ENVIRONMENTAL ASSESSMENT

FOR THE

PROPOSED 2006 MANAGEMENT MEASURES FOR THE OCEAN SALMON FISHERY

MANAGED UNDER THE PACIFIC COAST SALMON PLAN

PREPARED BY:

PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 200
PORTLAND, OR 97220-1384
(503) 820-2280
HTTP://WWW.PCOUNCIL.ORG

IN COOPERATION WITH

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COVER SHEET
2006 OCEAN SALMON FISHERY MANAGEMENT MEASURES
ENVIRONMENTAL ASSESSMENT

Proposed Action: Implementation of 2006 management measures will allow fishermen to harvest healthy natural and hatchery salmon stocks within the constraints specified under the Salmon Fishery Management Plan (Salmon FMP) and consultation standards established for Endangered Species Act (ESA)-listed salmon stocks. In achieving this goal, management measures must take into account the allocation of harvest among different user groups and port areas. Section 5.3 of the Salmon FMP enumerates specific allocation objectives.

Type of Statement: Environmental Assessment

For Further Information Contact:

National Marine Fisheries Service
Northwest Region
7600 Sand Point Way NE
Seattle, WA 98115

Mr. Chuck Tracy
Salmon Staff Officer
(503) 820-2280Chuck.Tracy@noaa.gov

Pacific Fishery Management Council
7700 NE Ambassador Way, Suite 200
Portland, OR 97220-1384

Abstract:
This document analyzes the environmental and socioeconomic impacts of proposed management measures for ocean salmon fisheries occurring off the coasts of Washington, Oregon, and California. The Pacific Fishery Management Council (Council) produces four documents that provide information for decision making and report the annual management measures recommended for implementation in the coming fishing season. (These are the Review of 2005 Ocean Salmon Fisheries and Preseason Reports I, II, and III, listed in the bibliography.) These documents form the basis for the description of alternatives and the impact analysis in this EA.

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ABBREVIATIONS AND ACRONYMS

BO	Biological Opinion
CCC	Central California Coastal (natural coho)
Council	Pacific Fishery Management Council
CPUE	catch per unit of effort
CVI	Central Valley Index
CZMA	Coastal Zone Management Act
EA	environmental assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FMP	fishery management plan
FMU	fishery management unit
FONSI	finding of no significant impact
FRAM	Fishery Regulation Assessment Model
IPHC	International Pacific Halibut Commission
KFMC	Klamath Fishery Management Council
KMZ	Klamath Management Zone
KOHM	Klamath Ocean Harvest Model
KRFC	Klamath River fall Chinook
LCR	Lower Columbia River (natural coho and natural tule fall Chinook)
LRH	lower river hatchery (tule fall Chinook returning to hatcheries below Bonneville Dam)
LRB	lower river bright (Chinook salmon from the Columbia River below Bonneville Dam)
LRW	lower Columbia River wild (bright fall Chinook spawning naturally below Bonneville Dam)
MCB	mid-Columbia River brights (bright hatchery fall Chinook released in the mid-Columbia River)
MOC	mid-Oregon coast
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Act
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOC	north Oregon coast
OCN	Oregon coastal natural (coho salmon)
OCNL	Oregon coastal natural (coho) lake component
OCNR	Oregon coastal natural (coho) river component
OPI	Oregon Production Index (area)
OY	optimum yield
PacFIN	Pacific Coast Fisheries Information Network
PEIS	programmatic environmental impact statement
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty

R/K	Rogue/Klamath (hatchery coho)
RIR	regulatory impact review
RMP	Resource Management Plan
SAB	select area brights
SAS	Salmon Advisory Subpanel
SCH	Spring Creek Hatchery (tule fall Chinook returning to Spring Creek Hatchery)
Secretary	U.S. Secretary of Commerce
SEIS	supplemental environmental impact statement
SFA	Sustainable Fisheries Act
SONCC	Southern Oregon/Northern California Coastal (natural coho)
SRFI	Snake River fall Chinook index
STEP	Salmon Trout Enhancement Program (Oregon)
STT	Salmon Technical Team
TAC	total allowable catch
URB	upper river brights (bright fall Chinook originating primarily above McNary Dam)
WOC	Washington, Oregon, and California

ABSTRACT

This document analyzes the environmental and socioeconomic impacts of proposed management measures for ocean salmon fisheries occurring off the coasts of Washington, Oregon, and California. The Pacific Fishery Management Council (Council) produces four documents that provide information for decision making and report the annual management measures recommended for implementation in the coming fishing season. (These are the *Review of 2005 Ocean Salmon Fisheries* and *Preseason Reports I, II,* and *III*, listed in the bibliography.) These documents form the basis for the description of alternatives and the impact analysis in this environmental assessment (EA). They are incorporated by reference into this EA, and the information in them is summarized here as appropriate.

1.0 INTRODUCTION

1.1 How This Document is Organized

The Council develops annual management measures for ocean salmon fisheries occurring off the coasts of Washington, Oregon, and California[1] and submits them to the U.S. Secretary of Commerce (Secretary) for review and implementation. The Secretary then either approves the measures and implements them by regulation, partially approves them, or disapproves them. If they are partially approved or disapproved, the Council may reconsider and revise the measures and resubmit them to the Secretary. The scope of the measures that may be chosen in this annual process is limited by the management framework established in the Pacific Coast Salmon Plan (Salmon FMP), a fishery management plan (FMP) first developed by the Council in 1977 and subsequently amended 14 times, most recently in 1999. The Salmon FMP conforms to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legislation governing fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore.

This document has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 to assess the impacts on the human environment that may result from the proposed action. An agency may prepare an EA in order to assist agency planning and decision-making. The rest of this section discusses the reasons for establishing new management measures for the 2006 season. This description of *purpose and need* defines the scope of the subsequent analysis. Section 2 outlines *different alternatives* that have been considered to address the purpose and need. Based on public input and analysis of the impacts, a Preferred Alternative is formulated and adopted during the Council's April meeting. Section 3 describes the *affected environment*. This information provides the basis for the analysis contained in Section 4, which *assesses the potential environmental and socioeconomic impacts* of the alternatives outlined in Section 2. A list of agencies and persons consulted during preparation of the EA may be found in Section 6.3. Detailed information on the 2006 management measures (Preferred and other alternatives) may be found in the *2006 Preseason Report II* (describing the initial set of alternatives, or regulatory options, which the Council uses to develop its preferred alternative) and *Preseason Report III* (the Council's preferred alternative).[2] Similarly, the No Action Alternative represents the 2005 (status quo) management measures the management measures projected on abundance for the coming season, described in the *2006 Preseason Report I*.

[1] In addition to these three coastal states, Council membership includes Idaho because salmon spawn in rivers in that state.

[2] All preseason reports, described further below, are appended to this document and incorporated by reference.

1.2 Purpose and Need

1.2.1 Problems for Resolution (Need for Action)

Salmon are anadromous fish, spending a part of their life in ocean waters, but returning to freshwater rivers and streams to spawn and then die. Juvenile salmon rear in freshwater for up to two years (depending on species), then the young fish migrate to the ocean for further rearing until they are ready to return to their natal rivers to spawn. Council-managed ocean salmon fisheries mainly catch Chinook and coho salmon (*Oncorhynchus tshawytscha* and *O. kisutch*); pink salmon (*O. gorbuscha*) are also caught in odd-numbered years, principally off of Washington. Fisheries not managed by the Council also impact stocks that are part of the Salmon FMP management unit (Salmon FMU). These fisheries include those prosecuted by Indian tribes and freshwater commercial and recreational fishers in state territorial and internal waters (including rivers and estuaries), as well as Canadian and Alaskan marine fisheries. Historical and contemporary habitat modification and degradation, primarily in and along rivers and streams that are critical to spawning and juvenile survival, have led to precipitous declines in West Coast salmon populations. As a result, several stocks within the salmon FMU have been listed as either threatened or endangered under the Endangered Species Act (ESA). Adult returns also fluctuate from year to year due to variability in juvenile production and survival rates.

Salmon originating from hatcheries have become an important component of all West Coast fisheries. Hatcheries have been established primarily for mitigation of development (hydropower, irrigation, etc.) and for fishery augmentation. When establishing annual management measures, the Council must set catch restrictions in order to meet the competing demands of different user groups and the need to ensure enough fish spawn, so that populations are sustained. These considerations must be applied to each stock.

1.2.2 Purpose of the Action: 2006 Management Measures

The purpose of this action, implementation of the 2006 ocean salmon fishery management measures, is to allow fishers to harvest healthy natural and hatchery salmon stocks within the constraints specified under the Salmon FMP, the MSA , the Pacific Salmon Treaty, guidance provided by the National Marine Fisheries Service (NMFS) for depressed Klamath River fall Chinook (KRFC), and consultation standards established for ESA-listed salmon stocks, while taking into account short-term adverse impacts to fishing communities and long-term stock management objectives. In achieving this goal, management measures must take into account the allocation of harvest among different user groups and port areas. This is not done by stock, but rather by total allowable catch (TAC) and species. (Section 5.3 of the Salmon FMP enumerates specific allocation objectives.) 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, specified ESA consultation 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. Seek to maintain ocean salmon fishing seasons that support the continuance of established recreational and commercial fisheries, while meeting salmon harvest allocation objectives among ocean and inside recreational and commercial fisheries. These allocations will be fair and equitable, and 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 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 a return to 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 (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 conservation objectives 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 MSA and the National Standards Guidelines.

The Salmon FMP conservation objective for KFRC requires a return of 33-34% of potential adult natural spawners, but no fewer than 35,000 in any one year. The preseason abundance forecast for 2006 indicates that even if ocean fisheries were closed from January through August, 2006 in the area between Cape Falcon, Oregon, and Point Sur, California, the KRFC natural spawning escapement would only be 25,400 adults (assuming the Klamath Basin Indian tribes with Federally recognized fishing rights take their entitled share of 6,100 adult KRFC). When a key stock is not projected to meet its conservation objective, a Conservation Alert is triggered under the Salmon FMP. A Conservation Alert requires the Council to close all salmon fisheries within its jurisdiction that impact the stock. Given the circumstances, any fishing in the Klamath impact area would have to be implemented by emergency rule temporarily modifying the conservation objective for KRFC set forth in the Salmon FMP. Any emergency rule would be have to be consistent with the agency's policy on use of emergency actions under the MSA published at 62 FR 44422.

1.3 Background and Related Documents

For regulatory purposes, the fishing season, or term during which annually-developed management measures apply, is May 1 to April 30. Most ocean salmon fishing occurs from early to mid-May until late September. However, it is common for seasons to open earlier than May 1 in some areas. These openings may be anticipated in the previous year's management process with an option for "inseason" modification to allow for what are considered early openings (but in terms of the management cycle are actually late openings). But in terms of impacts analysis, these "late openings" are considered part of the next year's season. For example, all fishery impacts on KRFC occurring after September 1 of 2005 are modeled when analyzing impacts in the 2006 season, which for regulatory purposes starts on May 1.

Any material summarized and incorporated into this EA by reference may be obtained by contacting the Council at the address on the front of this document. In-text citations are not given for Council-produced

documents referred to in this EA, but they are listed in the bibliography. Copies of these documents may be obtained from the Council office.

1.3.1 Pacific Coast Salmon Plan

As mentioned above, the Salmon FMP establishes conservation and allocation guidelines for annual management. This framework allows the Council to develop measures responsive to conditions in a given year. The Salmon FMP describes the types of management measures that may be applied and the flexibility available for modification during the process of developing annual management measures. These measures include setting size limits, bag limits for recreational fishers, gear restrictions, seasons, and quotas. The alternatives described in Section 2 are structured around variations within each type of management measure. They are assessed in light of the allocation and harvest objectives in the Salmon FMP discussed above.

