available to SRKW, and specifically on Chinook stocks designated as draft priority stocks for SRKW prey purposes in a 2018 report prepared by NMFS and the Washington Department of Fish and Wildlife. For the assessment, salmon abundance was ranked in "quartiles" of low, middle, and high abundance, compared with a 25-year retrospective time period, 1992 through 2016. The assessment determined that the 2019 preseason overall coastal and inland Chinook salmon abundance is likely to fall within the middle range of abundance, when compared to the period 1992 through 2016. The assessment also evaluated fishery reductions in Chinook salmon abundance. Overall, total percent reductions in prey availability in coastal waters anticipated from each fishing alternative ranged from 7.1% in Alternative 3 to 9.9% in Alternative 1, which fall within the middle range (the range between the lower and upper quartile boundaries) of what was observed during 1992 through 2016. Reductions in prey availability anticipated from the recommended alternative (see PRE III) fall within the range of Alternatives 1 and 3 (see PRE II), which set the highest and lowest fishery impacts, respectively.

Abundance forecasts in 2019 for 14 of 16 priority prey Chinook salmon stocks contributing to Council-area salmon fisheries are in the middle or upper quartiles of abundance when compared to the period 1992 through 2016. Although two priority stocks (Lower Columbia River and Upper Willamette spring-run Chinook salmon) are anticipated to have low abundance in 2019 relative to previous years, these stocks are minor contributors to the catch of PFMC ocean salmon fisheries, and we do not anticipate the 2019 Council-area salmon fisheries would substantially reduce the availability of those priority Chinook prey stocks to SRKW. Furthermore, the overall forecast composition in 2019 contains a higher proportion of Chinook salmon stocks that are considered to be higher priority than the average composition in the retrospective time period (1992 through 2016). Based on that assessment, NMFS has completed a 7(a)(2)/7(d) memo (NMFS 2019) which documents our conclusion that, consistent with sections 7(a)(2) and 7(d) of the ESA, this action will not jeopardize any listed species, would not adversely modify 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 implementation of any reasonable and prudent alternative measures.

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 PSC is the body formed by the governments of Canada and the United States to implement the Pacific Salmon Treaty.

5.1 Chinook Salmon Management

A new agreement under the PST was negotiated in 2018 and formally accepted by both the U.S. and Canada. The U.S. and Canada began managing fisheries in accordance with this new agreement on January 1, 2019. The new agreement includes reductions to catch ceilings for SEAK and WCVI AABM fisheries relative to the prior 2009 agreement. These reductions for SEAK and WCVI range from 7.5 percent and 12.5 percent, respectively, in years of low abundances to 1.5 percent and 2.4 percent, respectively, in years of higher abundances. Under the terms of the 2019 PST Agreement, Council fisheries for Chinook salmon will be subject to a new set of ISBM fishery limits, identified in Attachment I of Chapter 3. 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).

Many Chinook stocks of concern to the Council are affected by fisheries off Canada and Alaska. Maximum allowable catches by Canadian AABM fishery complexes off the WCVI and Northern British Columbia are determined through the annual calibration of the PSC Chinook Model. Under the new Agreement, catch ceilings for Southeast Alaskan (SEAK) fisheries will be determined prior to February 1 in each year using estimated catch per unit effort (CPUE) from the winter power troll fishery. Canadian fisheries that are not included in AABM complexes are managed under ISBM constraints, which, similar to U.S. ISBM fisheries, require the CYER by Canadian ISBM fisheries on specific indicator stocks to be below some level of the average 2009 – 2015 CYER if they do not achieve their management objectives. Expectations for Canadian and Alaskan fisheries harvest and stock abundance forecasts are incorporated into the Chinook Fishery Regulation Assessment Model (FRAM) to estimate total exploitation rate impacts from all marine fisheries (Table 5).

Key considerations for Canadian domestic fishery management for Chinook in 2019 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, Interior Fraser (Thompson River) coho, and potentially Thompson and/or Chilcotin River Steelhead (depending on a listing decision under Canada's Species at Risk Act). Increasing the availability of Chinook salmon in key foraging areas of Southern Resident Killer Whales in the southern 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. If the management unit is in the low abundance status, exploitation rates up to 20 percent are allowed.

For 2019, Puget Sound and Washington coast coho constraints are as follows:

FMP

FMP Stock	Total Exploitation Rate Constraint[a/]	Categorical Status[a/]
Skagit	35%	Low
Stillaguamish	50%	Normal
Snohomish	40%	Low
Hood Canal	45%	Low
Strait of Juan de Fuca	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	35%	Moderate
Stillaguamish	50%	Abundant
Snohomish	40%	Moderate
Hood Canal	45%	Moderate
Strait of Juan de Fuca	20%	Low
Quillayute Fall[c/]	57%	Abundant
Hoh[c/]	71%	Abundant
Queets[c/]	48%	Abundant
Grays Harbor	51%	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). This also becomes the maximum allowable rate unless the stock is in the "Low" status. In that case, an ER of up to 20% is allowed.

Key considerations for Canadian fishery management for coho in 2019 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 pink, Chinook, sockeye, and chum salmon; and (4) the desire to provide increased opportunity for sport fisheries through mark-selective retention regulations. 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.

In previous 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% 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 2019 indicates continuing concerns for the condition of Interior Fraser coho. The Interior Fraser coho management unit is anticipated to remain in low status, resulting in a requirement to constrain the total mortality fishery exploitation rate for 2019 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 2019 are:

- *Columbia River hatchery tules*. Combined production of Lower River Hatchery (LRH) and Spring Creek Hatchery (SCH) stocks returning to the Columbia River is forecasted to be 100,500, which is lower than the 2018 preseason expectation of 112,500. The 2019 LRH forecast is 54,500, compared to the 2018 forecast of 62,400. The 2019 SCH forecast is 46,000, compared to the 2018 forecast of 50,100.

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 stocks as provided in Section 4.0 above. Relevant stocks for the area north of Cape Falcon include LCR natural tule Chinook, Columbia Lower River Wild (LRW) fall Chinook, Snake River Wild (SRW) fall Chinook and Puget Sound Chinook.
- Fisheries north of Cape Falcon were shaped in 2019 to minimize impacts on Puget Sound Chinook.

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 36.0 percent, below the 38.0 percent maximum for 2019.
- *LRW fall Chinook.* The adopted management measures have a projected ocean escapement of 14,100 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 58.7 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.
- *Puget Sound Chinook*. The State of Washington and the Puget Sound treaty tribes reached agreement on a package of fisheries to be modeled prior to the Council's final adoption of the proposed action. The impacts of Council-area fisheries on Puget Sound stocks, combined with this package of inside fisheries, meet all the requirements for ESA-listed Puget Sound Chinook described

in the March 5, 2019 letter from NMFS and supplemental NMFS guidance received during the April 2019 PFMC meeting, and the applicable Biological Opinion.

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

6.2 South of Cape Falcon

Status of Chinook stocks important to 2019 Chinook harvest management south of Cape Falcon are:

- *SRFC*. The Sacramento Index forecast is 379,632 adults, which is higher than last year's preseason forecast of 229,432.
- *KRFC*. The ocean abundance forecast for this stock is 167,504 age-3, 106,119 age-4, and 599 age-5 fish. Last year's preseason forecast was 330,049 age-3, 28,415 age-4, and 767 age-5 fish. The 2019 potential natural area spawner abundance forecast is 87,893 adults, which is higher than last year's preseason forecast of 59,733.
- *SRWC*. The forecast of age-3 escapement absent fishing is 1,924, which is higher than last year's forecast of 1,594.

6.2.1 Objectives

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

- SRFC hatchery and natural area spawner escapement of at least 122,000 adults, which is produced, in expectation, by a maximum exploitation rate of 67.9 percent (FMP control rule). NMFS guidance provided at the March meeting included an escapement target around the upper end of the SRFC conservation objective range of 122,000–180,000 hatchery and natural area adults. NMFS provided more specific guidance at the April meeting to target a hatchery and natural area spawner escapement of at least 160,000 adults.
- KRFC natural area spawner escapement of at least 40,700 adults, which is produced, in expectation, by a maximum exploitation rate of 53.7 percent (FMP control rule). NMFS guidance provided at the March meeting included targeting spawner escapement levels greater than 40,700 (S_{MSY}). At the April meeting, NMFS modified its guidance to target the control-rule defined minimum spawner objective rather than exceeding it.
- NMFS consultation standards and annual guidance for ESA-listed stocks as provided in Section 4.0 above. Relevant stocks for the area south of Cape Falcon include SRWC, California coastal Chinook, SRW fall Chinook, and LCR natural tule Chinook.

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.

- *SRFC*. The adopted management measures have a projected escapement of 160,159, which exceeds the control rule-defined minimum of 122,000 hatchery and natural area adult spawners and

meets NMFS guidance provided at the April meeting to manage for an escapement of at least 160,000 adults.

- *KRFC.* The projected escapement is 40,700, which is consistent with the 2019 control rule-defined minimum of 40,700 natural area adult spawners.
- *SRWC.* The adopted management measures result in a projected age-3 impact rate of 14.8 percent, which is consistent with the ESA consultation standard that (1) limits the age-3 impact rate in 2019 fisheries south of Point Arena to a maximum of 15.7 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 16.0 percent, which is consistent with the consultation standard limiting the KRFC age-4 ocean harvest rate to a maximum of 16.0 percent.
- *LCR natural tule fall Chinook.* The projected exploitation rate in the adopted management measures is 36.0 percent, below the 38.0 percent maximum for 2019.
- *SRW fall Chinook.* The adopted management measures have an ocean exploitation rate of 58.7 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 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:

- *OPI Hatchery coho.* The 2019 forecast for hatchery coho from the Columbia River and the coast south of Cape Falcon of 933,500 is higher than the 2018 forecast of 294,100. The Columbia River early coho forecast is 545,000 compared to the 2018 forecast of 164,700, and the Columbia River late coho forecast is 360,600, compared to the 2018 forecast of 121,500.
- *OCN coho.* The 2019 OCN forecast is 76,100 compared to the 2018 forecast of 54,900.
- *LCN coho.* The 2019 LCN forecast is 36,900 compared to the 2018 forecast of 29,100.
- *Puget Sound coho.* Among Puget Sound natural stocks, Strait of Juan de Fuca coho are in the critical category in 2019. Skagit, Snohomish, and Hood Canal coho are in the low category. Stillaguamish coho are in the normal category.
- *Interior Fraser (Thompson River) coho.* This Canadian stock continues to be depressed, but will not constrain ocean coho fisheries north of Cape Falcon in 2019.
- *Washington coastal wild coho.* 2019 forecasts for most Washington coastal coho stocks are higher compared to 2018. Quileute fall, Hoh, Queets, and Grays Harbor coho are in the abundant category under the PST Southern Coho Management Plan.

7.1 Objectives

Key coho management objectives shaping management measures in 2019 Council area fisheries are:

- NMFS consultation standards and annual guidance for ESA-listed stocks are provided in Section 4.0. Relevant stocks include Central California Coast coho (south of the Oregon/California border), Southern Oregon/Northern California Coastal (SONCC) coho, OCN coho, and LCN coho. The

maximum allowable exploitation rates for 2019 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 marine exploitation rate not to exceed 13.0 percent for Rogue/Klamath hatchery coho, used as a surrogate for the SONCC coho ESU. Furthermore, coho retention is prohibited in all California ocean fisheries.

- FMP conservation objectives and obligations under Section 5.2 of the PST Southern Coho Management Plan for stocks originating along the Washington coast, Puget Sound, and British Columbia. The forecasts for some Puget Sound coho stocks and for Interior Fraser coho in 2019 are low; however, the majority of the exploitation on these stocks occurs in Puget Sound and were addressed in development of fishing seasons for inside waters during the North of Falcon co-management process by the state and tribes. 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.

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 RK coho. Table 8 provides expected coho mark rates for west coast fisheries by month. Table 12 provides an assessment of stock status.

- *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 4.2 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 12.3 percent and a freshwater exploitation rate of 1.4 percent.
- *Washington coastal wild coho.* The adopted management measures provide ocean escapement numbers of 65,900, 9,100, 5,800, and 13,700 for Grays Harbor, Queets, Hoh, and Quillayute natural coho respectively. These ocean escapement levels, when combined with scheduled in-river fisheries, meet FMP management objectives or objectives agreed to by WDFW and the treaty tribes for Grays Harbor, Queets, Hoh, and Quillayute.
- *Interior Fraser coho.* The Southern U.S. exploitation rates in the adopted management measures total 9.1 percent, which complies with the 10.0 percent maximum required by the PST Southern Coho Management Plan.

The adopted management measures for coho fisheries satisfy NMFS ESA consultation standards and guidance, FMP objectives, and all other objectives for relevant coho stocks other than and including those listed in Table 5.

8.0 PINK SALMON MANAGEMENT

Pink salmon merit management consideration in 2019. Impacts on Chinook and coho in pink-directed fisheries were part of negotiations to reach a final agreement in north of Cape Falcon ocean and Puget Sound fisheries.