Sections 8 and 9 of the Salmon FMP outline the annual process for developing management measures. This process results in a review of the previous year's fishery and three preseason reports, drafted by the Council's Salmon Technical Team (STT), that reflect the information gathering, analysis, and decision-making necessary to develop annual management measures.

This management regime has been subject to several previous environmental impact analyses. From 1976 through 1983, the Council prepared an environmental impact statement (EIS) or supplemental EIS (SEIS) for each year's salmon fishing season. In 1984 an EIS was prepared when the Salmon FMP was comprehensively amended to implement the framework process for annual management. This resulted in a much more efficient management process and obviated the substantial staff burden of preparing an EIS or SEIS annually. A still more recent SEIS accompanied Amendment 14, which was implemented in 2001. These EISs also represent information and analytical resources that, as appropriate, are incorporated into this document.

1.3.2 Review of 2005 Ocean Salmon Fisheries

This document is the first in a series of annual documents prepared by the Council's STT. It provides a historical context for fishery impacts, spawning escapement, and management performance for Salmon FMU stocks, annual regulations governing Council-area salmon fisheries, and economic factors associated with Council-area salmon fisheries. Information on inland marine and freshwater fisheries, as well as ocean fisheries in Canada and Alaska, are also presented. This document provides a baseline for the fishery impacts and economic assessments used in this EA.

1.3.3 Preseason Report I

This document is the second in the series prepared by the STT and presents projected stock abundances for Salmon FMU stocks and an analysis of the status quo management measures on projected abundance for the coming season. This analysis serves as the No Action Alternative in this EA.

1.3.4 Preseason Report II

This document is the third in the series prepared by the STT. It documents the range of management options, three in total, adopted by the Council for the coming season, which are released to the public for review and comment. The report includes an analysis of the effects of the management measures on conservation objectives for key Salmon FMU stocks, including those listed under the ESA, as well as an economic assessment of the options. These options serve as alternatives analyzed in this EA. The options also help inform managers in other forums of the likely range of ocean fishery impacts, so inland marine and freshwater fisheries can be structured to achieve the necessary conservation objectives and allocation agreements.

1.3.5 Preseason Report III

This is the final document in the series prepared by the STT. It details the final management measures adopted by the Council for recommendation to the National Marine Fisheries Service (NMFS) for the coming season's regulations. It includes an analysis of the effects of the management measures on conservation objectives for key Salmon FMU stocks, an assessment of the consultation standards for ESA-listed salmon, and an EA. These management measures serve as the Preferred Alternative analyzed in this EA.

1.3.6 West Coast Salmon Harvest Programmatic EIS (PEIS)

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.

1.3.7 Area 2A Pacific Halibut Catch Sharing Plan

A catch sharing plan for Pacific halibut in area 2A (southern U.S. waters) was developed in 1995 to allocate the halibut quota among various user groups and geographic areas. The catch sharing plan included, among other things, an annual allocation of Pacific halibut for the non-Indian commercial salmon fishery, to be taken incidentally during Council-area fisheries. This EA also assesses the impacts of the commercial salmon fishery on the halibut resource.

1.3.8 2005-2006 Groundfish Fishery EIS

The 2005-2006 Council-area groundfish fishery management measures were the subject of an EIS that included the likely effects of Council-area recreational and commercial salmon fisheries on important groundfish stocks. Alternative management measures for salmon fisheries were analyzed, but no modifications to salmon fisheries were recommended, due to the insignificant impacts on groundfish stocks of concern.

1.4 Scoping Summary

The scoping process occurs early in any EA process. It involves consultation with affected and interested parties—both inside and outside of agencies implementing the management measures—in order to determine which issues, because of their potential significance, should be analyzed in depth. Just as important, this process is used to eliminate those issues that are not significant based on public input and the best judgment of state and Federal fishery managers, and supported by other environmental impact analyses, such as the SEIS for the Pacific Coast Salmon Plan and the final PEIS prepared by NMFS, both of which were described above. This narrowing of scope allows the preparers to focus their attention on key issues. It should be emphasized that one aspect of this EA, the conservation objective and resulting management measures related to KRFC, does not fall entirely within the scope of the Salmon FMP, and will therefore require implementation by emergency rule. As noted, the Salmon FMP establishes very specific management goals

and outlines the process for developing management measures to achieve these goals. Fishery managers involved in the process often refer to the "sideboards" established in the Salmon FMP; this normally represents the scope of action that may be contemplated during the annual process. Implementation of an Emergency Action under MSA authority at §305(c)(2)(B) is necessary to temporarily modify the conservation objective in the Salmon FMP in order to implement any alternative allowing fishing in the area of Cape Falcon to Point Sur during May through August, 2006.

Early scoping is conducted by the STT, which comprises fishery scientists from NMFS, the U.S. Fish and Wildlife Service, the three West Coast states, and Indian tribes. Their review of the previous year's fishery provides information that may be relevant to issues that can surface in the coming year. After the review document is produced, the STT and Council staff compile preseason forecasts of the abundance of salmon for the coming fishing season, which for the most part begins in May, although there are limited early openings. This compilation, published as Preseason Report I, is produced in February each year and describes, to the extent practicable, the expected impacts (in terms of meeting conservation objectives) if the previous year's management measures were applied to abundance for the current season. The STT uses several linked computer models to determine fishing mortality, given a set of management measures.

The two Council meetings held in March and April each year, which focus on salmon management, provide opportunities to gain input from a broad cross-section of interested parties and the public, including those fishers likely to be directly affected by the management actions. At the March meeting, the Salmon Advisory Subpanel (SAS), with members representing commercial and recreational fishermen, charter boat operators, Indian tribe representatives, and conservationists, develops three "season options" covering a range from relatively low fishing mortality (more "conservative") to relatively high fishing mortality (more "liberal"). Components of each option may be developed separately for different parts of the coast by subgroups representing commercial, recreational, and tribal interests in each of the three West Coast states. An initial "draft" of these options is then analyzed by the STT, using Council-approved computer models and procedures, which are calibrated to preseason abundance forecasts and expectations for fisheries outside the Council's area of responsibility (i.e., fisheries occurring in Alaskan, Canadian, and inside waters) to project the impact of management measures (e.g., the duration and timing of season openings, quota levels, retention restrictions by species for different sections of the coast) on the ability to meet the Salmon FMP conservation and allocation goals. The options may be further modified, depending on the results of the STT analysis, and are then brought before the Council for examination. The Council also receives comments and recommendations from other bodies involved in salmon management, including NMFS, Indian tribes, Klamath Fishery Management Council (KFMC), and state representatives that sit on the Council, as well as the general public. Council members often recommend additional modifications to the options to ensure conservation objectives and legal obligations are met, clarify provisions, or to balance catch allocation in response to socioeconomic considerations. Over the course of the March meeting, management options are brought before the Council several times before refined final options are approved for public review.

In the week after the March meeting, the STT and Council staff produce Preseason Report II, which describes each of the three options developed during the March meeting and presents the STT's analysis of their predicted impacts in terms of conservation objectives, legal obligations, catch, and economic factors. Along with the Review and Preseason Report I, Preseason Report II is an information source for public hearings. These hearings are held in coastal communities between the March and April Council meetings. Along with any written comments submitted to the Council, testimony during these hearings on the three options are summarized and presented at the April Council meeting.

In addition to the Council process, notice and opportunity for public comment is provided through meetings and caucuses of state, tribal, local governments, and various user groups. This parallel process occurs throughout the February to April time frame when Council recommendations are developed. The two main forums that concern salmon fisheries on the West Coast are KFMC, established at 16 U.S.C. 46085-2, which

focuses on management measures directed at KRFC, and the North of Cape Falcon Forum, sponsored by the State of Washington and northwest Indian tribes with treaty fishing rights, which focuses on Chinook and coho fisheries from Cape Falcon, Oregon to the U.S./Canada border. Other forums include *U.S. v. Oregon* meetings related to ocean and Columbia River fisheries and meetings held by the Washington Fish and Wildlife Commission, the Oregon Fish and Wildlife Commission, and the California Fish and Game Commission. Commission meetings provide opportunities for the public, including stakeholders, to participate in the process of providing policy guidance to Council members and advisory body representatives. 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.

Finally, during the April meeting, the Council crafts the set of management measures that will regulate the coming fishing season. Although it may choose any one of the season options already developed, typically the adopted measures blend elements from these options, taking into consideration public comment, the results of deliberations in the North of Falcon and Klamath forums, and additional information regarding stock status and fishery expectations that may become available. The Council adopts fishery management measures for recommendation to the Secretary. The STT and Council staff then prepare Preseason Report III, which describes the adopted management measures; like the two preceding preseason reports, it contains an analysis of impacts, or fishing mortality to specific stocks, expected from ocean salmon fisheries under this regime. The Council-adopted management measures are then transmitted to the Secretary, so they may be promulgated as the Federal regulations that govern ocean salmon fisheries for the year in question. (Section 6.2 lists public meetings held and agencies and persons consulted during the annual management process.)

At both the March and April meetings, and the coastwide public hearings, there was a significant increase in participation and comments from the various fishing sectors regarding the proposed 2006 management measures. The majority of the comments expressed great concern that elimination of the ocean fisheries that impact KRFC would cause severe economic hardship to coastal communities from central California to central Oregon. Fishermen in these ports would have to forgo the opportunity to harvest other, stronger stocks of Chinook to preserve relatively few KRFC. Those testifying also spoke at length regarding concerns for the demise of the infrastructure that supports the fishing industry and thus the long-term consequences of a fishery closure or severe cutback in 2006.

1.5 Relevant Issues

In addition to the scoping activities described above, previous environmental impact analyses for Council-managed salmon fisheries, and other Council documents, are a valuable resource that can be used to narrow the scope of this analysis to potentially significant issues. These documents present issues the proposed action is likely to affect and aspects of the environment that may have changed since the completion of previous analyses. Agency guidance, in the form of National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6, Environmental Review Procedures for Implementing the NEPA, is a good starting point for identifying potentially significant issues. Section 6.01, which parallels NEPA implementing regulations (40 CFR 1508.27), lists 11 factors that should be used to determine the significance of any major action taken by NOAA. These are:

- Impacts may be both beneficial and adverse -- a significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

- Degree to which public health or safety is affected.

- Unique characteristics of the geographic area.

- Degree to which effects on the human environment are likely to be highly controversial.

- Degree to which effects are highly uncertain or involve unique or unknown risks.

- Degree to which the action establishes a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

- Individually insignificant, but cumulatively significant impacts.

- Degree to which the action adversely affects entities listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historic resources.

- Degree to which endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973, are adversely affected.

- Whether a violation of Federal, state, or local law for environmental protection is threatened.

- Whether a Federal action may result in the introduction or spread of a nonindigenous species.

Section 6.02 of the Order enumerates a more specific set of guidelines for identifying potentially significant environmental impacts resulting from a fishery management action. These are:

- The proposed action may be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action.

- The proposed action may be reasonably expected to jeopardize the sustainability of any non-target species.

- The proposed action may be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs.

- The proposed action may be reasonably expected to have a substantial adverse impact on public health or safety.

- The proposed action may be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species.

- The proposed action may be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species.

- The proposed action may be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc).

- If significant social or economic impacts are interrelated with significant natural or physical environmental effects, then an EIS should discuss all of the effects on the human environment.

- A final factor to be considered in any determination of significance is the degree to which the effects on the quality of the human environment are likely to be highly controversial. Although no action

should be deemed to be significant based solely on its controversial nature, this aspect should be used in weighing the decision on the proper type of environmental review needed to ensure full compliance with NEPA. Socioeconomic factors related to users of the resource should also be considered in determining controversy and significance.