9.0 IMPORTANT FEATURES OF THE ADOPTED MANAGEMENT MEASURES

Significant changes from recent seasons are highlighted below, but this section is not intended to be a comprehensive description of the adopted management measures. For detailed information on the adopted ocean salmon seasons see Table 1 (non-Indian commercial), Table 2 (recreational), and Table 3 (treaty Indian).

Adopted management measures in the area north of Cape Falcon were shaped to meet NMFS consultation standards and annual guidance for Chinook stocks of concern. The 2019 Chinook TAC is decreased relative to 2018 due to a slightly lower abundance of LCR natural tule Chinook and to help meet overall conservation objectives for Puget Sound Chinook. The 2019 coho TAC is increased relative to 2018 due to higher abundance forecasts for Columbia River and coastal Washington coho stocks.

Fisheries south of Cape Falcon are primarily constrained by SRFC and California coastal Chinook. The adopted management measures reflect NMFS guidance to achieve, in expectation, a minimum hatchery and natural area escapement of 160,000 SRFC adults.

9.1 Commercial

North of Cape Falcon, the non-Indian troll Chinook quota is split almost evenly between the spring (May-June) fishery and the summer fishery (July-September). Chinook subarea guidelines apply to the area between the U.S./Canada border and the Queets River, and to the area between Leadbetter Point and Cape Falcon during the spring fishery. Landing and possession limits per vessel per landing week (defined as Thursday through Wednesday) are in effect for some areas during the spring fishery. The non-Indian commercial Chinook quota of 26,250 is decreased slightly compared to 27,500 Chinook quota in 2018. The non-Indian commercial coho quota of 30,400 is increased relative to the 2018 quota of 5,600 coho.

The spring fishery in the area north of Cape Falcon will be open for Chinook seven days per week May 6 through June 28. Chinook landing and possession limits 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. Coho retention is not allowed during the spring fishery.

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.

For the Oregon coast between Cape Falcon and Humbug Mountain, Chinook fisheries will be open beginning April 20, most of May and then continuously through late August. Weekly landing and possession limits will be in place for September and October.

For the Oregon portion of the KMZ, from Humbug Mountain to the Oregon/California border, the season will be open for portions of April and May, followed by monthly quotas in June, July, and August. The summer quota fisheries have weekly landing and possession limits. For the California portion of the KMZ, from the Oregon/California border to Humboldt South Jetty, there will be monthly quotas in June, July, and August. The quota fisheries will be open five days per week with daily landing and possession limits. The commercial fishery is closed between Humboldt South Jetty and Horse Mountain.

The fishery from Horse Mountain to Point Arena, the Fort Bragg management area, will be open for most of June, three weeks in July, and nearly all of August.

The San Francisco management area, from Point Arena to Pigeon Point, will open in mid-May. Season dates in June, July, and August are identical to the season dates in Fort Bragg. The fishery will also be open for the month of September, and the Monday through Friday fall area target zone fishery between Point Reyes and Point San Pedro will occur during the first half of October.

Fisheries south of Pigeon Point will be open for all of May, most of June, and three weeks in July.

9.2 Recreational

The recreational fishery north of Cape Falcon will open for all salmon on June 22 in all areas and will continue through September 30, or when Chinook subarea guidelines or coho subarea quotas are attained. All subareas are open seven days per week. Daily bag limits of two salmon include only one Chinook in subareas south of the Queets River; in subareas north of the Queets River, up to two Chinook are allowed. The recreational Chinook quota of 26,250 is decreased compared to 27,500 Chinook quota in 2018. The recreational coho quota of 159,600 is increased relative to the 2018 quota of 42,000 coho. All coho must be marked with a healed adipose fin clip.

For the north and central Oregon coast south of Cape Falcon, the Chinook fishery opened March 15 and will run uninterrupted through October. Coho fisheries consist of a mark-selective coho quota beginning on June 22 and a non-mark-selective coho quota beginning on August 31 in the area from Cape Falcon to Humbug Mountain.

For both the Oregon and California KMZ, the season will run from Saturday of the Memorial Day weekend through Labor Day. The minimum size limit will be 24 inches in the Oregon KMZ and 20 inches in the California KMZ.

The area from Horse Mountain to Pigeon Point, which includes the Fort Bragg and San Francisco management areas, will be open for the second half of April. After a closure during the first half of May, the fishery will re-open on May 18 and run continuously through the end of October. The minimum size limit in the Fort Bragg area will be 20 inches for the entire season. In the San Francisco area, the minimum size limit will be 24 inches through the end of April, then 20 inches for the rest of the season.

South of Pigeon Point, the season will be open from April 6 through August 28 with a 24 inch minimum size limit.

9.3 Treaty Indian

The adopted management measures for Chinook fisheries are generally similar in structure to recent years, and coho retention is allowed in the summer season. The Treaty Indian troll fishery opens on May 1 with a Chinook only fishery and runs through June 30 with a 17,500 sub-quota. The summer fishery opens on July 1 and runs through September 15 with a sub-quota of 17,500 Chinook and 55,000 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 reflect a net loss, 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.

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 catch per unit effort (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 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, in 2018 there were deliveries of salmon: (1) caught between Cape Falcon and Humbug Mountain to landing ports in the Oregon KMZ region, (2) caught between Point Arena and Pigeon Point to landing ports in the Fort Bragg region, and (3) 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 include relatively small amounts occurring in state waters only (SWO) fisheries off central and southern Oregon. 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 in the coming season. Coastwide average Chinook weight per fish in 2018 was three percent higher than the prior year but slightly lower than the recent five-year average; while coastwide average Chinook exvessel prices in 2018 were 14 percent lower than the prior year but the fourth highest in inflation-adjusted terms since 1976. If this year's actual average weight per fish or exvessel prices diverge significantly from what was observed in 2018, then salmon exvessel revenues and resulting commercial fisheries income impacts projected in this document may prove to be correspondingly biased. Unless otherwise noted, the economic effects of the commercial and recreational fisheries summarized below are compared in terms of estimated community income impacts.

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 though management measures may actually be relatively more constraining, or *vice-versa*. Estimated effort includes relatively small amounts occurring in SWO fisheries off central and southern Oregon.

Recreational fishery effort north of Cape Falcon was estimated using historical CPUE estimates ("success rates") applied to salmon quotas and expected harvest levels. Adopted coho quotas north of Cape Falcon for the summer mark-selective coho fishery are much higher than last year's, which were lower than recent years' averages. The adopted quota for Chinook is slightly reduced from last year, and restrictive compared

with the recent past. Projections of recreational catch north of Cape Falcon were made by multiplying the proposed quotas for the two species by the historic shares of the quotas that were actually caught. 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 the Proposed Action.

10.2 Community Impacts

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 impacts under the Proposed Action with impacts under Alternatives I, II and III are summarized in Table 11. Projected coastwide income impacts from commercial salmon landings and processing under the Proposed Action are near the top of the range analyzed under the Alternatives, and overall are approximately 96 percent higher than estimated total coastwide commercial fisheries income impacts last year (Figure 3 and Table 11). Regionally the picture is somewhat mixed, with income impacts from commercial salmon fisheries under the Proposed Action projected to be considerably above last year's levels in all regions except the California KMZ (Oregon/California Border to Horse Mountain) where they are projected to be 22 percent below last year's level. With respect to the 2014-2018 inflation-adjusted average, income impacts from commercial salmon fisheries under the Proposed Action are projected to be 42 percent higher overall coastwide and at least 23 percent above the 2014-2018 inflation-adjusted average in all regions along the coast, except 12 percent lower North of Cape Falcon and three percent lower between Cape Falcon and Humbug Mountain (Figure 3 and Table 11).

Projected income impacts from expenditures by recreational salmon anglers under the Proposed Action are near the top of the range analyzed under the Alternatives, and overall are about 67 percent above the estimated total coastwide recreational fisheries income impacts from last year's activity (Table 11 and Figure 4). Regionally the picture is mostly positive, with recreational fisheries income impacts under the Proposed Action projected to be 13 percent lower than last year's level in the area from Point Arena to Pigeon Point but at least 33 percent above last year's levels in all other regions, respectively. Compared with the 2014-2018 inflation-adjusted average, recreational fisheries income impacts under the Proposed Action are projected to be 56 percent higher overall coastwide, and higher in every region, although only five percent above the 2014-2018 inflation-adjusted average in the area from Point Arena to Pigeon Point (Figure 4 and Table 10, Table 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 to the degree change in these indicators correlates with potential change in income. 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 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 remain consistent throughout the season in most areas, which, in addition to biological benefits, tend to increase regulatory compliance. Efforts were made to accommodate important cultural events such as the 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 in an effort 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 somewhat improved ocean salmon fishery opportunities compared with 2018 (Table 6). The Klamath River tribal share under the Proposed Action is 32,401 adult KRFC, a substantial increase from the 2018, 2017 and 2016 allocations of 18,122, 814 and 7,404 adult KRFC, respectively.

11.0 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The Proposed Action, adoption of the 2019 ocean salmon regulations, 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 fall outside the range of impacts under the Alternatives in Preseason Report II, such impacts result from shaping fisheries within Puget Sound, 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 2018. Although not true for all regions, relative to No Action (as represented by the 2018 values) the Proposed Action would provide greater overall coastwide income impacts from both commercial and recreational fishing (Table 11).

As stated in Preseason Report II, 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.

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A. SEASON DESCRIPTIONS
North of Cape Falcon
Supplemental Management Information
1. Overall non-Indian TAC: 52,500 Chinook and 190,000 coho marked with a healed adipose fin clip (marked). 2. Non-Indian commercial troll TAC: 26,250 Chinook and 30,400 marked coho
Model run: Coho1925, Chin2719
U.S./Canada Border to Cape Falcon • May 6 through the earlier of June 28, or 13,200 Chinook. No more than 5,000 of which may be caught in the area between the U.S./Canada border and the Queets River, and no more than 1,800 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: May 6-15 the landing and possession limit is 100 Chinook per vessel for the open period. May 16-June 28 the landing and possession limit is 50 Chinook per vessel per landing week (Thurs.-Wed.) (C.1, C.6). In the area between Leadbetter Pt. and Cape Falcon: May 6-15 the landing and possession limit is 100 Chinook per vessel for the open period. During May 16-June 28 the landing and possession limit is 50 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 28 inches total length (B). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). When it is projected that approximately 60% of the overall Chinook guideline has been landed, approximately 60% of the Chinook subarea guideline has been landed in the area between the U.S./Canada border and the Queets River, or approximately 60% of the Chinook subarea guideline has been landed in the area between Leadbetter Pt. and Cape Falcon, inseason action will be considered to ensure the guideline is not exceeded.
U.S./Canada Border to Cape Falcon • July 1 through the earlier of September 30, or 13,050 Chinook or 30,400 marked coho (C.8). Open seven days per week. All salmon. Chinook minimum size limit of 28 inches total length. Coho minimum size limit of 16 inches total length (B, C.1). All coho must be marked with a healed adipose fin clip (C.8.d). No chum retention north of Cape Alava, Washington in August and September (C.4, C.7). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Landing and possession limit of 150 marked coho per vessel per landing week (Thurs.-Wed.) (C.1).
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 12, 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 license. Vessels may not land fish east of the Sekiu River or east of the Megler-Astoria bridge. 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 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 must notify ODFW within one hour of delivery or prior to transport away from the port of landing by either calling 541-867-0300 ext. 271 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). 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.

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A. SEASON DESCRIPTIONS

South of Cape Falcon

Supplemental Management Information

1. Sacramento River fall Chinook spawning escapement of 160,159 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 57.8%.
3. Klamath River recreational fishery allocation: 7,637 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 32,401 adult Klamath River fall Chinook.
5. CA/OR share of Klamath River fall Chinook commercial ocean harvest: 70% / 30%.
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 California Fish and Game Commission.

Cape Falcon to Humbug Mt.

- April 20-30;
- May 6-30;
- June 1-August 29;
- 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 compliance requirements (C.1), and 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 2020, 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 2019. This opening could be modified following Council review at its March 2020 meeting.

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

- April 20-30;
- May 6-30;
- June 1 through the earlier of June 30, or a 3,200 Chinook quota;
- July 1 through the earlier of July 31, or a 2,500 Chinook quota;
- August 1 through the earlier of August 29, or a 1,200 Chinook quota (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). 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 29 weekly landing and possession limit of 50 Chinook per vessel per landing 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 (June, July, and August), 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 541-867-0300 Ext. 252 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 2020, 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 2019. This opening could be modified following Council review at its March 2020 meeting.

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

- June 1 through the earlier of June 30, or a 2,500 Chinook quota;
- July 1 through the earlier of July 30, or a 2,500 Chinook quota;
- August 2 through the earlier of August 31, or a 2,000 Chinook quota (C.9.b).

Open five days per week (Fri.-Tue.). All salmon except coho (C.4, C.7). 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).

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, 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 additional closures adjacent to the Smith and Klamath rivers.

Humboldt South Jetty to Horse Mt.

- 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).

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A. SEASON DESCRIPTIONS

Horse Mt. to Point Arena (Fort Bragg)
- June 4-30;
- July 11-31;
- August 1-28 (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.

All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., August 30 (C.6).

When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6).

In 2020, the season will open April 16-30 for all salmon except coho, with a 27 inch Chinook minimum size limit and the same gear restrictions as in 2019. All salmon caught in the area must be landed in the area. This opening could be modified following Council review at its March 2020 meeting.

Point Arena to Pigeon Point (San Francisco)
- May 16-31;
- June 4-30;
- July 11-31;
- August 1-28;
- 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 (B, C.1). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). All salmon must be landed in California.

All salmon caught in the area prior to September 1 must be landed and offloaded no later than 11:59 p.m., August 30 (C.6).

When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6).

Point Reyes to Point San Pedro (Fall Area Target Zone)
- October 1-4, 7-11, 14-15.

Open five days per week (Mon.-Fri.). All salmon except coho (C.4, C.7). Chinook minimum size limit of 27 inches total length (B, C.1). All salmon caught in this area must be landed between Point Arena and Pigeon Point (C.6). See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3).

Pigeon Point to U.S./Mexico Border (Monterey)
- May 1-31;
- June 4-30;
- July 11-31 (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.

All salmon caught in the area must be landed and offloaded no later than 11:59 p.m., August 5 (C.6).

When the CA KMZ fishery is open, all fish caught in the area must be landed south of Horse Mountain until the CA KMZ fishery has been closed for at least 24 hours (C.6).

For all commercial troll fisheries In California: 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).

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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	28	21.5	16	12	None
Cape Falcon to Humbug Mt.	28	21.5	-	-	None
Humbug Mt. to OR/CA Border	28	21.5	-	-	None
OR/CA Border to Humboldt South Jetty	27	20.5	-	-	27
Horse Mt. to Pt. Arena	27	20.5	-	-	27
Pt. Arena to Pigeon Pt.	27	20.5	-	-	27
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.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

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C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.5. Control Zone Definitions (continued):

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).

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

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

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

C.7. Incidental Halibut Harvest: During authorized periods, the operator of a vessel that has been issued an incidental halibut harvest license may retain Pacific halibut caught incidentally in Area 2A while trolling for salmon. Halibut retained must be no less than 32 inches in total length, measured from the tip of the lower jaw with the mouth closed to the extreme end of the middle of the tail, and must be landed with the head on. When halibut are caught and landed incidental to commercial salmon fishing by an IPHC license holder, any person who is required to report the salmon landing by applicable state law must include on the state landing receipt for that landing both the number of halibut landed, and the total dressed, head-on weight of halibut landed, in pounds, as well as the number and species of salmon landed.

License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to mid-March 2020 for 2020 permits (*exact date to be set by the IPHC in early 2020*). Incidental harvest is authorized only during April, May, and June of the 2019 troll seasons, and after June 30 in 2019 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 44,899 pound 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.

May 1, 2019 until the end of the 2019 salmon troll season, and April 1-30, 2020, license holders may land or possess no more than one Pacific halibut per two Chinook, except one halibut may be possessed or landed without meeting the ratio requirement, and no more than 35 halibut may be possessed or landed per trip. 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 2019, prior to any 2019 inseason action, will be in effect when incidental Pacific halibut retention opens on April 1, 2020 unless otherwise modified by inseason action at the March 2020 Council meeting.

TABLE 1. 2019 Commercial troll management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 6 of 6)

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

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. At the March 2020 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2019).
- 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.

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 Horse Mountain, California.

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.	Horse Mountain, CA	40°05′00″ N lat.
Queets River, WA	47°31′42″ N lat.	Point Arena, CA	38°57′30″ N lat.
Leadbetter Point, WA	46°38′10″ N lat.	Point Reyes, CA	37°59′44″ N lat.
Cape Falcon, OR	45°46′00″ N lat.	Point San Pedro, CA	37°35′40″ N lat.
Florence South Jetty, OR	44°00′54″ N lat.	Pigeon Point, CA	37°11′00″ N lat.
Humbug Mountain, OR	42°40′30″ 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.

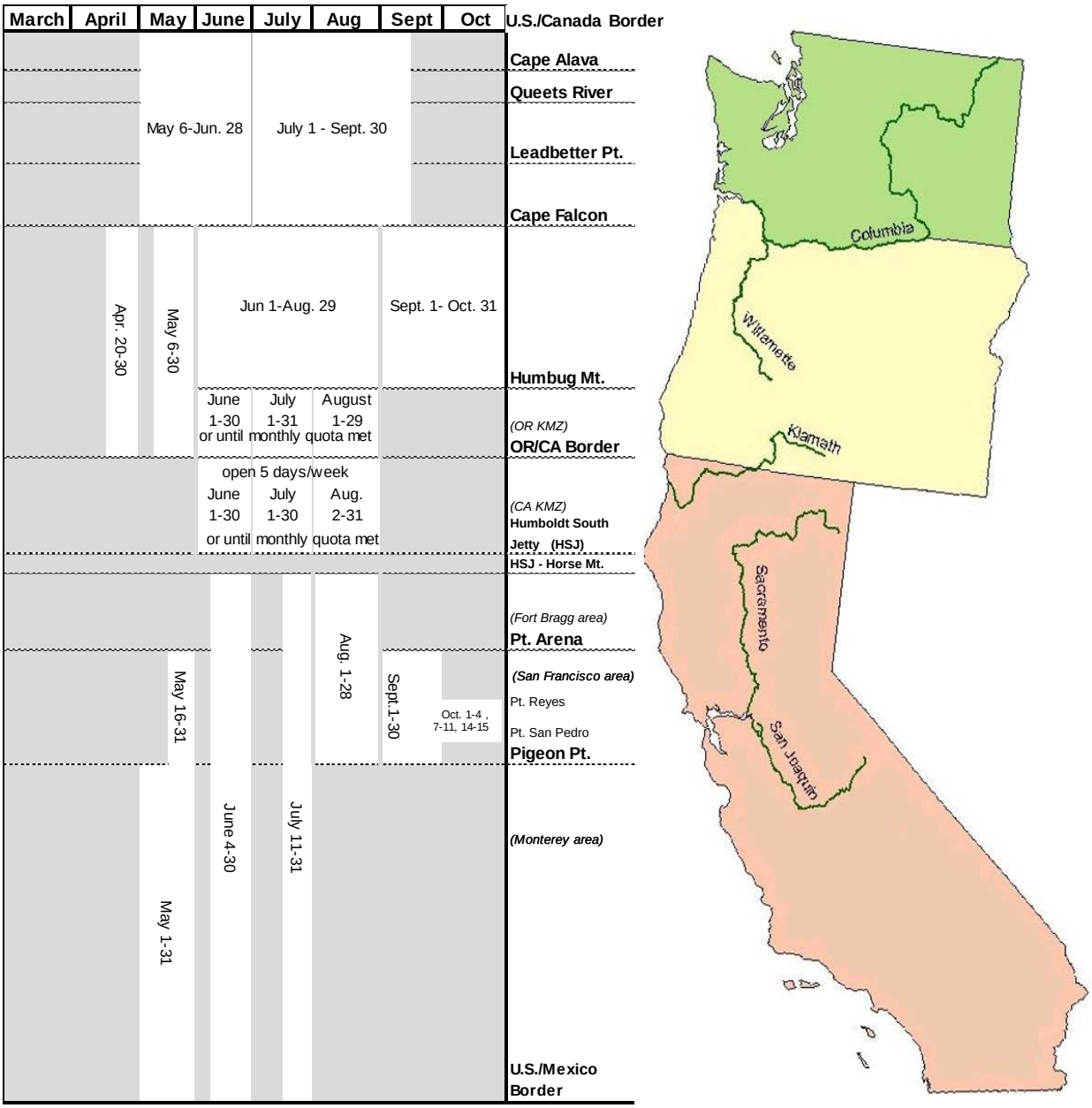


FIGURE 1. 2019 non-Indian commercial salmon seasons – Council adopted.

TABLE 2. 2019 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: 52,500 Chinook and 190,000 coho marked with a healed adipose fin clip (marked). 2. Recreational TAC: 26,250 Chinook and 159,600 marked coho; all retained coho must be marked. 3. No Area 4B add-on fishery. 4. Buoy 10 fishery opens August 1 with an expected landed catch of 50,000 marked coho in August and September
U.S./Canada Border to Cape Alava (Neah Bay Subarea) • June 22 through earlier of September 30, or 16,600 marked coho subarea quota, with a subarea guideline of 5,200 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 (B, 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).
Cape Alava to Queets River (La Push Subarea) • June 22 through earlier of September 30, or 4,050 marked coho subarea quota, with a subarea guideline of 1,100 Chinook (C.5). • October 1 through earlier of October 13, or 100 marked coho quota, or 100 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. All salmon, two salmon per day. All coho must be marked with a healed adipose fin clip (C.1). See gear restrictions and definitions (B, 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).
Queets River to Leadbetter Point (Westport Subarea) • June 22 through earlier of September 30, or 59,050 marked coho subarea quota, with a subarea guideline of 12,700 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 (B, C.1). See gear restrictions and definitions (C.2, C.3). Grays Harbor Control Zone closed beginning August 12 (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 22 through earlier of September 30, or 79,800 marked coho subarea quota, with a subarea guideline of 7,150 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 (B, C.1). See gear restrictions and definitions (C.2, C.3). 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. 2019 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 2 of 5)

A. SEASON DESCRIPTIONS

South of Cape Falcon

Supplemental Management Information

1. Sacramento River fall Chinook spawning escapement of 160,159 hatchery and natural area adults.
2. Sacramento Index exploitation rate of 57.8%.
3. Klamath River recreational fishery allocation: 7,637 adult Klamath River fall Chinook.
4. Klamath tribal allocation: 32,401 adult Klamath River fall Chinook.
5. Overall recreational coho TAC: 90,000 coho marked with a healed adipose fin clip (marked), and 9,000 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-October 31 (C.6), except as provided below during the all-salmon mark-selective fishery and the non-mark-selective coho fishery (C.5).

Open seven days per week. All salmon except coho, 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 2020, 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 meeting.

Cape Falcon to OR/CA Border

Mark-selective coho fishery:

- June 22 through the earlier of August 25, or 90,000 marked coho quota.

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 Humbug Mt.

Non-mark-selective coho fishery:

- August 31-September 30, open each Friday through Sunday, or 9,000 non-mark-selective coho quota (C.6). Open days may be modified inseason (C.5).

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)

- May 25-September 2 (C.6).

Open seven days per week. All salmon except coho, except as described above in the "Cape Falcon to OR/CA Border all-salmon mark-selective coho fishery." 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. 2019 Recreational management measures for non-Indian ocean salmon fisheries - Council adopted. (Page 3 of 5)

A. SEASON DESCRIPTIONS

OR/CA Border to Horse Mt. (California KMZ)

- May 25-September 2 (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.

Horse Mt. to Point Arena (Fort Bragg)

- April 13-30;
- May 18-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 2020, season opens April 4 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 meeting.

Point Arena to Pigeon Point (San Francisco)

- April 13-30;
- May 18-October 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 through April 30, then 20 inches thereafter (B). See gear restrictions and definitions (C.2, C.3).

In 2020, season opens April 4 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 meeting.

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

- April 6-August 28 (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 2020, season opens April 4 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 2019 (C.2, C.3). This opening could be modified following Council review at its March 2020 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	24	16	None
Cape Falcon to Humbug Mt.	24	16	None
Humbug Mt. to OR/CA Border	24	16	None
OR/CA Border to Horse Mt.	20	-	20
Horse Mt. to Pt. Arena	20	-	20
Pt. Arena to Pigeon Pt. (April 13-30)	24	-	24
Pt. Arena to Pigeon Pt. (May 18-October 31)	20	-	20
Pigeon Pt. to U.S./Mexico Border	24	-	24

TABLE 2. 2019 Recreational management Alternatives 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. *Horse Mt., 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).

TABLE 2. 2019 Recreational management Alternatives for non-Indian ocean salmon fisheries - Council adopted. (Page 5 of 5)

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

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

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.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 Oregon/California 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.