Both sets of guidelines are used in this assessment, but in different ways. The Section 6.02 guidelines are resource or topic specific and have been used to structure the analysis and screen for environmental components and effects that should be evaluated. Within this framework effects are evaluated based on the 11 factors listed in Section 6.01, as relevant.

As noted above, thorough scoping of the EA process should focus on those environmental components likely to be affected by the proposed action. NAO 216-6 Section 6.02 guidelines are used as a screen. If equivalent effects have already been considered in a previous environmental document, and the condition of an environmental component has not changed substantially in ways that would make it more likely the proposed action could significantly affect it, then that component is screened out from consideration. In this way, effects known not to be significant and resource components known not to be affected can be eliminated from consideration. This screening process is summarized below.

6.02(a) - Salmon FMU: Management measures developed annually for Council-managed fisheries control, by various means, the number of fish that will be harvested. They directly affect Salmon FMU populations. Because both the population status and the management measures change each year, and these changes may have significant impacts, this EA considers the impact of different harvest levels under alternatives considered by the Council. The Council's recommended management measures seek to maximize harvest opportunity by targeting stocks that have the largest harvestable surpluses (that is, fish in excess of established conservation needs) while constraining impacts on all stocks within allowable levels. The analysis focuses on fishing mortality to specific stocks, especially in relation to conservation objectives, legal obligations, and socioeconomic allocations identified in the Salmon FMP and NMFS guidance to the Council. Although salmon are target species, management measures are crafted to constrain impacts on salmon stocks that are either ESA-listed or whose status warrants critical attention. All coho stocks originating in Washington, Oregon, and California are affected by Council- area fisheries; however, some Chinook stocks are caught in such low numbers in Council-area fisheries that, according to the Salmon FMP, Council action would have negligible effects on stock status (see Salmon FMP Section 3.2.4.2). Therefore, the impact of management alternatives on these salmon stocks are considered in terms of potential mortality from Council-managed fisheries along with target stocks, and in terms of the specific standards established by the ESA for listed stocks, through agreement with treaty Indian tribes under the provisions of *U.S. v. Washington* and subsequent U.S. District Court Orders (see below), or the provisions of PST agreements.

Because the projected abundance of KRFC is so low in 2006, the Council and NMFS do not have the ability to regulate fisheries to achieve the Salmon FMP conservation objective for KRFC. Therefore, the Council and NMFS focused on the effects of fishing relative to the ability of the stock to achieve maximum sustainable yield (MSY) in the long term. NMFS is required to implement 2006 ocean salmon management measures for the area between Cape Falcon, Oregon and Point Sur, California, in which more than 99% of KRFC impacts occur historically, by emergency rule. The emergency rule would temporarily amend the Salmon FMP conservation objective for KRFC of a spawning escapement floor of no less than 35,000 naturally spawning adults. The emergency rule would change that requirement to ensuring ocean salmon fishery management measures do not jeopardize the capacity of the fishery to produce MSY on a continuing basis.

This EA evaluates the alternatives in terms of long-term sustainability of Salmon FMU stocks and in light of the conservation objectives established in the Salmon FMP, including the temporary amendment by

emergency rule for the KRFC conservation objective required to implement 2006 management measures, as well as NMFS guidance and ESA consultation standards, U.S. District Court orders, and/or the PST.

6.02(b) - Non-target Species: Commercial salmon trollers catch a range of species aside from salmon, albeit in low numbers. The 2000 SEIS found that the impacts of the fishery on fish other than salmon were not significant (see Section 5.2.3). Characteristics of the salmon fishery, such as changes in gear or method of deployment (including time and area) have not changed substantially since the SEIS was completed; however, the status of some of the non-salmon fish stocks taken as incidental catch has changed. For example, there are currently seven groundfish species that have been declared overfished and for which rebuilding plans have been developed: bocaccio, cowcod, darkblotched, canary, widow, and yelloweye rockfish, and Pacific ocean perch. These and other groundfish species are managed under the Council's Groundfish FMP. Under this plan, biennial management measures are established for these species, and an environmental impact analysis is prepared in connection with that process, which also covers landings in the ocean salmon fishery. The EIS for 2005-2006 groundfish management measures found that catch levels for target salmon fisheries would not have a significant impact on overfished groundfish species. Nonetheless, the effect of salmon fishing on selected groundfish species is described in this EA. The criteria used in this EA to evaluate the significance of alternatives in terms of sustainability of non-target groundfish stocks is the likelihood of landing more overfished groundfish species than recent year maximum estimated catch.

Pacific halibut (*Hippoglossus stenolepis*) is also incidentally caught in the salmon fishery, but continues to be a healthy stock. During its March and April meetings, the Council sets management measures for incidentally-caught Pacific halibut in the commercial salmon fishery. Halibut are demersal (bottom-dwelling) fish that may be caught during fisheries that target salmon. The International Pacific Halibut Commission (IPHC) manages halibut fisheries throughout the entire North American range of the fish (Alaska, British Columbia, and the U.S. West Coast) by means of allocated catch quotas. (More information on the IPHC and halibut life history and management is available from the IPHC website, http://www.iphc.washington.edu/halcom/.) The allocation, established annually by the IPHC for the West Coast (referred to as Area 2A in the IPHC's scheme of management zones), is subdivided among various user groups according to a catch sharing plan developed by the Council. This plan allocates 15 percent of the non-Indian commercial halibut allocation in Area 2A to the salmon troll fishery incidental catch during May and June (with provision for additional harvest from July through September if sufficient quota remains). In 1994, an EA was prepared for the catch sharing plan that allocates halibut catch among West Coast fishing sectors. The catch sharing plan is modified annually, or as necessary to accommodate changes, and an EA or Categorical Exclusion is prepared. Incidental catch in the salmon fishery in 2006 falls under terms of this plan, and impacts are not different from those analyzed in the EAs, which concluded they are not significant. Therefore, no further consideration of effects on Pacific halibut will be given in this EA.

6.02(c) - Affected Habitat Including Essential Fish Habitat (EFH): Appendix A of Amendment 14 (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 (page A-58). Although some types of gear, such as bottom trawls are known to have habitat impacts, these gear types are not used in the ocean salmon fisheries considered here, nor is it clear these impacts affect habitat important to salmon. Non-fishing impacts to salmon habitat have been extensive and significant (see pages A-62 to A-110 in EFH Appendix A). However, salmon harvest management measures do not affect the activities that cause these impacts. 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.

6.02(d) - Biodiversity and Ecosystem Function: The 2000 SEIS discusses impacts of the fishery to higher trophic level species including seabirds (Section 5.2.4 and 5.2.5 on pages 5-5 to 5-7) and lower trophic level species (Section 5.2.6 on page 5-7). Higher trophic level species affected by the salmon fishery include

marine mammals, particularly harbor seals and sea lions. Salmon form a part of the diet of these animals, so marine mammals may compete with fisheries over this resource. These marine mammal species are opportunistic feeders and, in general, their populations have been increasing. (However, some other species' populations have been declining.) According to the Pacific Salmon Fisheries Management Final PEIS (pages 4-42 to 4-44), Pacific Coast fisheries have a minimal impact on marine mammals, which is mitigated by NMFS education programs aimed at vessel operators. Both the SEIS and final PEIS found that direct impacts on seabirds are minimal to non-existent. Indirect impacts, due to competition for salmon and the availability of processing offal as a food source, were determined to be minimal. The SEIS notes that "any amount of harvest removes animals that otherwise would have remained in the ecosystem" to prey on lower trophic levels. However, it concludes that fishery removals are not significant in this respect and that wide-scale changes in oceanographic conditions, resulting from El Niño events for example, are the primary determinants of abundance and structure of lower trophic level populations. Maintaining biodiversity, by conserving evolutionarily significant salmon stocks, is a key management goal. Since biodiversity impacts correlate with fishing mortality to depressed and ESA-listed wild stocks, these impacts can be addressed in assessing impacts to target stocks, as discussed above. Based on the analysis in the SEIS and final PEIS, and the fact that determining conditions have not changed significantly, biodiversity and ecosystem impacts will not be separately considered in this document.

6.02(e) - Protected Species Interactions: Section 5.2.4 of the SEIS, referenced above, also discusses direct interactions between marine mammals and ocean salmon fishing vessels. These interactions include vessels approaching these animals, marine mammals feeding on hooked salmon, and rarely, animals that become hooked by or snagged in the gear. The SEIS concludes that these interactions do not constitute a significant impact; the document also notes that these fisheries are classified under the Marine Mammal Protection Act as Category III, indicating there is no record of such impacts. Other listed species that might be affected by the salmon fishery include sea turtles and certain seabirds. Similarly, the SEIS considered possible impacts to these species and determined they were not significant. Therefore, interactions with these protected species will not be considered here. However, various salmon, steelhead, and trout stocks (or evolutionarily significant units[3] [ESUs]) that are potentially caught in the fishery are listed under the ESA. Since 1992, NMFS has issued biological opinions (BOs) indicating ocean salmon fisheries do not jeopardize the continued existence of ESA-listed salmonids or adversely affect their critical habitat (see Section 5.6 for a list of relevant BOs). This determination has been reached through the Section 7 consultation or Section 4(d) determinations process, pursuant to the ESA. This process establishes a set of "consultation standards" the fishery must satisfy in order to avoid a determination that the action jeopardizes the continued existence of a listed ESU. ESA consultation standards must be considered when developing management measures because the proposed action constrains harvest levels in response to stock status, conservation objectives, and legal obligations. As noted above, listed salmon stocks are also components of the target species, but ESA-listed stocks are considered separately under the protected species heading. The criteria used in this EA to evaluate the significance of alternatives in terms of effects on ESA-listed salmon species is by meeting the NMFS ESA consultation standards.

Southern resident killer whales were listed as endangered under the ESA effective February 17, 2006. Chinook salmon have been identified as a primary prey for this population of killer whales. NMFS has initiated Section 7 consultation on the effects of Council area salmon fisheries on southern resident killer whales, but does not expect to have a BO completed until June 2006. NMFS has determined the anticipated Council area fisheries will not result in irreversible or irretrievable commitment of resources with respect to agency action to formulate or implement any reasonable and prudent alternatives, and that if necessary, additional fishery constraints can be implemented through inseason action.

[3] An ESU constitutes a "distinct population segment" for the purposes of listing, delisting, and reclassifying species under the ESA. (See 61 FR 4722 for the current policy on recognizing distinct population segments.)

6.02(f) - 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 EA incorporated into Amendment 8 to the Salmon FMP analyzed alternatives to adjust management measures if unsafe weather affected fishery access. The Council's Preferred Alternative in the Amendment 8 EA was the No Action Alternative, under which weather-related issues are considered during inseason adjustments to management measures. 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.

6.02(g) - Socioeconomic Environment: As noted above, socioeconomic effects are only considered if they are interrelated with environmental effects (see also 40 CFR 1508.14). The 2000 SEIS describes how management measures that could be part of the proposed action have interrelated environmental effects. Allocation of fish between different user groups is the main socioeconomic factor the Council considers when formulating annual management measures. Since management measures with these interrelated effects change from year to year, and they may cause potentially significant impacts, this EA considers certain socioeconomic effects. Overall harvest opportunities and those related to allocation can affect some communities more than others. Disproportional impacts to particular communities resulting from management alternatives are described.

The criteria used in this EA to evaluate the significance of alternatives in terms of socioeconomic impacts is deviation from the low end of the range of community level personal income impacts generated from Council-area commercial and recreational salmon fisheries observed since 1976, when salmon management under authority of the MSA began, and meeting the allocation provisions of the Salmon FMP and of other relevant agreements.