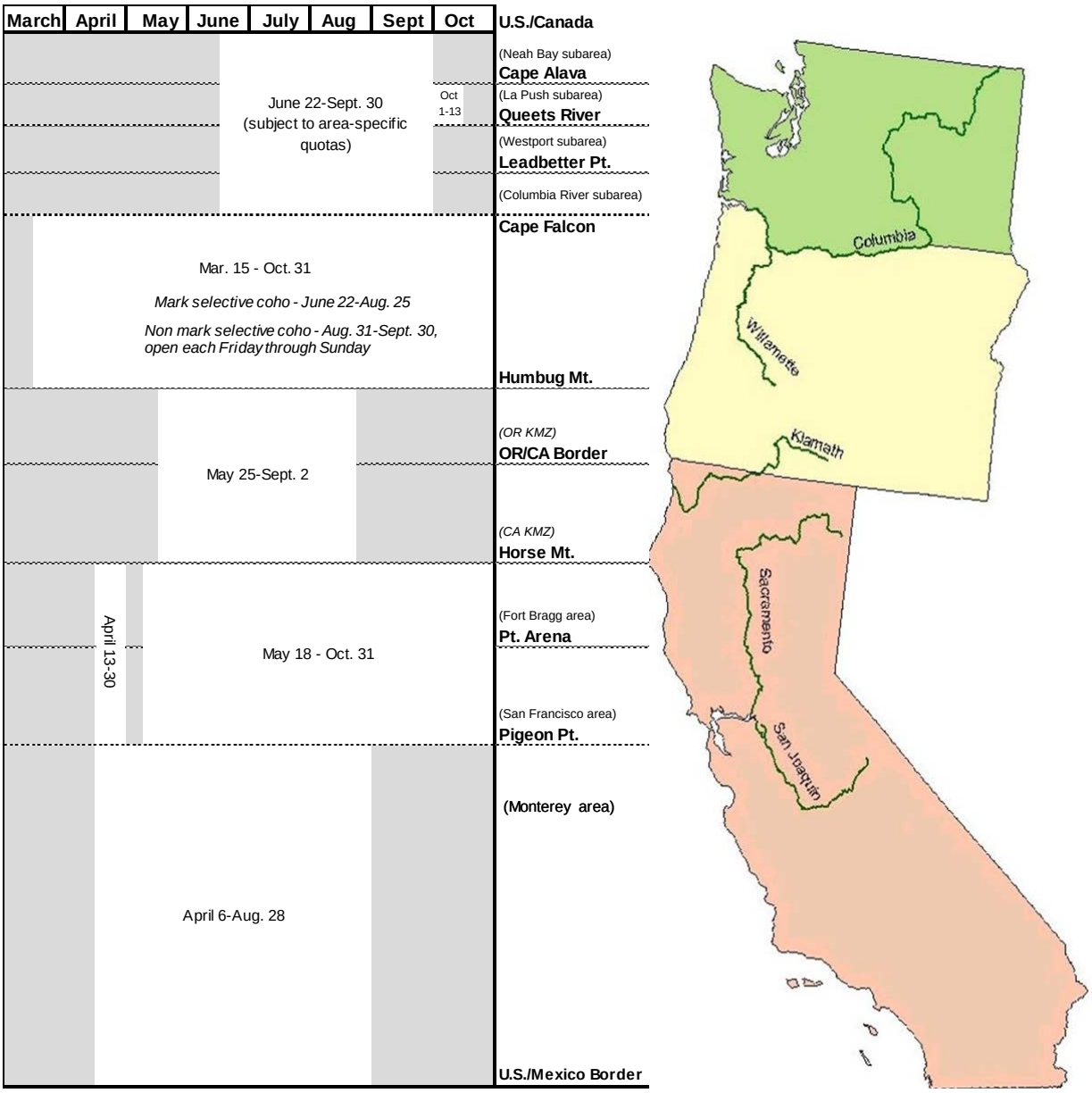


FIGURE 2. 2019 recreational salmon seasons – Council adopted.

TABLE 3. 2019 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: 35,000 Chinook and 55,000 coho.

- May 1 through the earlier of June 30 or 17,500 Chinook quota.

All salmon may be retained except coho. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season (C.5). See size limit (B) and other restrictions (C).

- July 1 through the earlier of September 15, or 17,500 Chinook quota or 55,000 coho quota

All salmon. See size limit (B) and other restrictions (C).

B. MINIMUM SIZE (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 2019 season (estimated harvest during the October ceremonial and subsistence fishery: 20 Chinook; 40 coho).

TABLE 3. 2019 Treaty Indian ocean troll management measures for ocean salmon fisheries - Council adopted. (Page 2 of 2)

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

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 2019 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)	17,500	-
U.S./Canada Border to Cape Falcon (All Species)	17,500	55,000
Subtotal Treaty Indian Ocean Troll	35,000	55,000
NON-INDIAN COMMERCIAL TROLL[b/]		
U.S./Canada Border to Cape Falcon (All Except Coho)	13,200	-
U.S./Canada Border to Cape Falcon (All Species)	13,050	30,400
Subtotal Non-Indian Commercial Troll	26,250	30,400
RECREATIONAL		
U.S./Canada Border to Cape Alava[b/]	5,200	16,600
Cape Alava to Queets River[b/]	1,200	4,150
Queets River to Leadbetter Pt.[b/]	12,700	59,050
Leadbetter Pt. to Cape Falcon[b/c/]	7,150	79,800
Subtotal Recreational	26,250	159,600
TOTAL NORTH OF CAPE FALCON	87,500	245,000
SOUTH OF CAPE FALCON		
COMMERCIAL TROLL[a/]		
Humbug Mt. to OR/CA Border	6,900	-
OR/CA Border to Humboldt South Jetty	7,000	-
Subtotal Troll	13,900	-
RECREATIONAL		
Cape Falcon to OR/CA Border	-	99,000 [d/]
TOTAL SOUTH OF CAPE FALCON	13,900	99,000

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 10,700 Chinook and 50,000 marked coho.
d/ The quota consists of both mark-selective and non-mark-selective quotas of 90,000 and 9,000, respectively.

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2019 ocean salmon fishery management measures - Council adopted.[a/] (Page 1 of 4)

Key Stock/Criteria	Projected	2019 Criteria	Spawner Objective or Other Comparative Standard as Noted[b/]
CHINOOK	**CHINOOK**		**CHINOOK**
PUGET SOUND:			
Elwha Summer/Fall	1.4%	≤ 10.0%	Southern U.S. exploitation rate (NMFS ESA consultation standard).
Dungeness Spring	1.2%	≤ 10.0%	Southern U.S. exploitation rate (NMFS ESA consultation standard).
Mid-Hood Canal Summer/Fall	11.8%	≤ 12.0%	Preterminal Southern U.S. exploitation rate (NMFS ESA consultation standard).
Skokomish Summer/Fall	48.2%	≤ 50.0%	Total exploitation rate (NMFS ESA consultation standard).
Nooksack Spring	10.5%	≤ 10.5%	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	36.7%	--	Total exploitation rate.
	12.224	≥ 8.242	Aggregate Rebuilding abundance threshold NOR (NMFS ESA consultation standard).
	--	≤ 0.95	ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC.
Skagit Spring	32.1%	--	Total exploitation rate.
	1.616	≥ 0.841	Aggregate Rebuilding abundance threshold NOR (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	18.0%	≤ 22.0%	Rebuilding exploitation rate (NMFS ESA consultation standard).
	0.53	≤ 1.00	ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC.
Snohomish Summer/Fall	15.8%	≤ 20.0%	Rebuilding exploitation rate (NMFS ESA consultation standard).
	0.55	≤ 1.00	ISBM obligation applicable, as this stock lacks a CTC agreed escapement goal. Compliance assessed postseason by the PSC.
Lake Washington Summer/Fall	0.844	≥ 0.500	Natural-origin escapement in the Cedar River (NMFS ESA consultation standard).
Green River Summer/Fall	2.161	≥ 1.200	Natural-origin spawning escapement (NMFS ESA consultation standard).
White River Spring	16.7%	≤ 22.0%	Southern U.S. exploitation rate (NMFS ESA consultation standard).
Puyallup Summer/Fall	1.115	≥ 0.750	Natural-origin spawning escapement (NMFS ESA consultation standard).
Nisqually River Summer/Fall	47.0% (48.7%)	≤ 47.0% (49.0%)	Total exploitation rate, (additional 2% contingent on mark selective fishery plan for river; NMFS ESA consultation standard).
Puget Sound Spring	1.8%	≤ 3.0%	Exploitation rate in PFMC fisheries (NMFS ESA consultation standard).
Puget Sound Summer/Fall	4.7%	≤ 6.0%	Exploitation rate in PFMC fisheries (NMFS ESA consultation standard).

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2019 ocean fishery management measures - Council adopted.[a/] (Page 2 of 4)

Key Stock/Criteria	Projected	2019 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
CHINOOK	**CHINOOK**		**CHINOOK**
WASHINGTON COAST:			
Hoko Fall	2.32	0.85	FMP MSY spawning escapement objective.
	2.4%	≤ 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	162.6	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.
	--	≤ 0.85	ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC.
Mid-Columbia Brights	66.4	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[e/]	55.1	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)	36.0%	≤ 38.0%	Total adult equivalent fishery exploitation rate (2019 NMFS ESA guidance).
Columbia Lower River Wild[c/] (threatened)	14.1	6.9	Minimum ocean escapement to attain MSY spawner goal of 5.7 for N. Lewis River fall Chinook (NMFS ESA consultation standard).
	--	≤ 0.85	ISBM obligation not applicable, escapement goal expected to be met. Compliance assessed postseason by the PSC.
Spring Creek Hatchery Tules	48.4	8.2	Minimum ocean escapement to attain 6.0 adults for Spring Creek Hatchery egg-take, assuming average conversion and no mainstem harvest.
Snake River Fall (threatened) SRFI	58.7%	≤ 70.0%	Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard).
Columbia Upriver Summers	36.3	29.0	Aggregate escapement to mouth of Columbia River (2019 NMFS guidance). Minimum ocean escapement to attain 12.1 adults over Rock Island Dam.

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2019 ocean fishery management measures - Council adopted.[a/] (Page 3 of 4)

Key Stock/Criteria	Projected	2019 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	40.7	≥ 40.7	2019 minimum natural area adult escapement (FMP control rule).
Federally recognized tribal harvest	50.0%	50.0%	Equals 32.4 (thousand) adult fish for Yurok and Hoopa Valley tribal fisheries.
Exploitation (spawner reduction) rate	53.7%	≤ 53.7%	FMP control rule.
Adult river mouth return	97.9	NA	Total adults in thousands.
Age-4 ocean harvest rate	16.0%	≤ 16.0%	NMFS ESA consultation standard for threatened California Coastal Chinook.
KMZ sport fishery share	7.0%	NA	Includes 0.0 (thousand) adult fish impacted in the KMZ sport fishery during fall (Sept-Dec) 2018.
River recreational fishery share	23.6%	NA	Equals 7.6 (thousand) adult fish for recreational inriver fisheries.
Sacramento River Winter (endangered)	14.8%	≤ 15.7%	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 2019 ESA Guidance).
Sacramento River Fall	160.2	≥ 160.0	2019 minimum hatchery and natural area adult escapement (NMFS guidance).
Sacramento Index Exploitation Rate	57.8%	≤ 67.9%	FMP control rule.
Ocean commercial impacts	142.3	NA	Includes fall (Sept-Dec) 2018 impacts (6.2 thousand SRFC).
Ocean recreational impacts	48.9	NA	Includes fall 2018 impacts (7.7 thousand SRFC).
River recreational impacts	28.3	NA	Equals 12.9% of the total harvest.

TABLE 5. Projected key stock escapements (thousands of fish) or management criteria for 2019 ocean fishery management measures - Council adopted.[a/] (Page 4 of 4)

Key Stock/Criteria	Projected	2019 Criteria	Spawner Objective or Other Comparative Standard as Noted [b/]
COHO	**COHO**	**COHO**	**COHO**
Interior Fraser (Thompson River)	9.1%(5.3%)	≤ 10.0%	2019 Southern U.S. exploitation rate ceiling; PSC coho agreement.
Skagit	32.5%(4.8%)	≤ 35.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Stillaguamish	22.5%(3.4%)	≤ 50.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Snohomish	19.4%(3.4%)	≤ 40.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Hood Canal	44.3%(5.3%)	≤ 45.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Strait of Juan de Fuca	8.9%(4.2%)	≤ 20.0%	2019 total exploitation rate ceiling; FMP matrix[d/]
Quillayute Fall	13.7	6.3	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Hoh	5.8	2.0	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Queets Wild	9.1	5.8	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Grays Harbor	65.9	24.4	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Willapa Bay Natural	56.3	17.2	FMP MSY adult spawner estimate. Value depicted is ocean escapement.
Lower Columbia River Natural (threatened)	18.0%	≤ 23.0%	Total marine and mainstem Columbia R. fishery exploitation rate (NMFS ESA guidance).
Upper Columbia	63%	≥ 50%	Minimum percentage of the run to Bonneville Dam.
Columbia River Hatchery Early	340.5	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	213.3	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	13.7%	≤ 15.0%	Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard).
Southern Oregon/Northern California Coast (threatened)	5.8%	≤ 13.0%	Marine fishery exploitation rate for R/K hatchery coho (NMFS ESA consultation standard).

a/ Reflects 2019 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 exploitation rates 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 include marine and mainstem Columbia River impacts. Exploitation rates for OCN coho represent marine and freshwater impacts. 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 minor contributions from East Fork Lewis River and Sandy River.

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.

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2019 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 2018 Catch	Observed in 2018 Bycatch Mortality
OCEAN FISHERIES:		**CHINOOK (thousands of fish)**			
NORTH OF CAPE FALCON					
Treaty Indian Ocean Troll	35.0	3.6	9.0	23.7	2.5
Non-Indian Commercial Troll	26.2	10.8	38.5	23.9	11.8
Recreational	26.2	4.3	22.4	10.6	1.8
CAPE FALCON TO HUMBUG MT.[c/]					
Commercial Troll	61.8	21.0	63.6	20.2	8.2
Recreational	7.6	1.2	4.8	2.7	0.2
HUMBUG MT. TO OR/CA BORDER[c/]					
Commercial Troll	8.1	2.7	8.3	3.9	1.9 [e/]
Recreational	3.7	0.6	2.3	1.6	0.5 [e/]
OR/CA BORDER TO HORSE MT.[d/]					
Commercial Troll	7.0	2.4	7.2	9.0	4.4 [e/]
Recreational	8.5	1.3	5.4	3.7	1.2 [e/]
HORSE MT. TO PT. ARENA					
Commercial Troll	68.5	23.2	70.5	10.6	4.9 [e/]
Recreational	6.8	1.1	4.4	5.6	1.0 [e/]
PT. ARENA TO PIGEON PT.					
Commercial Troll	64.9	22.0	66.8	39.5	15.5 [e/]
Recreational	35.0	5.5	21.4	72.0	10.8 [e/]
SOUTH OF PIGEON PT.					
Commercial Troll	27.4	9.3	28.2	19.4	1.8 [e/]
Recreational	10.6	1.7	6.5	5.7	0.6 [e/]
TOTAL OCEAN FISHERIES					
Commercial Troll	299.0	95.0	292.1	150.1	51.0
Recreational	98.5	15.6	67.3	101.9	16.1
INSIDE FISHERIES:					
Area 4B	-	-	-	-	-
Buoy 10	10.7	1.9	9.0	11.6	5.0 [e/]

TABLE 6. Preliminary projections of Chinook and coho harvest impacts for 2019 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 2018 Catch	Observed in 2018 Bycatch Mortality
OCEAN FISHERIES:		**COHO (thousands of fish)**			
NORTH OF CAPE FALCON					
Treaty Indian Ocean Troll[f/]	55.0	3.4	5.4	11.3	0.7
Non-Indian Commercial Troll	30.4	10.4	32.3	1.4	0.4
Recreational	159.6	24.8	101.1	41.8	11.3
SOUTH OF CAPE FALCON					
Commercial Troll	-	11.4	43.8	-	1.9
Recreational[f/]	99.0	20.1	88.2	18.5	9.4
TOTAL OCEAN FISHERIES					
Commercial Troll	85.4	25.2	81.5	12.7	3.0
Recreational	258.6	44.9	189.3	60.3	20.7
INSIDE FISHERIES:					
Area 4B	-	-	-	-	-
Buoy 10	50.0	8.7	32.7	6.8	1.5 [e/]

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: 15% (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/ The commecial fishery in this area is closed between Humboldt South Jetty and Horse Mountain.

e/ Based on reported released Chinook or coho. Reported releases in California fisheries are used as a surrogate in Oregon fisheries.

f/ Includes fisheries that allow retention of all legal sized coho.

TABLE 7. Expected coastwide lower Columbia Natural (LCN), Oregon coastal natural (OCN), and Rogue/Klamath (RK) coho, and Lower Columbia River (LCR) natural tule Chinook exploitation rates by fishery for 2019 ocean salmon fisheries - Council adopted.

	Exploitation Rate (Percent)			
Fishery	LCN Coho	OCN Coho	RK Coho	LCR Tule
SOUTHEAST ALASKA	0.0%	0.0%	0.0%	1.6%
BRITISH COLUMBIA	0.2%	0.5%	0.3%	11.9%
PUGET SOUND/STRAIT/BAY	0.1%	0.0%	0.0%	0.7%
NORTH OF CAPE FALCON				
Treaty Indian Ocean Troll	2.7%	0.6%	0.0%	2.0%
Recreational	5.0%	0.9%	0.1%	4.5%
Non-Indian Troll	1.5%	0.3%	0.0%	5.3%
SOUTH OF CAPE FALCON				
Recreational:				0.2%
Cape Falcon to Humbug Mt.	3.4%	7.0%	0.4%	
Humbug Mt. to OR/CA border (KMZ)	0.1%	0.4%	0.8%	
OR/CA border to Horse Mt. (KMZ)	0.0%	0.3%	1.1%	
Fort Bragg	0.0%	0.2%	0.6%	
South of Pt. Arena	0.0%	0.1%	0.2%	
Troll:				1.5%
Cape Falcon to Humbug Mt.	0.7%	0.9%	0.2%	
Humbug Mt. OR/CA border (KMZ)	0.0%	0.1%	0.2%	
OR/CA border to Horse Mt. (KMZ)	0.0%	0.2%	0.8%	
Fort Bragg	0.0%	0.4%	1.0%	
South of Pt. Arena	0.0%	0.3%	0.2%	
BUOY 10	1.8%	0.1%	-	8.2%
ESTUARY/FRESHWATER	2.4%	1.4%	-	
TOTAL	18.0%	13.7%	5.8%	36.0%

TABLE 8. 2019 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	50%	45%	38%	--
West Coast Vancouver Island	Recreational	58%	43%	46%	45%
North Georgia Strait	Recreational	57%	59%	58%	53%
South Georgia Strait	Recreational	30%	62%	48%	59%
Juan de Fuca Strait	Recreational	58%	58%	58%	52%
Johnstone Strait	Troll	--	--	--	--
NW Vancouver Island	Troll	48%	43%	41%	23%
SW Vancouver Island	Troll	49%	51%	49%	51%
Georgia Strait	Troll	--	--	--	--
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	67%	60%	56%	58%
Strait of Juan de Fuca (Area 6)	Recreational	67%	59%	59%	54%
San Juan Island (Area 7)	Recreational	--	61%	--	40%
North Puget Sound (Areas 6 & 7A)	Net	--	67%	58%	46%
Council Area					
Neah Bay (Area 4/4B)	Recreational	47%	62%	55%	57%
LaPush (Area 3)	Recreational	70%	64%	72%	54%
Westport (Area 2)	Recreational	77%	72%	65%	61%
Columbia River (Area 1)	Recreational	81%	81%	71%	72%
Tillamook	Recreational	73%	66%	61%	56%
New port	Recreational	68%	64%	60%	45%
Coos Bay	Recreational	66%	62%	53%	39%
Brookings	Recreational	63%	50%	41%	15%
Neah Bay (Area 4/4B)	Troll	53%	59%	56%	56%
LaPush (Area 3)	Troll	48%	59%	57%	58%
Westport (Area 2)	Troll	66%	63%	62%	52%
Columbia River (Area 1)	Troll	76%	74%	67%	59%
Tillamook	Troll	63%	62%	65%	54%
New port	Troll	65%	63%	60%	56%
Coos Bay	Troll	65%	62%	56%	40%
Brookings	Troll	58%	53%	54%	--
Columbia River					
Buoy 10	Recreational	--	--	--	66%

TABLE 9. Preliminary projected exvessel value by catch area under Council-adopted 2019 non-Indian commercial troll management measures compared with 2018 and the 2014-2018 average (inflation-adjusted 2018 dollars).

	Exvessel Value (thousands of dollars)[a/]			Percent Change	
Management Area	2019 Projected[b/]	2018	2014-2018 Average	From 2018 (Modeled)	From 2014-2018 Average
North of Cape Falcon	3,138	2,371	3,240	+32%	-3%
Cape Falcon to Humbug Mt.	5,901	1,908	5,497	+209%	+7%
Humbug Mt. to OR/CA Border (OR KMZ)	924	441	432	+109%	+114%
OR/CA Border to Horse Mt. (CA KMZ)	559	709	154	-21%	+263%
Horse Mt. to Pt. Arena (Fort Bragg)	5,514	848	2,591	+550%	+113%
Pt. Arena to Pigeon Pt. (SF)	6,504	3,918	3,960	+66%	+64%
South of Pigeon Pt. (MO)	3,416	2,390	1,439	+43%	+137%
Total South of Cape Falcon	22,818	10,213	14,073	+123%	+62%
West Coast Total	25,956	12,584	17,312	+106%	+50%

a/ Exvessel value estimates are not comparable to the community income impacts shown in Table 10.
b/ 2019 projections are based on expected catches in the Council management areas, 2018 exvessel prices and 2018 average weight per fish.

TABLE 10. Preliminary projected angler trips and associated state level personal income impacts under Council-adopted 2019 recreational ocean salmon fishery management measures compared to estimated 2018 and the 2014-2018 average.

	Angler Trips (thousands)				Coastal Community Income Impacts[a/] (thousands of dollars)[b/]				Percent Change in Income Impacts	
Management Area	2019 Projected	2018	2014-2018 Avg.	2003-2007 Avg.	2019 Projected	2018	2014-2018 Avg.	2007 Avg.[b/]	Compared to 2018	Compared to 2014-2018 Avg.
North of Cape Falcon	155.9	55.7	80.1	105.6	27,831	9,940	15,370	11,533	+180%	+81%
Cape Falcon to Humbug Mt.	70.5	49.1	50.4	75.5	6,886	4,801	5,001	5,011	+43%	+38%
Humbug Mt. to OR/CA Border (OR KMZ)	14.1	7.0	7.8	13.5	1,827	584	693	671	+213%	+164%
OR/CA Border to Horse Mt. (CA KMZ)	18.3	7.4	9.2	19.1	2,370	1,282	1,708	1,105	+85%	+39%
Horse Mt. to Pt. Arena (Fort Bragg)	17.5	9.9	10.7	23.3	3,745	2,114	2,321	2,025	+77%	+61%
Pt. Arena to Pigeon Pt. (SF)	62.0	65.3	52.8	72.4	18,849	21,692	17,904	9,041	-13%	+5%
South of Pigeon Pt. (MO)	32.6	13.9	15.9	36.7	9,915	2,365	2,907	3,276	+319%	+241%
Total South of Cape Falcon	215.0	152.6	146.7	240.6	43,593	32,839	30,535	21,128	+33%	+43%
West Coast Total	370.8	208.2	226.8	346.2	71,424	42,779	45,904	32,661	+67%	+56%

a/ Income impacts are not comparable to exvessel values shown in Table 9.
b/ Dollar amounts are in inflation-adjusted 2018 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	2019 Criteria	Objective or Other Comparative Standard as Noted
Chinook								
KRFC	Spawning Escapement	58,729	40,700	40,700	45,000	40,700	≥ 40,700	2019 minimum natural area adult escapement.
	Exploitation (spawner reduction) rate	33.2%	53.7%	53.7%	48.8%	53.7%	≤ 53.7%	FMP control rule.
SRFC	Spawning Escapement	230,486	**152,272**	163,939	180,085	160,159	≥ 160,000	2019 minimum hatchery and natural area adult escapement (2019 NMFS guidance).
	Exploitation Rate	39.3%	59.9%	56.8%	52.6%	57.8%	≤ 67.9%	FMP control rule.
Canadian Stocks								
Interior Fraser Coho		7.5%	**11.0%(6.3%)**	**10.1%(5.4%)**	7.7%(3.0%)	9.1%(5.3%)	≤ 10.0%	2019 Southern U.S. exploitation rate ceiling; PSC coho agreement.
Puget Sound Coho								
Skagit		8.6%	33.8%(5.7%)	33.2%(4.9%)	31.4%(2.7%)	32.5%(4.8%)	≤ 35.0%	2019 total exploitation rate ceiling; FMP matrix[c/]
Stillaguamish		8.1%	32.5%(4.1%)	31.9%(3.4%)	30.5%(1.9%)	22.5%(3.4%)	≤ 50.0%	2019 total exploitation rate ceiling; FMP matrix[c/]
Snohomish		19.5%	33.7%(4.1%)	33.1%(3.4%)	31.6%(1.9%)	19.4%(3.4%)	≤ 40.0%	2019 total exploitation rate ceiling; FMP matrix[c/]
Hood Canal		41.5%	**48.8%(6.3%)**	**48.2%(5.4%)**	**46.8%(2.9%)**	44.3%(5.3%)	≤ 45.0%	2019 total exploitation rate ceiling; FMP matrix[c/]
Strait of Juan de Fuca		5.3%	9.6%(5.0%)	8.9%(4.3%)	7.0%(2.4%)	8.9%(4.2%)	≤ 20.0%	2019 total exploitation rate ceiling; FMP matrix[c/]
Washington Coastal Coho (in thousands of fish)								
Quillayute Fall Coho		10.2	13.6	13.7	14.1	13.7	6.3	For all Washington Coastal coho stocks listed:
Hoh Coho		5.3	5.6	5.8	6.2	5.8	2.0	FMP MSY adult spawner estimate.
Queets Wild Coho		6.1	8.9	9.1	9.7	9.1	5.8	Value depicted is ocean escapement.
Grays Harbor Coho		40.3	65.3	66.1	68.1	65.9	24.4	
Willapa Bay Natural Coho		19.1	55.5	56.3	58.5	56.3	17.2	
ESA-Listed Salmon								
California Coastal Chinook		10.2%	15.9%	16.0%	15.3%	16.0%	≤ 16.0%	KRFC age-4 ocean harvest rate.
SRWC		9.1%	15.7%	15.6%	13.5%	14.8%	≤ 15.7%	SRWC age-3 ocean impact rate in fisheries south of Pt. Arena.
LCR Natural Tule Chinook		NA	**39.2%**	36.7%	34.8%	36.0%	≤ 38.0%	Total adult equivalent fishery exploitation rate.
LCN Coho[d/]		14.2%	18.5%	16.6%	12.6%	18.0%	≤ 23.0%	Total marine and mainstem Columbia fishery exploitation rate. (2019 NMFS ESA guidance).
OCN coho[d/]		13.9%	14.6%	13.0%	10.4%	13.7%	≤ 15.0%	Marine and freshwater fishery exploitation rate (NMFS ESA consultation standard).
SONCC (RK) coho		4.7%	5.8%	5.8%	6.2%	5.8%	≤ 13.0%	Marine fishery exploitation rate for R/K hatchery coho (NMFS ESA consultation standard).