6.02(h) - Cumulative Effects: This class of effects is usually considered separately, because it requires consideration of the impacts of actions other than the proposed action that may occur at different times or places. The incremental effects of these many actions may be collectively significant. In the context of salmon management, for example, past and "reasonably foreseeable" management measures may be considered as well as impacts to salmon habitat not caused by the proposed action. The effect of regulations for the ocean salmon fishery in any given year should be assessed with past and future annual regulations, since they affect a given population cohort. Although habitat impacts have been considered in previous documents, the cumulative effects of these impacts, when combined with fishing permitted under Council authority, should also be assessed. For these reasons, cumulative effects are considered. The West Coast Salmon Harvest Programmatic EIS (NMFS 2003) provides a comprehensive summary of cumulative effects regarding West Coast salmon, including a general inventory of actions known to adversely affect salmon habitat and a list of the factors for decline for ESA-listed species. It examines the degree to which harvest can be expected to contribute to recovery of depressed stocks and the degree to which necessary survival improvements will have to come from other sources of human-induced mortality. It also provides examples of current remedial activities designed to improve the status of salmon stocks.

6.02(i) - Controversy: The final factor, controversy, is not by itself a basis for determining significance. Like other more general factors it is considered during EA preparation, but is not used to structure the analysis.

The screening process described above focuses the impact assessment in this EA on those components of the human environment for which further analysis is needed to determine whether there is a potential significant impact stemming from implementing the proposed action. As noted previously, if it is determined the proposed action has the potential to significantly impact the quality of the human environment, then the agency must prepare an EIS. Conversely, if based on this EA, the agency concludes the proposed action will not have significant impacts, this is disclosed in a Finding of No Significant Impact (FONSI) and an EIS need not be prepared. It should be noted that the evaluation of the three options at the March, 2006 Council

meeting, and subsequently published in *Preseason Report II*, assume historical base period level fisheries for northern (Alaskan and Canadian) and inland (Puget Sound, Coastal Washington, Columbia River, and Klamath River) fisheries. Prior to adoption of a Preferred Alternative, those fisheries are negotiated (state, tribal, Canadian, and/or U.S. governments) to ensure all relevant conservation and allocation objectives can be met. However, the Council may adopt for public review some options that do not meet all relevant objectives, so as not to restrict the range of possible Preferred Alternatives pending completed negotiations for northern and inside fisheries. Because final NMFS guidance was not available for KRFC at the March Council meeting in 2006, a range of options were also considered to frame possible results of that process. Therefore, although an option may appear to have potentially significant impacts to the environment prior to completed negotiations, the Council is not violating the intent of the Salmon FMP or Sustainable Fisheries Act (SFA), nor triggering the need to develop an EIS, since the Council's expectation is the option will meet all relevant objectives. The indication that certain objectives are not met given base level fisheries assumptions also provides a focus for the subsequent negotiations. Further, if the overall impacts of an option do not meet all relevant objectives at the conclusion of negotiations, certain aspects of the option are still likely to be used in crafting a Preferred Alternative that does meet all relevant objectives.

2.0 ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE

Management alternatives applicable to this EA are developed during the annual process described above (see Section 1.4). *Preseason Report I* contains salmon stock abundance projections for the current year and analyzes the impacts if the previous year's management regime were to be implemented. In the NEPA context, the previous year's management regime constitutes the No Action Alternative, which are the expected impacts without the implementation of new management measures that respond to changes in the status of the salmon stocks significantly affected by Council-area fisheries. (According to the regulatory regime for ocean salmon fishing, the fishing season is governed by regulations established annually and apply until new measures are implemented.) *Preseason Report II* presents the three options developed during the March Council meeting, which represent the reasonable range of alternatives that, according to NEPA regulations, must be considered by the decision makers. The final management measures developed at the April Council meeting, and based on the options in *Preseason Report II*, public comment, and input from the Council's advisory bodies, represent the Preferred Alternative, which is described in *Preseason Report III*. Therefore, for the purposes of this EA there are five alternatives drawn from *Preseason Reports I* through *III*. Table 2-1 provides a summary of the analysis comparing the projected impacts of these alternatives.

2.1 Preferred Alternative

The Preferred Alternative, which is the set of management measures adopted by the Council at its April meeting, is summarized in Preseason Report III, Tables 1-3. These tables are appended to this EA; see Appendix A.

For areas south of Cape Falcon, Oregon the Preferred Alternative is most similar to Option II (the three options developed at the Council's March meeting are discussed below). For areas north of Cape Falcon, the Preferred Alternative is a combination of Options I and II.

South of Cape Falcon, Oregon

Primary constraints on the 2006 proposed seasons are (1) KRFC spawning escapement for fisheries between Cape Falcon and Point Sur; (2) endangered Sacramento River winter Chinook for fisheries south of Point Arena, California, and (3) management goals for naturally produced coho salmon over the entire Council management area, including lower Columbia River (LCR) and California coastal stocks, which are listed as threatened under the ESA. Comparing the Preferred Alternative management measures with those in Option II, several refinements were made to increase the natural spawning escapement of KRFC. Changes from Option II were also made in response to comments received at the public hearings in late March and were negotiated in an effort to increase socioeconomic benefits with either negligible biological consequences or as compensation for changes with greater biological benefits. The changes include:

- From Cape Falcon to Florence south jetty, the Commercial season in May was closed, and the June season was reduced to a four days open-three days closed schedule. However, the complete closures in July, August, and October were replaced with nine open days in July, three open days in August, and 15 days open in October. The September season was increased from 11 days to 14 days open.
- In the Preferred Alternative, all Commercial seasons from Florence south jetty to Horse Mt., California were closed for 2006.
- The Preferred Alternative placed a quota of 4,000 Chinook on the September 1-15 Horse Mt. to Point Arena commercial fishery.
- For the Point Arena to Pigeon Point commercial fishery, the Preferred Alternative reduced the days open in July from 15 to 6, increased the days open in August from 29 to 31, and placed a quota of 20,000 Chinook on the September 1-30 fishery.
- For the Pigeon Point to Point Sur commercial fishery, the Preferred Alternative added the last six days in July and the last two days in August to the season, but reduced the weekly landing limit to 75 Chinook per vessel from 100 Chinook per vessel.
- For the Cape Falcon to Florence South Jetty commercial fishery, the Preferred Alternative requires all fish caught in the area to be landed in the State of Oregon to ensure catches are sampled and assigned to appropriate catch areas for postseason impact assessment.
- For commercial fisheries in the Horse Mt. to Point Sur areas, the Preferred Alternative requires all fish caught in the area to be landed either in the area or specified adjacent areas to ensure catches are sampled and assigned to the appropriate catch areas for quota monitoring and postseason impact assessment.
- From Cape Falcon to the Oregon/California border, the Preferred Alternative included additional opportunity for the recreational mark selective coho fishery September 1 to 6, if there is sufficient quota remaining from the June 17 to July 31 fishery.
- From Humbug Mt., Oregon to Horse Mt., California, the recreational Chinook season in May was increased by 13 days, the entire month of June was opened, but the nine open days in August were closed.
- The Preferred Alternative increased the open days in the recreational fishery between Horse Mt. and Point Arena, including the entire month of May, 22 days in June, and 10 additional days in July
- The Preferred Alternative increased the days open in the Point Arena to Pigeon Point recreational fishery by a total of 154 days, including all of April (inside 3 state waters) and August, most of June and July, and half of September and October.

- The Preferred Alternative increased the days open in the Pigeon Point to Point Sur recreational fishery by a total of 134 days, including all of April (inside 3 state waters), June, July, and August.

North of Cape Falcon, Oregon

Comparing the Preferred Alternative management measures with those in Options I and II, several refinements were made to simultaneously satisfy requirements of the Salmon Framework Plan, NMFS ESA consultation standards, and PST obligations. Primary constraints on the 2006 proposed seasons are (1) threatened LCR natural tule Chinook north of Cape Falcon; and (2) management goals for naturally produced coho salmon over the entire Council management area, including LCR natural coho, which are listed as threatened under the ESA, and Interior Fraser (Thompson River, B.C.) coho, which are subject to provisions of the PST. Changes from Option I were also made in response to comments received at the public hearings in late March and were negotiated in an effort to increase socioeconomic benefits with either negligible biological consequences or as compensation for changes with greater biological benefits. The changes include:

- The overall Chinook total allowable catch (TAC) for non-Indian fisheries in the Preferred Alternative was 65,000, the same as in Option I. The overall coho TAC was 80,000 marked coho, the same as Option II.
- A preseason trade was included in the Preferred Alternative; 6,000 marked coho from the commercial fishery to the recreational fishery in exchange for 1,500 Chinook.
- The May/June commercial fishery weekly landing limit in the Preferred Alternative was changed to 80 Chinook from 75 Chinook in Option II, or 100 Chinook in Option I.
- The July-September commercial fishery in the Preferred Alternative set a landing limit of 35 marked coho per vessel per week, down form 100 marked coho in Options I and II. The Preferred Alternative also included a gear requirement of only plugs 6 inches (15.2 cm) or longer in the fishery.
- The Preferred Alternative requires all fish caught in the commercial fishery north of Leadbetter Point to be landed in the area and north of Leadbetter Point to ensure catches are sampled and assigned to appropriate catch areas for accurate inseason quota monitoring and postseason impact assessment.
- The Preferred Alternative requires all fish caught in the commercial fishery south of Leadbetter Point to be landed south of Leadbetter Point, or in Garibaldi, Oregon to ensure catches are sampled and assigned to appropriate catch areas for accurate inseason quota monitoring and postseason impact assessment.
- Recreational fisheries under the Preferred Alternative were similar to Option II, except that an Area 4B add-on fishery with a quota of 3,000 marked quota was included.
- The treaty-Indian ocean fishery was intermediate between Options I and II with overall Chinook TAC of 42,200 and an overall coho TAC of 37,500.

2.2 No Action Alternative

As noted above, the No Action Alternative consists of the previous year's regulations. For analytical purposes, 2006 Chinook and coho abundance was modeled with 2005 preseason management measures and assumptions (no 2005 inseason actions are considered). These management measures may be found in Table I-1 through I-3 of the *Preseason Report III* for 2006, which is appended to this EA.

2.3 Other Alternatives Considered

Management measures for the three options developed during the March Council meeting are summarized in Tables 1, 2, and 3 in the 2006 *Preseason Report II*. Option I provides the most liberal seasons for both coho and Chinook coastwide. Option III for areas south of Cape Falcon represents a complete closure of all fisheries with modeled impacts on 2006 KRFC potential spawners. This option was considered because of the requirements of the Salmon FMP when a stock triggers a Conservation Alert as described in Section 1.2.2 of this document, and Section 3.2.2 of the Salmon FMP.

All non-Indian fisheries allowing coho retention are selective for coho marked with a healed adipose fin clip (marked). However, in Option II for commercial fisheries north of Cape Falcon, there are provisions for inseason action to allow retention of all legal sized coho in non-Indian commercial fisheries north of Cape Falcon, with specific dates set for decision points.

All recreational and commercial non-Indian fisheries north of Cape Falcon, Oregon are managed on quotas (or guidelines) to be taken within a specified time frame. The TAC is allocated among port areas based on terms of the Salmon FMP. North of Cape Falcon the non-Indian commercial TAC is 32,500 Chinook and 17,600 coho for Option I; 25,000 Chinook and 12,800 coho for Option II; and 17,500 Chinook and 8,000 coho for Option III. The recreational TAC north of Cape Falcon is 32,500 Chinook and 92,400 coho for Option I; 25,000 Chinook and 67,200 coho for Option II; and 17,500 Chinook and42,000 coho for Option III. Treaty Indian fisheries north of Cape Falcon also operate on a quota system, but only for the period between May 1 and September 30. The treaty Indian TAC north of Cape Falcon is 50,000 Chinook and 45,000 coho for Option I; 33,200 Chinook and 35,000 coho for Option II; and 25,000 Chinook and 25,000 coho for Option III.