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	3,270	5,179	4,444	3,187	4,274
Cape Falcon to Humbug Mt.	2,444	7,787	5,155	5,259	7,419
Humbug to OR/CA border (OR KMZ)	428	1,033	766	599	980
OR/CA border to Horse Mt. (CA KMZ)	813	590	816	1,633	635
Horse Mt. to Pt. Arena (Fort Bragg)	1,058	5,780	6,856	6,064	6,780
Pt. Arena to Pigeon Pt. (San Francisco)	9,775	18,391	14,351	10,329	15,542
South of Pigeon Pt. (Monterey)	1,269	1,676	1,851	1,832	1,795
West Coast Total	19,057	40,435	34,240	28,902	37,425
Recreational Community Personal Income Impacts (thousands of dollars)					
North of Cape Falcon	9,940	29,636	27,288	16,566	27,831
Cape Falcon to Humbug Mt.	4,801	7,034	6,123	7,132	6,886
Humbug to OR/CA border (OR KMZ)	584	1,775	1,872	1,827	1,827
OR/CA border to Horse Mt. (CA KMZ)	1,282	2,425	2,389	2,370	2,370
Horse Mt. to Pt. Arena (Fort Bragg)	2,114	3,978	3,978	3,340	3,745
Pt. Arena to Pigeon Pt. (San Francisco)	21,692	20,029	20,029	16,909	18,849
South of Pigeon Pt. (Monterey)	2,365	9,915	9,812	9,744	9,915
West Coast Total	42,779	74,792	71,492	57,888	71,424

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 2018 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. 2019 spawning escapement and exploitation rate estimates are based on 2019 preseason abundance forecasts and 2019 adopted Council regulations.

	Estimated Adult Spawning Escapement									Total Exploitation Rate						
	2014	2015	2016	2017	2018[a/]	Forecast 2019[b/]	3-yr Geo Mean	MSST	S_{MSY}	2014	2015	2016	2017	2018[a/]	2019[b/]	MFMT
Chinook																
Sacramento Fall	212,468	114,085	89,699	42,714	105,739	160,159	89,767	91,500	122,000	0.61	0.55	0.56	0.68	0.53	0.58	0.78
Klamath River Fall	95,104	28,112	13,937	19,904	53,624	40,700	35,153	30,525	40,700	0.36	0.59	0.37	0.10	0.28	0.54	0.71
Southern Oregon[c/]	53,546	30,462	27,278	91,977	39,497	NA	46,276	20,500	34,992	NA	NA	NA	NA	NA	NA	0.54
Central and Northern OR	157	247	118	114	92	NA	107	30 fish/mi	60 fish/mi	0.43	0.42	0.47	NA	NA	NA	0.78
Upper Columbia Bright - Fall[d/]	233,934	323,276	151,373	97,789	58,540	63,864	71,504	19,182	39,625	0.53	0.40	0.51	NA	NA	NA	0.86
Upper Columbia - Summer[d/]	77,982	88,691	79,253	56,265	38,816	33,452	41,805	6,072	12,143	0.69	0.67	0.63	NA	NA	NA	0.75
Willapa Bay - Fall[e/]	2,075	2,824	1,887	3,078	NA	NA	2,541	1,696	3,393	0.57	0.47	0.59	NA	NA	NA	0.78
Grays Harbor Fall[e/]	11,893	17,305	11,248	17,145	NA	NA	14,944	5,694	13,326	0.57	0.47	0.59	NA	NA	NA	0.78
Grays Harbor Spring	1,583	1,841	926	1,384	493	NA	858	700	1,400	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall[d/]	3,820	5,313	2,915	2,702	NA	NA	3,472	1,250	2,500	0.57	0.47	0.59	NA	NA	NA	0.87
Queets - Sp/Su	377	532	704	NA	NA	NA	521	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall[e/]	1,933	1,795	2,831	1,808	NA	NA	2,094	600	1,200	0.57	0.47	0.59	NA	NA	NA	0.90
Hoh Sp/Su	744	1,070	1,144	1,364	NA	NA	1,186	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall[e/]	2,782	3,440	3,654	3,604	4,031	NA	3,758	1,500	3,000	0.57	0.47	0.59	NA	NA	NA	0.87
Quillayute - Sp/Su	608	794	900	1,097	1,232	NA	1,067	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa[d/]	1,760	2,877	1,324	1,188	2,179	NA	1,508	425	850	0.42	0.30	0.30	NA	NA	NA	0.78
Coho																
Willapa Bay	47,154	10,790	25,290	9,091	NA	40,750	21,081	8,600	17,200	0.51	0.44	0.38	0.33	NA	0.42	0.74
Grays Harbor	105,039	21,278	38,595	26,907	NA	41,582	35,083	18,320	24,426	0.45	0.49	0.12	0.32	NA	0.42	0.65
Queets	7,558	2,028	5,156	5,232	NA	6,729	5,662	4,350	5,800	0.41	0.26	0.15	0.23	NA	0.40	0.65
Hoh	4,565	1,794	5,009	4,478	NA	3,180	4,147	1,890	2,520	0.52	0.39	0.08	0.43	NA	0.55	0.65
Quillayute Fall	7,425	2,571	9,630	7,474	5,157	7,271	6,544	4,725	6,300	0.57	0.47	0.18	0.42	NA	0.51	0.59
Juan de Fuca	11,488	3,859	8,435	5,530	NA	8,044	7,213	7,000	11,000	0.17	0.18	0.03	0.06	NA	0.09	0.60
Hood Canal	26,787	26,926	24,313	22,519	NA	22,415	23,066	10,750	14,350	**0.68**	0.59	0.40	0.35	NA	0.44	0.65
Skagit	24,820	5,794	35,822	20,184	NA	39,317	30,520	14,875	25,000	0.52	**0.63**	0.20	0.09	NA	0.33	0.60
Stillaguamish	35,829	2,914	13,048	6,099	NA	18,488	11,374	6,100	10,000	0.27	0.48	0.16	0.12	NA	0.23	0.50
Snohomish	46,244	12,804	44,141	18,195	NA	50,564	34,373	31,000	50,000	0.31	0.55	0.18	0.21	NA	0.19	0.60

a/ Preliminary.

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

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

d/ CWT based exploitation rates from PSC-CTC 2018 Exploitation Rate Analysis.

e/ Queets River fall Chinook CWT exploitation rates used as a proxy. Exploitation rates in the terminal fisheries will differ from those calculated for Queets fall CWTs.

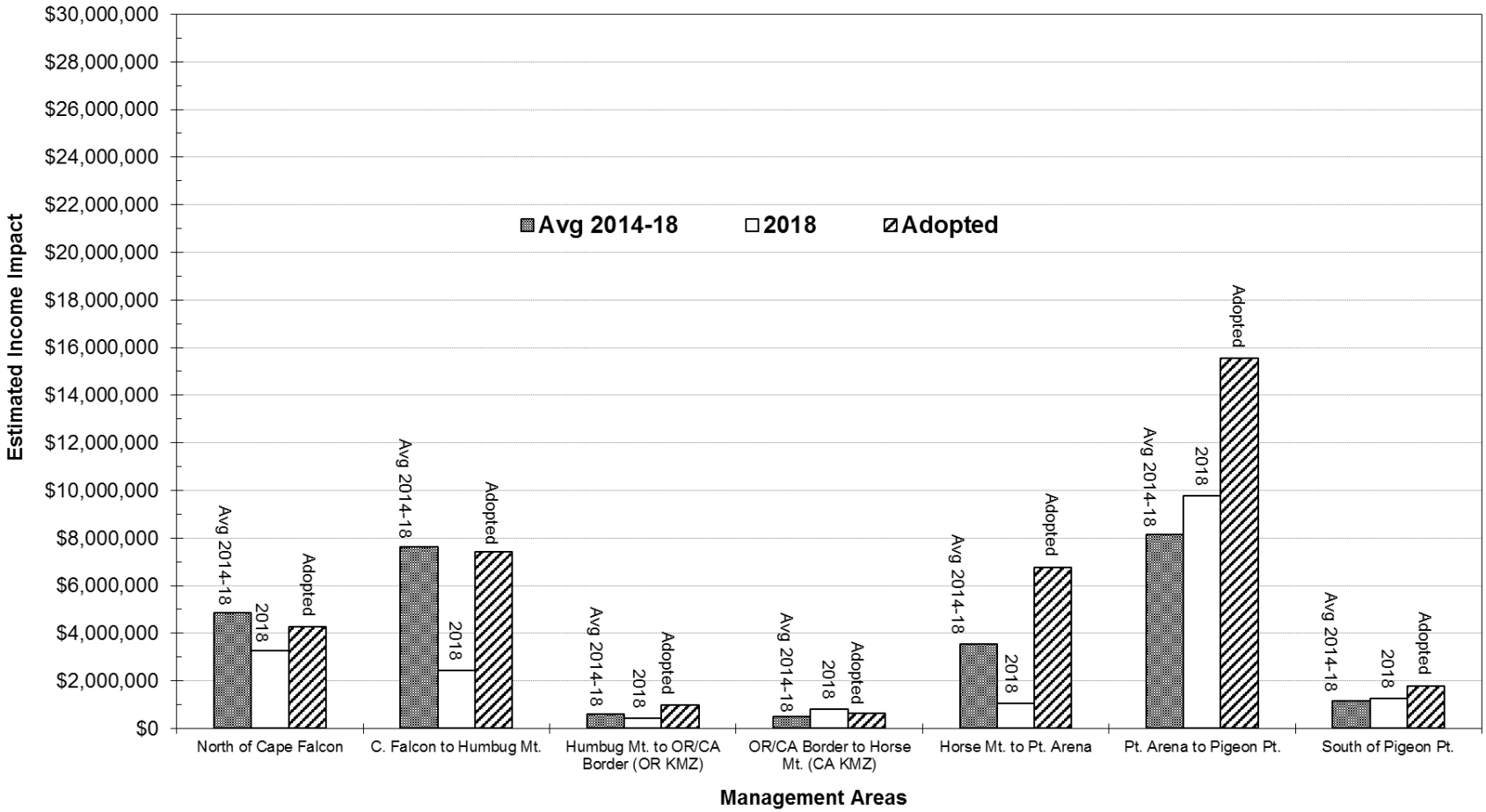


FIGURE 3. Projected coastal community personal income impacts associated with the 2019 commercial troll fishery under Council-adopted management measures compared to estimated 2018 and the 2014-2018 inflation-adjusted average (in 2018 dollars).

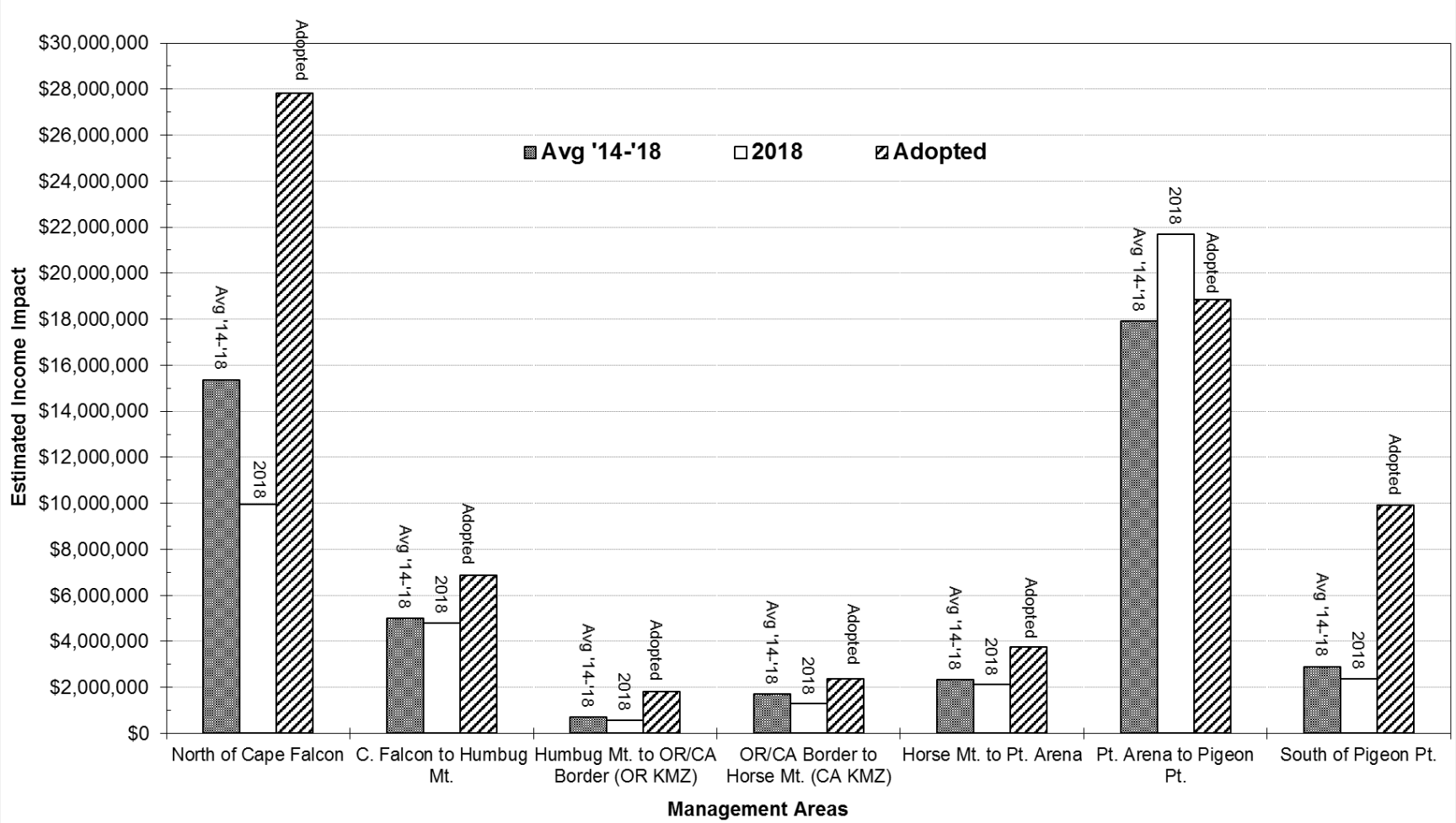
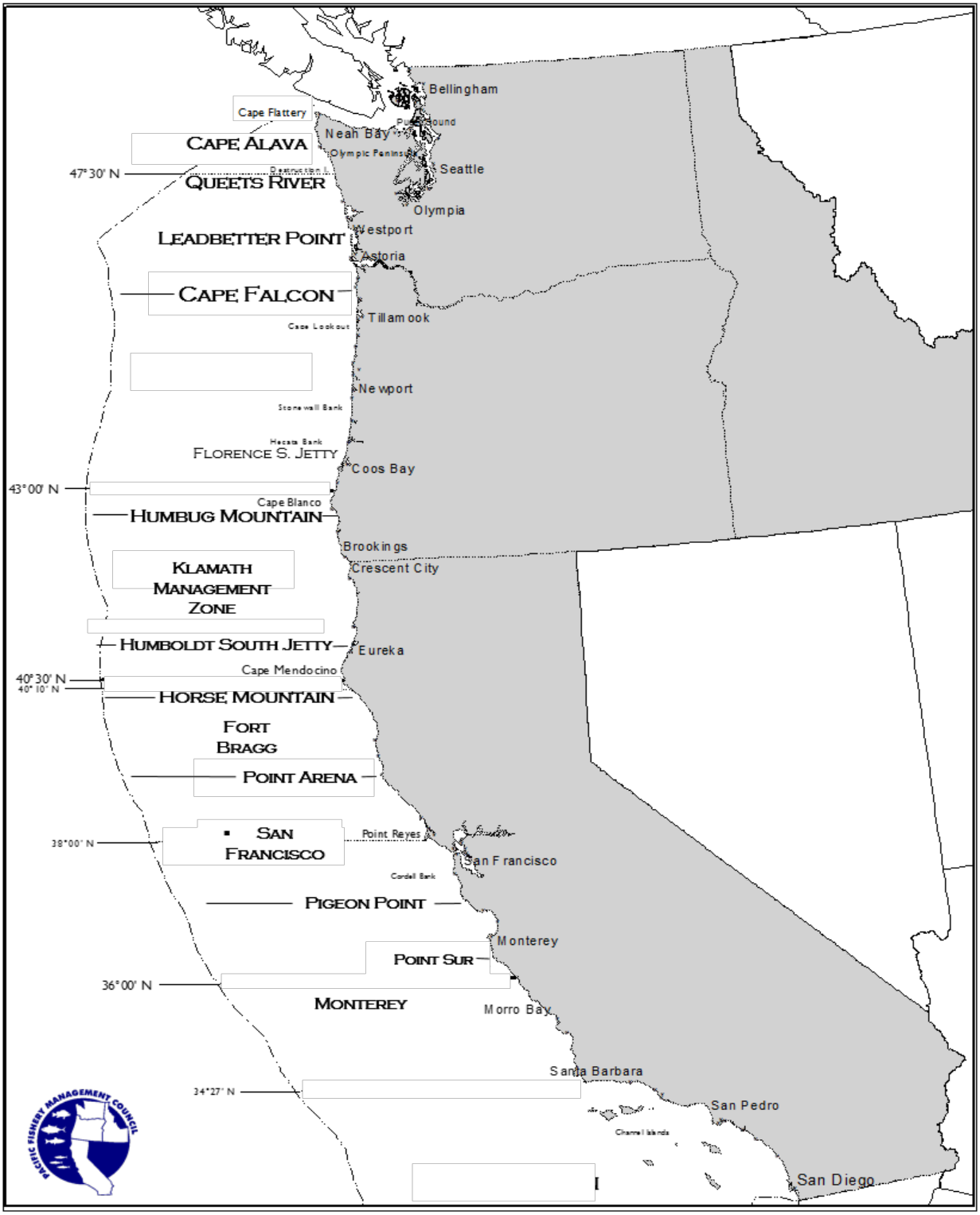


FIGURE 4. Projected coastal community personal income impacts associated with the 2019 recreational fishery under Council-adopted management measures compared to estimated 2018 and the 2014-2018 inflation-adjusted average (in 2018 dollars).



This map is for reference only and is not intended for use in navigation or fishery regulation.

ADDENDUM: CONSISTENCY WITH OTHER APPLICABLE LAW

Magnuson-Stevens Conservation and Management Act (MSA)

The MSA provides parameters and guidance for Federal fisheries management. Overarching principles for fisheries management are found in the MSA's National Standards, which articulate a broad set of policies governing fisheries management. In crafting fisheries management regimes, the Councils and 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 salmon 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 ACLs are met. These reference points are in turn designed to prevent overfishing while achieving optimum yield on a continuing basis. In 2019, 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 Fishery Management Plan (FMP) and under the Pacific Salmon Treaty (PST). The five stocks of primary concern due to constraints on the fishery to meet their conservation and management objectives in 2019 are: Sacramento River fall-run Chinook (SRFC), Klamath River fall-run Chinook salmon (KRFC), Upper Columbia River summer-run Chinook salmon, California Coastal Chinook salmon ((ESA-listed as threatened, and Puget Sound Chinook salmon (ESA-listed as threatened).

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., targeting a spawning escapement for SRFC that is in the high end of the conservation objective range of 122,000 to 180,000 adult spawners).

Two of the five stocks of primary concern, and three additional stocks, were determined in 2018 to be overfished: SRFC, KRFC, Queets coho, Juan de Fuca coho, and Snohomish coho. The alternatives in this EA were designed to be risk averse with respect to these stocks and the recommended fishing would not constitute overfishing and would achieve spawning escapements consistent with the FMP's conservation objectives 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 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. 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. 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 a unit 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. Alternative 3 (see PRE II) departs from the FMP's allocation scheme for coho in fisheries north of Cape Falcon, Oregon to the extent that would provide a lower portion of coho retention in commercial fisheries than allowed in the FMP. The purpose of this departure from the FMP would be to minimize impacts on northern coho stocks while allowing retention where stocks are healthier.

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, needs which rely on long-term health of the salmon stocks.

National Standard 9 requires the reduction, to the extent practicable, of bycatch or bycatch mortality. All alternatives in this EA are expected to have no significant effects due to bycatch mortality on non-target species.

National Standard 10 requires, to the extent practicable, conservation and management measures to promote the safety of human life at sea. The Alternatives in this EA are not expected to impact risks to salmon fishermen.

Paperwork Reduction Act (PRA)

The purposes of the PRA are to minimize the burden of information collection by the Federal Government on the public; maximize the utility of any information thus collected; improve the quality of information used in Federal decision making, minimize the cost of collection, use and dissemination of such information; and improve accountability. The PRA requires Federal agencies to obtain clearance from the Office of Management and Budget before collecting information. This clearance requirement is triggered

if certain conditions are met. "Collection of information" is defined broadly. In summary it means obtaining information from third parties or the public by or for an agency through a standardized method imposed on 10 or more persons. Collection of information need not be mandatory to meet the trigger definition. Even information collected by a third party, if at the behest of a Federal agency, may trigger the clearance requirement. Within NMFS, the Office of the Chief Information Officer is responsible for PRA compliance. Obtaining clearance can take up to 9 months and is one aspect of NMFS review and approval of Council decisions.

The proposed action includes an existing approved collection-of-information requirement which is being implemented under Federal regulations. A specific requirement on when and where to land fish is imposed when necessary to ensure timely and accurate assessment of catches in specific regulatory areas. If fishermen are unable to comply with this landing requirement because of unsafe weather or mechanical problems, they must notify the U.S. Coast Guard of their problem, and advise of the name of the vessel, the port where delivery will be made, the approximate amount of salmon on board, and the estimated time of arrival. This emergency provision is rarely used, but is important to be retained for safety purposes. Authorization under the PRA for this information collection was extended on August 11, 2017, and will expire on August 31, 2020 (OMB Control No. 0648-0433).

Marine Mammal Protection Act (MMPA)

The MMPA of 1972 is the principle Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the US Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the west coast, the Southern Resident Puget Sound killer whale stock (SRKW) is listed as endangered under the Endangered Species Act (ESA); Guadalupe fur seal, and Southern sea otter California stock are listed as threatened under the ESA. The sperm whale (WA, OR, CA stock), humpback whale (WA, OR, CA, Mexico stock), blue whale eastern north Pacific stock, and Fin whale (WA, OR, CA stock) are listed as endangered under the Endangered Species Act (ESA). Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The commercial salmon troll fisheries off the west coast are classified as Category III fisheries, indicating a remote or no likelihood of causing incidental mortality or serious injury to marine mammals (83 FR 5349, February 7, 2018). Recreational salmon fisheries are assumed to have similar impacts as they use similar gear and techniques.

National Environmental Policy Act (NEPA)

This EA is intended to meet the NEPA requirements that apply to the proposed action.

Endangered Species Act (ESA)

Ocean salmon fisheries conducted under the FMP do affect ESA-listed salmon species. The alternatives analyzed in this EA were developed to be consistent with biological opinions issued by NMFS. The proposed action is consistent with those biological opinions.

Of the ESA-listed marine mammals described above (see MMPA section), Council-managed salmon fisheries only impact listed Southern Resident Killer Whales. NMFS consulted on the effects of the

ocean salmon fisheries on the ESA-listed Southern Resident killer whale (SRKW) distinct population segment in 2009. As discussed above, NMFS has reinitiated consultation to consider new information. NMFS has assessed the potential impacts of the 2019 management measures to SRKW, and has made a determination under ESA sections 7(a)(2) and 7(d) that the 2019 fisheries are not likely to jeopardize SRKW, 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. 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 BOs and Section 4(d) determinations have been prepared for West Coast stocks by NMFS.

Table 1. NMFS ESA Biological Opinions regarding Evolutionarily Significant Units (ESUs) and Distinct Population Segments (DPSs) affected by PFMC Fisheries.

Date	Duration	Species Considered
Salmonid Species		
March 8, 1996	until reinitiated	Snake River spring/summer and fall Chinook Snake River sockeye
April 28, 1999	until reinitiated	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
April 27, 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 4, 2015	until reinitiated	Lower Columbia River coho
March 3, 2018	until reinitiated	Sacramento River winter-run Chinook
April 29, 2004	until reinitiated	Puget Sound Chinook
April 26, 2012	until reinitiated	Lower Columbia River Chinook
Non-Salmonid Species		
April 30, 2007	until reinitiated	North American Green Sturgeon
December 22, 2008	until December 2018	Eastern and Western DPS Steller Sea Lion (eastern DPS was delisted November 4, 2013 (78 FR 66140))
May 5, 2009	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 January 29, 2019, for review under section 307(c)(1) of the CZMA. Three of four agencies concurred with this determination; the fourth did not comment; therefore, concurrence is inferred.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished populations of many native bird species. The act states it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The Migratory Bird Treaty Act prohibits the directed take of seabirds, but the incidental take of seabirds does occur. None of the alternatives directly affect any seabirds protected by the Migratory Bird Treaty Act.

Executive Order 13175: Consultation and Coordination with Indian Tribal Governments (EO 13175)

Executive Order 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. At Section 302(b)(5), the MSA reserves a seat on the Council for a representative of an Indian tribe with Federally-recognized fishing rights from California, Oregon, Washington, or Idaho.