Options I, II, and III require all fish caught in the commercial fishery north of Leadbetter Point to be landed in the area and north of Leadbetter Point and all fish caught in the commercial fishery south of Leadbetter Point to be landed south of Leadbetter Point, or in Garibaldi, Oregon.

Fisheries south of Cape Falcon, Oregon, are managed primarily by season dates, although quota fisheries within specified time frames are employed in some fisheries. Coho quotas for the central Oregon mark selective recreational coho fishery are 40,000 for Option I and 20,000 for Option II. The fishery is closed under Option III. The area included in the mark selective recreational coho fishery is from Cape Falcon to the OR/CA border for both Option I and II.

Commercial non-Indian quotas for the September time frame in the Oregon portion of the Klamath Management Zone (KMZ) are 2,000 Chinook in Option I and 1,500 in Option II. The fishery is closed in Option III. In the California portion of the KMZ, the September commercial non-Indian quota is 2,000 Chinook for Option I and closed for options II and III.

Chinook possession and landing limits for commercial fisheries between Cape Falcon and Point Sur are included in Options I and II. For the Cape Falcon to Humbug Mt. area, landing limits range from 50 to 100 Chinook per calendar week (or open period), depending on the area, time, and Option. For the KMZ, landing limits are 45 Chinook per week in the Oregon portion and 30 Chinook in the California portion for options with September openings. Landing limits in the Point Arena to Pigeon Point area are 50 Chinook per week for both Options I and II. Landing limits in the Pigeon Point to Point Sur area are 100 Chinook per week for both Options I and II.

Table 2-1. Comparison of impacts of alternatives on selected key stocks. Source for the Preferred Alternative is Preseason Report III, for the No Action Alternative is Preseason Report I, and for Options I, II, and III is Preseason Report II. (Page 1 of 2)

Impact Criterion	Preferred Alternative	No Action	Option I	Option II	Option III
Chinook					
California Central Valley fall Chinook escapement Goal: 122,000-180,000	398,500	359.200	385,300	440,100	550,300
California Coast (Klamath fall Chinook Age 4 harvest rate) Goal: ≤16%	11.5%	12.2%	17.0%	14.8%	6.7%
Klamath River (Natural spawning adults) Goal: ≥35,000	21,100	18,700	13,800	18,800	25,400
Oregon Coast		Natural spawner escapement goal met			
Columbia River Natural Tule (total exploitation rate) Goal: ≤49%	47.2%	>49.0%	52.4%	48.1%	41.8%
Snake River Fall Index (exploitation rate as a percentage of the base period) Goal: ≤70%	64.3%	>70.0%	77.0%	68.6%	58.4%
Washington Coast		Council fisheries have a minor impact (<5% exploitation rate) on these stocks; no evaluation			
Puget Sound	Impacts consistent with NMFS Guidance	Council fisheries have a minor impact (<5% exploitation rate) on these stocks; no evaluation			
Coho					
Oregon Production Index (OPI)	Conservation goals met for all stocks; Upper Columbia sharing agreement met.	Conservation goals met for all stocks except Lower Columbia River natural coho; Upper Columbia sharing agreement met.	Conservation goals met for all stocks; Upper Columbia sharing agreement met.		
Washington Coast and Puget Sound		Conservation goals met for all stocks Conservation goals met for all stocks			
Canadian Stocks (Interior Fraser total exploitation rate for southern U.S. fisheries) Goal: ≤10.0%	9.2%	10.3%	9.2%	8.1%	7.3%

Table 2-1. Comparison of impacts of alternatives on selected key stocks. Source for the Preferred Alternative is Preseason Report III, for the No Action Alternative is Preseason Report I, and for Options I, II, and III is Preseason Report II. (Page 2 of 2)

Impact Criterion	Preferred Alternative	No Action	Option I	Option II	Option III
Coastwide community income associated with the non-Indian commercial troll fishery (millions $)	14.1	No dollar value determined because this alternative was not viable	20.5	15.4	1.3
Coastwide community income associated with the recreational ocean salmon fishery (millions $)	27.2	No dollar value determined because this alternative was not viable	26.6	14.0	4.8

3.0 AFFECTED ENVIRONMENT

The following descriptions summarize information provided in the Salmon FMP and preseason reports.

3.1 Salmon FMU Stocks and Non-salmon Incidental Catch

3.1.1 Salmon FMU Stocks

Salmon are anadromous, living in the ocean, but returning to freshwater to spawn, and semelparous, dying after they spawn. Eggs are laid in nests (called redds) in stream bottoms with fairly specific characteristics, including clear, cool water and suitable gravel for redd excavation. After an incubation period, which varies depending on water temperature, the eggs hatch into yolk sac larvae, which remain in the gravel until the sac is absorbed. These fry emerge, and after maturing into smolts capable of living in salt water, migrate downstream. These smolts may pause in lakes or estuaries before entering the ocean environment. Adults then spend from one to four years in the ocean before returning to spawn. Salmon return predominantly to their natal streams to spawn. Several stocks may return to freshwater during a given season; this constitutes a seasonal run. Therefore, management measures aim to constrain fishery impacts on distinct stocks or runs to levels appropriate for their status, as determined by the difference between projections of abundance and conservation needs.

Individual stocks exhibit considerable variability within these life history parameters: pre-spawning adult and post-hatchlings can spend varying amounts of time in freshwater, fish can mature at different ages, and ocean migration patterns can differ. In addition to natural characteristics, the development of hatchery rearing programs over the past century has added another dimension to management. As noted in Section 1, Council-managed ocean fisheries catch mostly Chinook and coho salmon, and, to a lesser extent, pink salmon in odd-numbered years.

Population sustainability is predicated on the return of a sufficient number of adult fish, referred to as escapement, and their ability to successfully spawn. (Hatchery programs have the goal of increasing survival of juvenile fish by raising them under artificial conditions where mortality is comparatively low.) Management focuses on ensuring sufficient escapement for particular stocks and must also consider the timing of the seasonal runs in setting fishing seasons. Escapement levels can be assessed by monitoring the number of fish that reach freshwater spawning areas. Alternatively, managers may use allowable fishery exploitation rates instead of, or in addition to, escapement measures. Exploitation rates are commonly used to allow some fishing opportunity that might otherwise be precluded if management goals were based exclusively on escapement levels for depressed stocks. The abundance of hatchery-raised salmon, which in comparison to wild stocks are a less important reservoir of genetic variability,[4] has prompted management measures that direct fishermen to target and retain hatchery stocks in preference to wild fish.

Both Chinook and coho salmon have specific life history features. Chinook show considerable life history variation. In addition to age of maturity and timing of entry to freshwater, stream-type and ocean-type races have been identified. Stream-type fish spend one to two years in freshwater as juveniles before moving to the ocean. Adults enter freshwater in spring and summer, and spawn upriver in late summer or early fall. Juvenile ocean-type fish spend a few days to several months in freshwater, but may spend a long time in estuarine areas. The timing of adult entry varies from late summer-early fall into winter months. In some river systems, Chinook may enter freshwater throughout a good portion of the year. However, not all runs types are equally abundant. In Oregon and Washington, spring (March through May) and fall (August

[4] Because the parent stock is fairly small, genetic diversity of these populations is lower. A related issue arises when hatchery-raised fish, returning to spawn as adults, interbreed with wild stocks, affecting wild population fitness.

through November) Chinook runs are most common; a few stocks run in summer (May through July). In California there are also late fall and winter runs (December through July) in the Sacramento River. (A late fall run has also been reported from the Eel River.) Chinook salmon mature and return to spawn between two to six years of age, although most returning fish are three to five years old. Precocious males that return to spawn early, at age two or three, are called "jacks." In contrast to Chinook, coho salmon have a relatively fixed residence time in fresh and saltwater and mature predominantly as age-three fish. Juveniles spend at least a year in freshwater and usually 18 months at sea before maturity. Like Chinook, precocious male coho jacks return to spawn early. Although their historic range stretches south to Monterey Bay, California, most production currently occurs north of California. Most coho spawning sites are in smaller, low-gradient streams and tributaries. Unlike the year round distribution of Chinook runs, coho generally return to spawn in the fall. Pink salmon are caught in significant numbers in odd numbered years, such as 2005, and can be considered target species in odd numbered years for the purposes of this EA. Pink salmon spawn in areas close to saltwater, and have a very short freshwater residence time as juveniles, migrating to the ocean soon after emergence. Adults return almost exclusively as two-year-olds. (Additional information about Council-managed salmons species' life histories may be found in EFH Appendix A, which describes salmon EFH.)

Salmon FMP Table 3-1 (an updated version is in Table A-1 in Appendix A of *Preseason Report I*) summarizes the individual West Coast stocks (or runs) identified for the purpose of managing ocean fisheries. This table describes salmon conservation objectives for each stock or run. Chinook stocks are grouped into six major geographic categories, coho into three, and pink into two. For reference, Chinook and coho geographic categories and component stocks (both hatchery and wild) are listed in Table 3-1 in this document. Note that two wild Chinook stocks are listed as endangered under the Federal ESA and 17 are listed as threatened, and two[5] wild coho stocks are listed as threatened. Lower Columbia River natural coho were also listed as threatened under the Federal ESA in June, 2005, and have become a driving constraint in fisheries north of Humbug Mt. Oregon.

Because salmon are anadromous, it is relatively easy to monitor the number fish that return to spawn (inriver escapement) and determine whether conservation objectives have been achieved. However, managers also need to predict ocean abundance and ocean escapement (number of fish reaching freshwater and available for inriver fisheries and escapement to spawning grounds). Although predictions cannot be made for all of the stocks listed in the Salmon FMP, estimates are made for the major stock components of the fishery. The components of the harvest for which abundance predictions are made is sufficient to allow reasonable projections of overall catch and bycatch mortality. Tables I-1 and I-2 in *Preseason Report I* summarize preseason estimates for the current season (2006) and several preceding years. Figures 3-1 and 3-2 display these estimates. *Preseason Report I* also provides detailed information on the performance of each predictor and a summary of 2006 stock status based on predictions.

Overall, abundance projections for Chinook and coho indicate substantial fisheries can be conducted off the coasts of Washington, northern Oregon, and central California in 2006, however because KRFC are not projected to meet the floor value of 35,000 natural spwning adults described in the Salmon FMP, some fisheries between Cape Falcon, Oregon and Point Sur, California will be severely constrained or closed. Figures 3-1 and 3-2 display the forecast data from *Preseason Report I* Tables I-1 and I-2. (It should be noted that these tables use different measures for some of the stocks, such as ocean abundance versus ocean escapement, so the comparisons made in the figures are not exact. Nonetheless, they provide a general idea of the relative abundance from year to year of different stocks. Consult *Preseason Report I* for more information on the predictors.) The figures show Chinook abundance is predicted to be substantially lower in 2006 than in 2005, both for the major California stocks and Columbia River stocks. Because KRFC are not projected to meet the 35,000 natural adult spawner floor they are flagged with a Conservation Alert. Coho

[5] The National Marine Fisheries Service completed a status review of the Oregon coastal coho ESU in 2005 and concluded the ESU did not warrant listing under the ESA.

salmon abundance in 2006 is expected to be mixed, with some stocks higher and others lower. Oregon Production Index (OPI) hatchery and Puget Sound hatchery stocks are predicted to up modestly while other stocks show lower abundance compared to 2005 predictions. Oregon Coastal natural (OCN) coho show the greatest year-on-year change in predicted abundance, down by 60 percent.

3.1.2 Non-salmon Incidental Catch

Groundfish

These species are managed under the Council's Groundfish FMP. Under this plan biennial management measures are established for these species, and an EIS is prepared in connection with that process. The biennial management measures anticipate and take into account incidental groundfish in the ocean salmon fishery. This incidental groundfish catch is considered part of the open access groundfish fishery. During the groundfish process, expected groundfish bycatch in the salmon fishery is estimated, based on previous year's incidental catch levels. In 2006, no regulations specific to the ocean commercial salmon troll fishery were implemented as part of groundfish annual management. While the levels of salmon catch fluctuate from year to year, the amount of groundfish taken as incidental catch is very low, so changes in the salmon fishery do not substantially alter the projections for harvest-related mortality in the groundfish fishery (projections made as part of the development of the groundfish annual specifications). Any unexpected expansion in incidental groundfish harvest would be taken into account in management of the groundfish open access fishery and appropriate inseason adjustments made to groundfish regulations (e.g., season closures or reduced landing limits).

Various groundfish species are caught incidentally in ocean salmon fisheries. Table 3-4 shows landings of selected, overfished groundfish species and total groundfish landings in 2000 and 2001. Four of the eight overfished species are listed in the table; of the remaining four, darkblotched rockfish, Pacific Ocean perch and cowcod are unlikely to be caught because they occur in habitats outside areas where salmon trolling occurs. Although data from 2002 through 2005 are not available at this time, it is not likely there has been a substantial change in amount of groundfish catches in salmon fisheries, as effort has not increased substantially in salmon fisheries and landing restrictions for overfished groundfish have become more conservative. The table also lists OYs for the reported overfished species. It can be seen that the 2001 landings represent a small fraction of these OYs. The EIS for 2005-2006 groundfish specifications and management measures also provides estimates of catch mortality by fishery for 2005. These estimates are generally in line with 2001 landings, except the document reports an estimate of 1.6 mt of canary rockfish total catch for the commercial salmon troll fishery. Canary rockfish are probably of greatest concern, since they have one of the lowest OYs (47.3 mt), so salmon troll catches represent a greater proportion of this limit.

A recreational vessel (charter or private) may target both groundfish and salmon on a single trip. Recreational groundfish catches are regulated through the groundfish management process. In 2006, various bag limits were imposed, varying by state or region and species, to limit catches of overfished species. Seasonal closures to recreational groundfish fisheries have also been implemented.

If incidental groundfish catch in the salmon fishery were to expand enough to cause increased restrictions in the open access groundfish fishery, the primary effect would depend on the nature of the restriction. If a season closure were to be imposed, the greatest burden of the reduction would be imposed on vessels targeting groundfish. Groundfish taken incidentally in fisheries targeting nongroundfish species would be discarded. If a trip limit reduction were to be imposed, the reduction would be borne primarily by the sector of the open access fishery that makes trips close to the existing limit and would be further constrained by the reduction of those limits. The effect of the constraint, whether a trip limit reduction or season closure, would be regulatory discards (to the degree the incidental harvest is unavoidable) and discard mortality (to the

degree discarded fish die). Again, given the level of bycatch in the salmon fishery, it does not appear likely that a substantial increase in groundfish catch will be expected with the increase in salmon harvest.

Other Species

Other Council-managed species such as halibut, highly migratory species, 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 shows 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 these non-salmon stocks. Fisheries for these non-salmon species are managed under other Council management plans or other jurisdictions. At present, these other non-salmon stocks are not the subject of overfishing concerns.

3.2 Salmon Stocks Listed Under the Endangered Species Act

ESA-listed species are managed under regulations pursuant to that law in addition to the MSA. "Take" (a term that covers a broader range of impacts than just mortality) of listed species may be allowed as long as it is not the primary purpose of the activity. (Therefore, catches of ESA-listed stocks are termed incidental take.) For salmon fisheries, this means incidental mortality may be allowed (including, for example, fish that are released or "drop off" the hook and consequently die). As part of the process authorizing such take, regulatory agencies must consult with NMFS[6] in order to ensure fisheries conducted in the Council area do not "jeopardize the continued existence of the species" (or in the case of salmon, the listed ESUs). Because of the Council's central role in developing fishery management regimes, it must take the results of such consultations into account. Typically this process, termed a "Section 7 consultation" after the relevant section in the ESA, results in a BO that applies a set of "consultation standards" to the subject activity and mandates those actions that must be taken in order to avoid such jeopardy. As listings have occurred, NMFS has initiated formal Section 7 consultations and issued BOs which consider the impacts to listed salmonid species resulting from proposed implementation of the FMP (long-term opinions), or in some cases, from proposed implementation of the annual management measures. The consultation standards, which are quantitative targets that must be met to avoid jeopardy, are also incorporated into the Salmon FMP and play an important part in developing annual management measures. A Section 7 consultation may be reinitiated periodically as environmental conditions change, and new measures may be required to avoid jeopardy. (BOs for Council-managed salmon stocks are listed in Section 5.6 and are available from the NMFS Northwest Region office. These documents also provide detailed information on the biology and status of these stocks.)

In addition to the Section 7 consultation, actions that fall under the jurisdiction of the ESA may also be permitted through ESA Section 10 and ESA Section 4(d). Section 10 generally covers scientific, research, and propagation activities that may affect ESA-listed species. Section 4(d) covers the activities of state and local governments and private citizens.

Section 4(d) of the ESA requires NMFS and the U.S. Fish and Wildlife Service to promulgate "protective regulations" for threatened species (Section 4(d) is not applicable to species listed as endangered) whenever it is deemed "necessary and advisable to provide for the conservation of such species."

> "Whenever any species is listed as a threatened species pursuant to subsection (c) of this section, the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1) of this title ..."

[6] NMFS is the designated agency for listed anadromous and marine species. The U.S. Fish and Wildlife Service is responsible for listed terrestrial species.

These protective rules for threatened species may apply to any or all of the ESA Section 9 protections that automatically prohibit take of species listed as endangered. The rules need not prohibit all take. There may be an "exception" from the prohibitions on take, so long as the take occurs as the result of a program that adequately protects the listed species and its habitat. In other words, the 4(d) rule can restrict the situations to which the take prohibitions apply.

Sec 9(a)(1) includes the take prohibition. The U.S. Fish and Wildlife Service has adopted a blanket regulation automatically applying the take prohibition to all threatened species upon listing. NMFS has no comparable blanket 4(d) regulation. Instead, NMFS promulgates 4(d) regulations on a species-by-species basis once a species is listed as threatened.

In proposing and finalizing a 4(d) rule, NMFS may establish exemptions to the take prohibition for specified categories of activities that NMFS finds "contribute to conserving listed salmonids." Other exemptions cover habitat-degrading activities (and tribal and recreational fishing activities) that NMFS believes are governed by a program that adequately limits impacts on listed salmonids.

As part of the process for developing annual management measures, NMFS summarizes the current consultation standards and may provide additional guidance to the Council on minimizing the take of listed species. This guidance, a letter dated March 6, 2006, was presented to the Council during its March meeting. It describes requirements under relevant BOs and consultation standards for the current season. Pages 10-12 in *Preseason Report II* and Appendix A in *Preseason Report III* summarize this guidance.

3.2.1 Endangered Killer Whales

Southern resident killer whales were recently listed as endangered under the ESA effective February 16, 2006. NMFS has initiated a Section 7 consultation regarding the effects of Council salmon fisheries on southern resident killer whales. The southern resident killer whales are the significant population in the Northwest Region. These whales are the "resident" type, spending specific periods each year in the San Juan Islands and Puget Sound, and feed mostly on salmon.

3.3 Socioeconomic Environment

Chapter IV in the *Review of 2005 Ocean Salmon Fisheries* provides information on the socioeconomic environment. More extensive information on ocean and inside salmon fisheries is provided in Appendix B to the Salmon FMP. Information on fishing communities is provided in Appendices A and B to the Council's description of West Coast fishing communities.

The most significant trend in the non-Indian commercial troll fishery is the steep decline in the real exvessel value of landings from the 1980s to the 1990s; there was a modest increase over the past few years (see Figure IV-4 in the *Review*). These trends reflect both declining landings and the real exvessel price for coho and Chinook during that period; prices did increase sharply in the past few years, contributing to overall revenue increase (see Figure IV-3 in the *Review*). Coastwide, the number of participating commercial vessels has declined and in 2005 was 6% less than in 2004. In California participation decreased by 9% compared to 2004, and 72% compared to the 1986-1990 average; in Oregon participation decreased by 5% compared to 2004, and was 72% below the 1986-1990 average; in Washington participation increased by 6% compared to 2004, but was 90% below compared to the 1986-1990 average.

Recreational fishing for ocean salmon includes private vessels, charter boats, and some shore-based fishing, although this last component accounts for a small amount of the recreational ocean catch. In 2005 California exhibited the highest proportion of charter boat participation of the three states and the highest overall level of

recreational effort, with a combined 171,900 estimated trips, of which 40 percent were on charter boats. This reflects a general recovery in recreational participation since 2003, although down from 2004. Effort in Oregon and Washington fell substantially in 2005 from the levels seen in 2003 and 2004, although it was still higher than typical values in the 1990s (Figure 3-6). Over the long term there has been a decline in the number of ocean recreational trips, with most of the decline occurring from the Eureka area north. In recent years, there has been some recovery in Washington and Oregon north of Humbug Mountain with the creation of mark-selective fisheries for coho with healed adipose fin clips.

While analysis of impacts to the natural environment is organized around stocks that spawn in particular rivers, the social dimension, including management measures, is organized around ocean management areas, as described in the Salmon FMP. These areas also correspond to some extent with the ocean distribution of salmon stocks, although stocks are mixed in offshore waters. Broadly, from north to south these 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' 30" N. lat.) on Oregon's southern coast; (3) the Klamath Management Zone, which covers ocean waters from Humbug Mountain in southern Oregon to Horse Mountain (40°05' N. lat.) in northern California; and (4) from Horse Mountain to the U.S./Mexican border. (There are also numerous subdivisions within these areas used to further balance stock conservation and harvest allocation needs.) Figure 3-3 shows the boundaries of these areas and the main salmon ports. The following description of the fisheries and fishing communities is organized around these areas and is derived from the *Review*. For the purpose of characterizing the economic impact of Council area salmon fisheries, coastal community level personal income impacts were used (Figures 3-7a and 3-7b).

3.3.1 U.S./Canada Border to Cape Falcon

Stocks on Which the Fisheries Rely

Columbia River tule stocks comprise the bulk of the Chinook salmon caught in this area, although stocks from British Columbia, Puget Sound, Central and Northern Oregon, and California also contribute. (See *Preseason Report I* and especially Table A-1 for details on the occurrence of stocks in ocean fisheries.) Columbia River, Washington Coast, and Puget Sound stocks are the main contributors to coho catches in this area. Indian tribes land a portion of the total catch in accordance with treaty rights. Pink salmon that contribute to fisheries in this zone originate primarily from Puget Sound and the Fraser River.

Commercial Fisheries

The area north of Cape Falcon covers fisheries around the Columbia River mouth and the Washington coast. Ports in this area include Neah Bay and La Push on the Olympic Peninsula; Westport on the central Washington Coast; Ilwaco, Washington, on the north side of the Columbia River mouth; and Astoria, Oregon, on the south side of the Columbia River mouth. (Smaller ports whose landings statistics are grouped with those of these ports are listed in footnotes to Table IV-6 through IV-8 in the *Review of 2005 Ocean Salmon Fisheries*.) Figures 3-4a and 3-4b display historical commercial landings by major catch areas. In the figures, port areas have been grouped by management areas and show that the north of Cape Falcon area accounts for a small proportion of commercial Chinook landings, about 13% in 2005. Coho stocks experienced serious declines in the early 1990s. Regulatory action to limit catches accounts for the immediate fall in landings; retention of coho has been prohibited south of Cape Falcon since 1993. Thus, total coho landings are small and all but some minor illegal landings are made north of Cape Falcon. (For more information on the history of these management actions refer to Amendment 13 to the Salmon FMP.)