The U.S. government formally recognizes that the four Washington Coastal Tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for salmon within the Council-managed area. Each of the treaty tribes has the discretion to administer their fisheries and to establish their own policies to achieve program objectives. In addition, other tribes with Federally-recognized fishing rights may be impacted by Council-area fisheries, including tribes from Puget Sound, the Columbia River, and the Klamath River. Accordingly, the proposed action and other alternatives have been developed through the Council process. Through the tribal representative on the Council and tribal comments submitted to NMFS and the Council, the Tribes have had a role in the developing the proposed action and analyzing the effects of the alternatives; therefore, the proposed action is consistent with EO 13175.

Executive Order 12898: Environmental Justice

Executive Order 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental analysis associated with an action. NOAA guidance, NAO 216-6, at 7.02, states that "consideration of Executive Order 12898 should be specifically included in the NEPA documentation for decision making purposes." Agencies should also

encourage public participation "especially by affected communities" as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic or occupational factor that could amplify the adverse effects of the proposed action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability or price of that fish could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice developed, health effects are usually considered and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

Fisheries conducted under the FMP are not expected to disproportionally affect minority and low-income communities. West Coast Indian tribes are part of the Council's decision-making process on salmon management issues, and tribes with treaty rights to salmon, groundfish, or halibut have a seat on the Council. Available demographic data detailed in the Salmon FMP Amendment 14, Appendix B show that coastal counties where fishing communities are located are variable in terms of social indicators like income, employment, and race and ethnic composition. As a result, the alternatives are not expected to disproportionally affect fishing communities, nor minority and low income groups in particular.

Executive Order 13132: Federalism

Executive Order 13132 enumerates eight "fundamental federalism principles." The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the Executive Order directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement."

The Council process offers many opportunities for states and Indian tribes (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management frameworks and management measures implementing the framework. This process encourages states and tribes to institute complementary measures to manage fisheries under their jurisdiction that may affect federally managed stocks.

The proposed action would not have federalism implications subject to Executive Order 13132.

REGULATORY FLEXIBILITY ACT (RFA)

This action is exempt from the procedures of the RFA because NMFS is waiving notice and comment for the reasons described below under the Administrative Procedures Act determination section.

ADMINISTRATIVE PROCEDURE ACT (APA)

NOAA's Assistant Administrator for Fisheries (AA) finds it is impracticable and contrary to public interest to provide for prior notice and comment on the rule implementing the salmon management measures and waives this requirement under 5 U.S.C. 553(b)(B) for the reasons explained below.

The annual salmon management cycle traditionally begins May 1 and continues through April 30 of the following year. May 1 was chosen because the pre-May harvests constitute a relatively small portion of the annual catch. The time frame of the preseason process for determining the annual modifications to ocean salmon fishery management measures depends on when the pertinent biological data are available. Salmon stocks are managed to meet annual spawning escapement goals 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 preseason abundance forecasts, which are derived from previous years' observed spawning escapements, 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 typically effective on May 1. For 2019, even with the waiver of notice and comment, NMFS does not expect the rule to be effective until May 6. This is because the Council scheduled final action on the 2019 management measures for April 15, too late to allow NMFS to complete the necessary regulatory process to review, approve, and implement these fishing regulations by the traditional May 1 date. This delay, which is occurring even with the waiver of notice and comment rulemaking, required NMFS to take inseason action to close fisheries that would have otherwise opened May 1 under 2018 management measures to avoid excessive impacts to certain stocks during the first week of fishing in 2019.

As described in the Federal Register Notice for this action under the "Schedule Used to Establish 2019 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 in 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 2019 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 during May and 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 are managed under measures developed the previous year, as modified by the Council at its March meeting, relatively little harvest occurs during that period (e.g., less than 5 percent of commercial and recreational harvest occurred prior to May 1 in the period 2001 through 2017). 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 1 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 2019 measures are not in place on May 6, 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 6 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 6, 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 1, 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 (http://www.westcoast.fisheries.noaa.gov). 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.

Background

Proposed Action:

Develop annual management measures for the 2019 Ocean Salmon Fisheries Management Measures including: commercial, recreational, and tribal ocean salmon fisheries. Details of the proposed action can be found in the environmental assessment (EA), to which this FONSI is attached.

Alternatives Evaluated in the Environmental Assessment:

No-action Alternative
Alternative I
Alternative II
Alternative III
Preferred Alternative

Selected Alternative:

The National Marine Fisheries Service (NMFS) is selecting the Pacific Fishery Management Council's (Council) preferred alternative, which is described in the attached EA in the part titled "Preseason Report III."

Related Consultations:

The proposed action is consistent with existing consultations on salmon fishery impacts to species listed as threatened or endangered under the Endangered Species Act (ESA), these are described in the attached EA.

The area affected by the annual management measures of the Salmon FMP has been identified as EFH under the Salmon FMP, Coastal Pelagic Species FMP, and Pacific Coast Groundfish FMP. The action in the context of the fisheries as a whole may have an adverse impact on EFH identified in these FMPs. Because the potential adverse impact on EFH is not substantial, NMFS conducted an abbreviated EFH consultation pursuant to 50 CFR 600.920(h) and prepared an EFH Assessment that incorporates all of the information required in 50 CFR 920(g)(2). The abbreviated EFH consultation was incorporated into the NMFS biological opinion on the effects of the Salmon FMP on ESA-listed salmonids dated April 30, 2001. The consultation concluded that there are appropriate conservation measures governing fishing actions that occur under the Salmon FMP to minimize potential adverse impacts to EFH for species managed under the FMPs listed above. NMFS has continued to confirm these conclusions through subsequent EFH consultations, including one completed most recently in 2018 for Sacramento River winter-run Chinook salmon.

Significance Review

The Council on Environmental Quality (CEQ) Regulations state that the determination of significance using an analysis of effects requires examination of both context and intensity, and

lists ten criteria for intensity (40 C.F.R. § 1508.27). In addition, the Companion Manual for National Oceanic and Atmospheric Administration Administrative Order 216-6A provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a proposed action are significant. Each criterion is discussed below with respect to the proposed action and considered individually as well as in combination with the others.

1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?

No, the proposed action will not result in a significant effect. The proposed action has been developed to be consistent with the Council's Pacific Coast Salmon Fishery Management Plan (FMP). The framework FMP and each amendment to the FMP have been analyzed under the National Environmental Policy Act (NEPA), and no significant effects have been found.

2. Can the proposed action reasonably be expected to significantly affect public health or safety?

This proposed action will not impact public health or safety because the proposed action, consistent with the FMP, has provisions to adjust management measures if unsafe weather affects the fisheries' access and is consistent with previously analyzed management measures used since the FMP was adopted.

3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?

No significant impacts are expected to occur in any of the above areas. No ground disturbing activity is part of this proposed action.

4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?

The impacts of the proposed action are not be expected to be controversial due to the use of the best available scientific information in decision-making, as provided by the Council's Salmon Technical Team and Scientific and Statistical Committee during development of the alternatives, and extensive public input into the development of the action. Additionally, NMFS analyzed the effects to Southern Resident Killer Whales using the best available scientific information. The proposed action was developed through the Council process, including a four week period of extensive public review and discussion of the alternatives. Public hearings were held in each of the West Coast states (California, Oregon, and Washington), in addition to the March and April Council meetings. The Council considered these public comments when adopting the proposed action.

5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The effects of this proposed action are not anticipated to be highly uncertain or involve unknown risks. The proposed 2019 ocean salmon fisheries would be comparable to previous fisheries developed under the Salmon FMP, which has been in place for many years. Salmon fisheries conducted under the FMP have been monitored and analyzed in the Council's pre-season process for many years and, thus, risks from the fisheries are relatively well known. There is some uncertainty involved in projecting stock abundance in a given year; however, such uncertainty is addressed by implementing precautionary management measures to protect the less abundant stocks (i.e., "weak" stocks). In order to prevent overfishing on, and conserve, the weaker stocks, there is less harvest opportunity on the more abundant stocks that intermix with weak stocks in the fisheries.

6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

The action will not be setting precedents for future actions with significant effects because the fisheries management measures are structured each year based on the FMP framework and the best available scientific information.

7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?

No, the action will not be expected to have any significant cumulative effects. The ocean salmon fisheries are managed in a sustainable manner and consistent with the Magnuson-Stevens Fishery Conservation and Management Act (MSA), ESA, Marine Mammal Protection Act (MMPA), and other applicable law. The Council and NMFS account for impacts from other fisheries in developing and analyzing the alternatives. Fisheries are conducted consistent with the current ESA consultations on the fisheries, and based on measures that serve to protect multiple stocks in the mixed-stock ocean salmon fisheries, especially where stocks overlap and intermingle in the ocean. Management measures for the ocean salmon fisheries are developed annually taking into account scientific and management information from the prior year's fisheries, as well as new scientific information regarding status of the stocks, environmental conditions that may affect the stocks, and socio-economic impacts of the alternatives.

8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

No significant effects of this proposed action are anticipated on cultural, scientific, or historical resources. No ground disturbing activity is anticipated. In addition, tribes

with treaty fishing rights for West Coast salmon have representation on the Council and are involved in the preseason planning process.

9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?

This proposed action would not significantly affect any endangered or threatened species or its critical habitat. Several salmonid species that are potentially caught in the fisheries are listed as threatened or endangered under the ESA. NMFS has issued biological opinions addressing the effects of the fisheries on all of these species. The alternatives for the 2019 fisheries were developed consistent with the biological opinions for these species. NMFS consulted on the effects of the ocean salmon fisheries on the ESA-listed Southern Resident killer whale (SRKW) distinct population segment in 2009. As discussed above, NMFS has reinitiated consultation to consider new information. NMFS has assessed the potential impacts of the 2019 management measures to SRKW, and has made a determination under ESA sections 7(a)(2) and 7(d) that the 2019 fisheries are not likely to jeopardize SRKW, 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.

10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?

This proposed action will not threaten a violation any federal, state, or local law or requirement imposed for the protection of the environment.

11. Can the proposed action reasonably be expected to significantly adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?

No. Ocean salmon fisheries are classified under the MMPA as Category III (83 FR 5349, February 7, 2018), indicating there is "a remote likelihood of or no known incidental mortality or serious injury of marine mammals" (MMPA 118(c) I). See the response to question #9, above, for consideration of ESA-listed endangered SRKW.

12. Can the proposed action reasonably be expected to significantly adversely affect managed fish species?

No. The proposed action is consistent with conservation and management objectives of the FMP. The EA considered impacts to non-target fish species (see the EA part "Preseason Report II section 8.3"). Ocean salmon fishery impacts to groundfish stocks (e.g., species such as rockfish and flatfish that live on or near the bottom of the ocean) are managed as part of the open access groundfish fishery sector. Ocean salmon fishery impacts to Pacific halibut are managed under limits established through the

International Pacific Halibut Commission (IPHC). The proposed action has no impacts to other managed fish species.

13. Can the proposed action reasonably be expected to significantly adversely affect essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act?

The area affected by the proposed action has been identified as EFH under the Salmon FMP, Coastal Pelagic Species FMP, and Pacific Coast Groundfish FMP. The action in the context of the fisheries as a whole 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 salmon dated April 30, 2001. The consultation concluded that there are appropriate conservation measures governing fishing actions that occur under the Salmon FMP to minimize potential adverse impacts to EFH for species managed under the FMPs listed above. NMFS has continued to confirm these conclusions through subsequent EFH consultations, including one completed most recently in 2018 for Sacramento River winter-run Chinook salmon.

14. Can the proposed action reasonably be expected to significantly adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?

The proposed action is not expected to adversely affect vulnerable marine, coastal, or coral ecosystems. The proposed action does include any ground disturbing activity.

15. Can the proposed action reasonably be expected to significantly adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?

Substantial impacts to biodiversity and ecosystem function is not be 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. Considerations specifically related to SRKW are more complicated but are addressed in more detail through NMFS' ESA Section 7 consultation and 7(a)(2)/7(d) memo on the fisheries, as noted in the response to question #9. Generally, the Pacific Coast salmon fisheries have a minimal impact on marine mammals, as noted in the response to question #11. 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 trophic level species; however, salmon fisheries' removals are not significant in this respect and wide-scale changes in oceanographic conditions, resulting from EI Niño events for example, are the primary

determinants of abundance, variability, and structure of lower trophic level populations. In addition, maintaining biodiversity by conserving salmon evolutionarily significant units is a key management goal.

16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

The proposed action would not be expected to import, introduce, or contribute to the spread of non-indigenous species. The fishing vessels participating in the proposed action would not increase the risk of introduction through ballast water or hull fouling. Disposition of the catch does not include any translocation of living marine resources nor use of any nonindigenous species as bait.

Determination

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for 2019 Ocean Salmon Fisheries Management Measures, it is hereby determined that the 2019 Ocean Salmon Fisheries Management Measures will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

Barry A. Thom
Regional Administrator
West Coast Region
National Marine Fisheries Service

April 24, 2019
Date