Tribal Fisheries

The Hoh, S'Klallam, Makah, Quileute, and Quinault tribes participate in ocean troll fisheries in the area from Grays Harbor northward. Ceremonial and subsistence fishing also occurs. There are no tribal fisheries in ocean waters south of this zone. Tribal fisheries operate in Puget Sound, Washington coastal rivers, the Columbia River, the Klamath River, and other coastal bays, estuaries, and rivers. Tribal fisheries are discussed in detail in Appendix B to the EIS prepared for Amendment 14 to the Salmon FMP.

Recreational Fisheries

In 2005, the north of Cape Falcon area accounted for 37% of the total Council-wide ocean area recreational landings of all salmon species (Table 3-3; Figure 3-5). As with commercial landings, the north of Cape Falcon area accounts for the largest share of coho landings at about 93% in 2005. The Salmon FMP allocates a larger portion of the coho total allowable catch to the recreational fishery as reflected in the management measures. This is facilitated by allowing retention of coho marked with a healed adipose fin clip. In 2005, ports north of Cape Falcon accounted for 31% of recreational fishing trips in the Council area (Figure 3-6). Two-thirds of these trips were made by private vessels. Westport and Columbia River ports (Astoria and Ilwaco) are usually the dominant ports for charter trips, although Neah Bay surpassed Westport in 2004 and 2005.

Two recreational fisheries adjacent to this ocean management area are particularly important considerations in estimating the impacts of management options for the ocean. One is referred to as the Buoy 10 recreational fishery, in reference to a navigational aid at the entrance to the Columbia River that demarcates the inner boundary between the ocean and the Columbia River. This fishery is important because it impacts a substantial portion of Chinook and coho stocks from the Columbia River at a point where fish are just entering freshwater and because it also intercepts coho stocks destined for other river systems. The second fishery is referred to as Area 4B in reference to state waters near Neah Bay in the Strait of Juan de Fuca. Like the Buoy 10 fishery, recreational fisheries here intercept both local and non-local stocks, in this case, predominantly stocks entering Puget Sound or returning to Canadian Rivers. When the ocean fishery is open, Area 4B is managed as part of the ocean fishery; however, when the ocean fishery closes, the state will often keep the Area 4B fishery open as a state-managed fishery. There was no Area 4B fishery in 2005 because there was sufficient opportunity to harvest surplus coho in ocean fisheries.

3.3.2 Cape Falcon to Humbug Mountain (Central Oregon Coast)

Stocks on Which the Fisheries Rely

Fisheries in this area catch a mix of stocks, which varies from year to year in response to the status of individual stocks. Oregon Coast Chinook, Central Valley, and KRFC stocks contribute substantially to these fisheries. Although regulations have prohibited retention of coho in commercial fisheries south of Cape Falcon since 1993, limited recreational fishing that is selective for marked coho has been permitted since 1999. Washington coastal, Columbia River, and Oregon coastal coho stocks are encountered in this area.

Commercial Fisheries

Oregon coast ports between Cape Falcon and the KMZ are the major contributors to Chinook landings, along with California ports south of the KMZ; in 2005, the Cape Falcon to Humbug Mountain harvest accounted for 36% of all commercial Chinook landings from the Council area (Figure 3-4). Coho landings were very large between Cape Falcon and Humbug Mountain until 1992 when, as noted, stock declines coupled with regulatory actions eliminated most landings south of Cape Falcon. (Some mortality to coho stocks still occurs in conjunction with effort targeted on Chinook. Mortality from gear encounters, including drop-off and hook-

and-release, is accounted for in coho mortality estimates.) Tillamook, Newport, and Coos Bay are the major port areas in this zone; almost half of the Chinook landings were made at Newport.

Recreational Fisheries

Central Oregon recreational coho landings accounted for about 6% of Council-area-wide recreational coho catch (Table 3-3) and 8% of the total recreational salmon catch (Figure 3-5) in 2005. Seasonal management measures allowed a selective fishery for marked coho in this area. This area accounted for 15%t of Council-area-wide recreational fishing trips in 2005; 85% were on private boats (Figure 3-6). Of the three ports in this area, Newport originated the most charter trips in 2005. But the two other ports (Tillamook and Coos Bay) each originated more private trips than the number of charter trips or private trips out of Newport. Thus, while Newport is an important center for charter fishing, recreational fishing on private boats is important at all of the ports in the area.

3.3.3 Humbug Mountain to Horse Mountain (KMZ)

The KMZ covers waters in southern Oregon and northern California around the mouth of the Klamath River. This is geographically the smallest zone. A significant component of the allocation issues in this zone are the harvest needs of Klamath River tribal and sport fisheries.

Stocks on Which the Fisheries Rely

The KMZ was created to focus management on KRFC because the impacts of ocean fisheries have predominantly occurred in this area. Other major contributors to the harvest in this area include the Sacramento Valley and southern Oregon coast Chinook stocks. Retention of coho is prohibited in California (NMFS ESA consultation standard for southern Oregon/northern California coastal [SONCC] and central California coastal [CCC] coho ESUs).

Commercial Fishery

This area accounts for a small proportion of commercial landings. In 2005, only about 1% of Council-area-wide commercial Chinook landings were made at the three major ports in this zone: Brookings, Oregon; and Crescent City and Eureka in California (Figure 3-4).

Recreational Fishery

This area accounts for a small portion of recreational landings, about 11% of coastwide Chinook landings (Table 3-3; Figure 3-5). About 9% of Council-area-wide angler trips occurred in the KMZ in 2005, with 96% of these trips made on private vessels (Figure 3-6). Charter fishing in the zone, from a Council- area-wide perspective, accounted for less than half a percent in 2005.

3.3.4 South of Horse Mountain

Although this area is defined as stretching to the U.S./Mexican border, ocean salmon fishing generally occurs only as far south as Point Conception.

Stocks on Which the Fisheries Rely

Central Valley Chinook stocks are important throughout this area, particularly south of Fort Bragg (Point Arena). Southern Oregon Chinook stocks contribute to fisheries in the northern portion of this area. KRFC and Sacramento River winter run Chinook stocks are also caught in this area, and the conservation needs for

these stocks often have a significant effect on ocean harvest management measures. Coho retention is prohibited in California (NMFS ESA consultation standard for SONCC and CCC coho ESUs).

Commercial Fisheries

California commercial fisheries historically have been the major component of Council-area-wide ocean salmon fishing, consistently accounting for a major share of Chinook landings; 50% in 2005, and as much as 75% as recently as 2000 (Figure 3-4). Coho were less important historically than Chinook; coho retention in commercial fisheries south of Cape Falcon has not been allowed since 1993 to reduce impacts on OCN and other depressed coho stocks.

Major ports in this area (as listed in *Review* Table IV-6) are Fort Bragg, San Francisco, and Monterey. In recent years San Francisco has been the major port for commercial landings, accounting for about two-thirds of landings at the three ports and half of landings in this area in 2005. Opportunity in Fort Bragg was reduced beginning in 1990 to reduce impacts on Klamath River fall Chinook. Monterey and Fort Bragg had a greater share of landings in the past, and as recently as 1996, Monterey landings exceeded San Francisco's.

Recreational Fisheries

This area had the largest share of Council-area-wide recreational Chinook landings in 2005 at 46% (Table 3-3; Figure 3-5); coho landings were negligible, reflecting regulations prohibiting coho retention. (The reported landings include some illegal harvest, as footnoted in the Review tables.) The number of recreational trips has remained more stable over the long term in the area south of Horse Mountain than in areas to the north where effort declined substantially in the 1990s (Figure 3-6). As a result, the number of trips occurring in this area as a proportion of coastwide trips has generally increased and accounted for the largest share of angler trips in Council-area recreational salmon fisheries. Charter fishing historically, and today, has accounted for a much larger fraction of recreational trips in this area, as compared to areas to the north; in 2005, 43% of trips south of Horse Mountain were made by charter vessels. San Francisco is by far the largest port for charter trips, while private recreational trips are more evenly distributed among the three ports in this area.

Table 3-1. Chinook and coho salmon stocks managed under the Salmon FMP.

Chinook	Coho
California Central Valley Sacramento River Fall Sacramento River Spring (**threatened**) Sacramento River Winter (**endangered**)	
Northern California Coast Eel, Mattole, Mad (**all threatened**), and Smith Rivers, Fall and Spring Klamath River Fall Klamath River Spring	
Oregon Coast Southern Oregon (aggregate of several stocks) Central and Northern Coast (aggregate of several stocks)	Oregon Production Index Area Central California Coast (**threatened**) Southern Oregon/Northern California (**threatened**) Oregon Coastal Natural Columbia River Late Hatchery Columbia River Early Hatchery Columbia River Natural (**threatened**)
Columbia River Basin North Lewis River Fall (**threatened**) Lower River Hatchery Fall Lower River Hatchery Spring Upper Willamette Spring (**threatened**)[b/] Mid-Columbia Bright Hatchery Fall Spring Creek Hatchery Fall Klickitat, Warm Springs, John Day, and Yakima Rivers Spring[a/] Snake River Fall (threatened) Snake River Spring/Summer (threatened)[a/] Upper River Bright Falla/ Upper River Summera/ Upper Columbia River Spring (endangered)[a/]	
Washington Coast Willapa Bay Fall Natural[a/] Willapa Bay Fall Hatchery Grays Harbor Falla/ Grays Harbor Spring[a/] Quinault Falla/ Queets Falla/ Queets Summer/Spring[a/] Hoh Falla/ Hoh Spring/Summer[a/] Quillayute Fall[a/] Quillayute Spring/Summer[a/] Hoko Summer/Fall[a/]	Washington Coastal Willapa Bay Hatchery Grays Harbor Quinault Hatchery Queets Hoh Quillayute Fall Quillayute Summer Hatchery Western Strait of Juan de Fuca
Puget Sound Eastern Strait of Juan de Fuca Summer/Fall (**threatened**)[a/] Skokomish Summer/Fall (**threatened**)[a/] Nooksack Spring (**threatened**)[a/] Skagit Summer/Fall (**threatened**)[a/] Skagit Spring (**threatened**)[a/] Stillaguamish Summer/Fall (**threatened**)[a/] Snohomish Summer/Fall (**threatened**)[a/] Cedar River Summer/Fall-Lake Washington (**threatened**)[a/] White River Spring (**threatened**)[a/] Green River Summer/Fall (**threatened**)[a/] Nisqually River Summer/Fall-South Puget Sound (**threatened**)[a/]	Puget Sound Eastern Strait of Juan de Fuca Hood Canal Skagit Stillaguamish Snohomish South Puget Sound Hatchery
Southern British Columbia Coastal Stocks[a/] Fraser River[a/]	Southern British Columbia Coast Coastal Stocks Fraser River

[a/] This stock impacted at a rate of less than 5% in Council-area fisheries.

Table 3-2a. Chinook 2006 predicted stock status.

Stock/Predictor	Status
Sacramento River Fall Chinook	A total of 23,800 age-2 Chinook are estimated to have returned to the Central Valley in 2005, forecasting a 2006 CVI of 632,500 adult Chinook (Figure II-1), which is 0.38 times the 2005 preseason forecast and the lowest since 1996 but similar to the 2001 forecast.
Klamath River Fall Chinook	The forecast September 1, 2005 (preseason) ocean abundance of Klamath River fall Chinook salmon is 44,100 age-3, 63,700 age-4, and 2,200 age-5 fish (Figure II-3). The forecast number of adults is thus 110,000 and is comparable to the 1992 forecast of 96,000 adults (the lowest on record; Table II-4). Last year's preseason forecast was 185,700 age-3, 48,900 age-4, and 5,200 age-5 fish. September-November ocean fisheries in 2005 (were estimated to have harvested 0 age-3, 4,269 age-4, and 1,867 age-5 Klamath River fall Chinook. This harvest was deducted from the ocean fishery's allocation in determining the 2006 allowable ocean harvest.
Oregon Coastal Chinook, North Migrating	NOC annual spawner counts have been decreasing since 2002 despite excellent parental escapements indices in 2001 to 2004 (Review of 2005 Ocean Salmon Fisheries, Appendix B, Table B-11). If this trend continues, the 2006 NOC stock abundance is expected to be less than the 2005 abundance. For the MOC stock component age-specific ocean abundance forecasts for 2006 are not currently available.
Oregon Coast Chinook, South/Local Migrating	A quantitative estimate is made only for Rogue River fall Chinook; the ocean abundance index for 2006 is 3,600 Chinook, down substantially from 2005 and the lowest in the time series.
Columbia River Fall 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. The lower river hatchery (LRH) tule, Spring Creek Hatchery (SCH) tule, and mid-Columbia brights (MCB) are primarily hatchery produced stocks. The tule stocks generally mature at an earlier age than the natural fall stocks and do not migrate as far north. Minor stocks include lower river bright (LRB), a naturally produced stock, and Select Area brights (SAB), a hatchery stock originally from Rogue River stock; both occur downstream from Bonneville Dam. The preliminary forecast for 2006 URB fall Chinook ocean escapement is 253,900 adults. If the forecast is realized, it would be about 95% of last year's return and about 1.1 times greater than the recent 10-year average of 228,830. No preseason forecast for 2006 ocean escapement of ESA-listed Snake River wild fall Chinook is currently available. However, the Columbia River technical staffs are expected to develop a run size estimate for this stock prior to the April Council meeting. Ocean escapement of LRW fall Chinook in 2006 is forecast at 16,600 adults. If the forecast is realized, it would be about 98% of last year's return and about 1.1 times greater than the recent 10-year average return of 15,340. The preliminary forecast for 2006 ocean escapement of LRH fall Chinook is for a return of 55,800 adults, which would be 71% of last year's return and 70% of the recent 10-year average of 83,810. Ocean escapement of SCH fall Chinook in 2006 is forecast at 50,000 adults. If the forecast is realized, it would be about 54% of last year's return and about 60% of the recent 10-year average of 88,620. The preliminary forecast for the 2006 ocean escapement of MCB fall Chinook is 88,300 adults. If the forecast is realized, it would be about 90% of last year's return and about 1.1 times the recent 10-year average of 79,480. The MCB Chinook are returns from hatchery releases and natural spawn of bright fall Chinook stock in the area downstream from McNary Dam.
Washington Coastal Chinook	Preseason forecasts for most Washington coastal Chinook stocks were not available for inclusion in *Preseason Report I*. The 2006 Willapa Bay hatchery fall Chinook ocean escapement abundance forecast is 29,565, which is up from the 2005 prediction of 17,400. The 2006 natural fall Chinook ocean escapement abundance forecast is 1,880, down from last year's 3,200 prediction.
Puget Sound Chinook	Spring Chinook originating in Puget Sound are expected to remain depressed. Runs in the Nooksack, Skagit, White, and Dungeness rivers are of particular concern. Preliminary information for Puget Sound summer/fall stocks indicates the total 2006 return will be 213,400, slightly lower than the 2005 preseason forecast of 214,900. The 2006 natural Chinook return forecast of 62,400 is slightly lower than the 2005 forecast of 64,600. Natural stocks from Puget Sound have experienced improved survival in recent years, but not to the extent that it can be labeled as a trend. While recent returns are slightly below the previous three year average, they are still well above those observed from 1999 to 2001. 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.

Table 3-2b. Coho 2006 predicted stock status.

Stock/Predictor	Status
Oregon Production Index Area–Public Hatchery Coho	The OPIH abundance prediction for 2006 is 398,800 coho, 102% of the 2005 prediction and 90% of the preliminary 2005 postseason estimate.
Oregon Production Index Area–Oregon Coastal Natural Coho	The 2006 preseason prediction for OCN (river and lake systems combined) is 60,800 coho, 40% of the 2005 preseason prediction and 41% of the 2005 postseason estimate (Table III-1). The 2006 preseason SRS prediction for OCNR and OCNL components are 44,600 and 16,200 coho, respectively.
Oregon Production Index Area–Salmon and Trout Enhancement Program Hatchery Coho	The 2006 preseason STEP index abundance prediction is 600 coho (Table III-1). The 2006 prediction is below the 2005 preseason prediction of 1,000 coho, but higher than the 2005 preliminary postseason abundance estimate of 400.
Willapa Bay	The 2006 Willapa Bay hatchery coho abundance forecast is 37,663 ocean recruits compared to a 2005 preseason forecast of 56,400. The hatchery forecast is based on the 2005 hatchery jack returns multiplied by the 1998-2005 average terminal return regressed against the 1997-2004 jack returns. The natural coho forecast is 30,342 ocean recruits, based on the 2005 hatchery jack returns multiplied by the 1998-2005 average terminal return regressed against the 1097-2004 jack returns.
Grays Harbor	The abundance forecast for Grays Harbor natural stock coho for 2006 is 67,300 ocean age-3 recruits. The forecast for hatchery stock ocean abundance is 52,400 ocean age-3 recruits.
Quinault River	The 2006 forecast for Quinault natural coho is 28,800 ocean recruits, a 36% decrease from the 2005 forecast of 44,900. The Quinault hatchery coho forecast is 34,500 ocean recruits, an increase of 3% compared to the 2005 forecast level of 33,600..
Queets River	The 2006 Queets natural coho forecast is 8,300 ocean recruits, a decrease of 52% compared to the 2005 forecast level of 17,100. The 2006 Queets hatchery (Salmon River) coho forecast is 11,900 ocean recruits, a decrease of 32% compared to the 2005 forecast level of 17,400.
Hoh River	The Hoh River natural coho forecast is 6,400 ocean recruits, a decrease of 16% compared to the 2005 forecast of 7,600.
Quillayute River	The Quillayute River summer natural and hatchery coho forecasts for 2006 are 1,100 and 4,000 ocean recruits, respectively. The 2006 forecast abundance of natural summer coho is 38% higher than the 2005 forecast, while the hatchery forecast is 34% lower than the 2005 forecast level. The Quillayute River fall natural and hatchery coho forecasts are 14,600 and 10,400 ocean recruits, respectively. The 2006 forecast abundances of natural and hatchery components of Quillayute fall coho are 22% and 53% below their respective 2005 forecast levels.
North Washington Coast Independent Tributaries	The 2006 forecast of natural coho production for these independent streams is 8,100. The hatchery forecast of 3,200.
Puget Sound	The 2006 forecasts for Strait of Juan de Fuca natural and hatchery coho ocean recruits are 26,130 and 20,468, respectively. The 2006 forecasts for Nooksack-Samish natural and hatchery coho ocean recruits are 18,300 and 81,138, respectively. The 2006 forecasts for Skagit River natural and hatchery coho ocean recruits are 106,599 and 22,463 (20,492 from in-river hatchery production, 1,980 from Oak Harbor Net Pens), respectively. The 2006 forecast for Stillaguamish River natural coho ocean recruits is 47,600, and 1,229 from a small tribal hatchery enhancement program. The 2006 forecast for Snohomish River natural coho ocean recruits is 139,500. The Snohomish regional hatchery coho forecast is 96,360; 14,890 for the Wallace River Hatchery facility, 74,968 for the Tulalip Bay facility, and 6,502 for the Possession Baithouse net pen project located on southeast Whidbey Island. The 2006 forecasts for South Sound region natural and hatchery coho ocean recruits are 45,270 and 256,051, respectively. The 2006 forecasts for Hood Canal region natural and hatchery coho ocean recruits are 59,447 and 57,919, respectively.

Table 3-3. Recreational landings by port area in 2005 (thousands of fish and percent).

	Chinook	Coho	Total
Neah Bay	2.8 (1.3%)	10.2 (15.4%)	13.0 (4.7%)
La Push	1.7 (0.8%)	2.3 (3.5%)	4.0 (1.5%)
Westport	22.4 (10.8%)	10.5 (15.9%)	32.9 (12.0%)
Ilwaco	9.6 (4.6%)	28.7 (43.4%)	38.3 (14.0%)
Columbia River	3.6 (1.8%)	10.0 (15.1%)	13.6 (5.0%)
North of Falcon	**40.0 (19.3%)**	**61.7 (93.3%)**	**101.8 (37.2%)**
Tillamook	2.7 (1.3%)	1.1 (1.6%)	3.8 (1.4%)
Newport	4.7 (2.3%)	1.1 (1.7%)	5.8 (2.1%)
Coos Bay	11.2 (5.4%)	1.4 (2.2%)	12.6 (4.6%)
Falcon to Humbug	**18.6 (9.0%)**	**3.6 (5.5%)**	**22.2 (8.1%)**
Brookings	5.7 (2.7%)	0.1 (0.2%)	5.8 (2.1%)
Crescent City	1.5 (0.7%)	0.0 (0.0%)	1.5 (0.6%)
Eureka	15.8 (7.6%)	0.1 (0.2%)	15.9 (5.8%)
KMZ	**23.0 (11.1%)**	**0.3 (0.4%)**	**23.2 (8.5%)**
Fort Bragg	21.9 (10.5%)	0.1 (0.1%)	22.0 (8.0%)
San Francisco	72.3 (34.8%)	0.3 (0.4%)	72.6 (26.5%)
Monterey	31.8 (15.3%)	0.2 (0.3%)	32.0 (11.7%)
South of Horse Mt.	**126.0 (60.7%)**	**0.6 (0.9%)**	**126.6 (46.2%)**
Total	207.6 (100.0%)	66.2 (100.0%)	273.8 (100.0%)

Table 3-4. Incidental overfished groundfish landings (lbs) in non-Indian commercial salmon troll fisheries by salmon management area for 2000 and 2001.[a/] (Page 1 of 1)

Port Area/Year	Species			
	Bocaccio	Canary	Widow	Yelloweye[b/]
Neah Bay-La Push				
2000	NA	469	65	205
2001	NA	175	40	101
Westport-Astoria				
2000	NA	119	15	-
2001	NA	97	-	-
Central Oregon				
2000	NA	2,332	102	132
2001	NA	1,264	136	99
Oregon KMZ				
2000	NA	167	9	4
2001	NA	185	70	9
California KMZ				
2000	NA	-	-	-
2001	NA	-	-	-
Fort Bragg				
2000	12	91	-	NA
2001	9	61	22	NA
San Francisco				
2000	106	115	6	NA
2001	2	51	-	NA
Monterey-Conception				
2000	311	65	-	NA
2001	16	8	-	NA
Total				
2000	429	3,357	197	341
2001	27	1,841	268	209
Total (mt)				
2000	0.20	1.53	0.09	0.16
2001	0.01	0.84	0.12	0.10
2006 Scorecard	0.2	1.6	0.3	0.2
2006 OY (MT)	309.0	47.0	289.0	27.0

[a/] Salmon troll landings are defined as those for which salmon represents at least 50% by weight of the total ticketed landing. Other overfished groundfish (darkblotched rockfish, Pacific Ocean perch, cowcod and whiting) are not recorded as landed. N/A indicates individual species estimates were not made. Data from Pacific Coast Fisheries Information Network (PacFIN).

[b/] Yelloweye rockfish were not separated on landing tickets, so a proxy of shelf rockfish with an exvessel value of >$1.00/lb was used for areas north of Cape Mendocino. For areas south of Cape Mendocino yelloweye catch was not estimated, however landings are assumed negligible because of species distribution, the absence of commercial landings in the area between Cape Mendocino and the OR/CA border, and the scarcity of recreational landings in California.

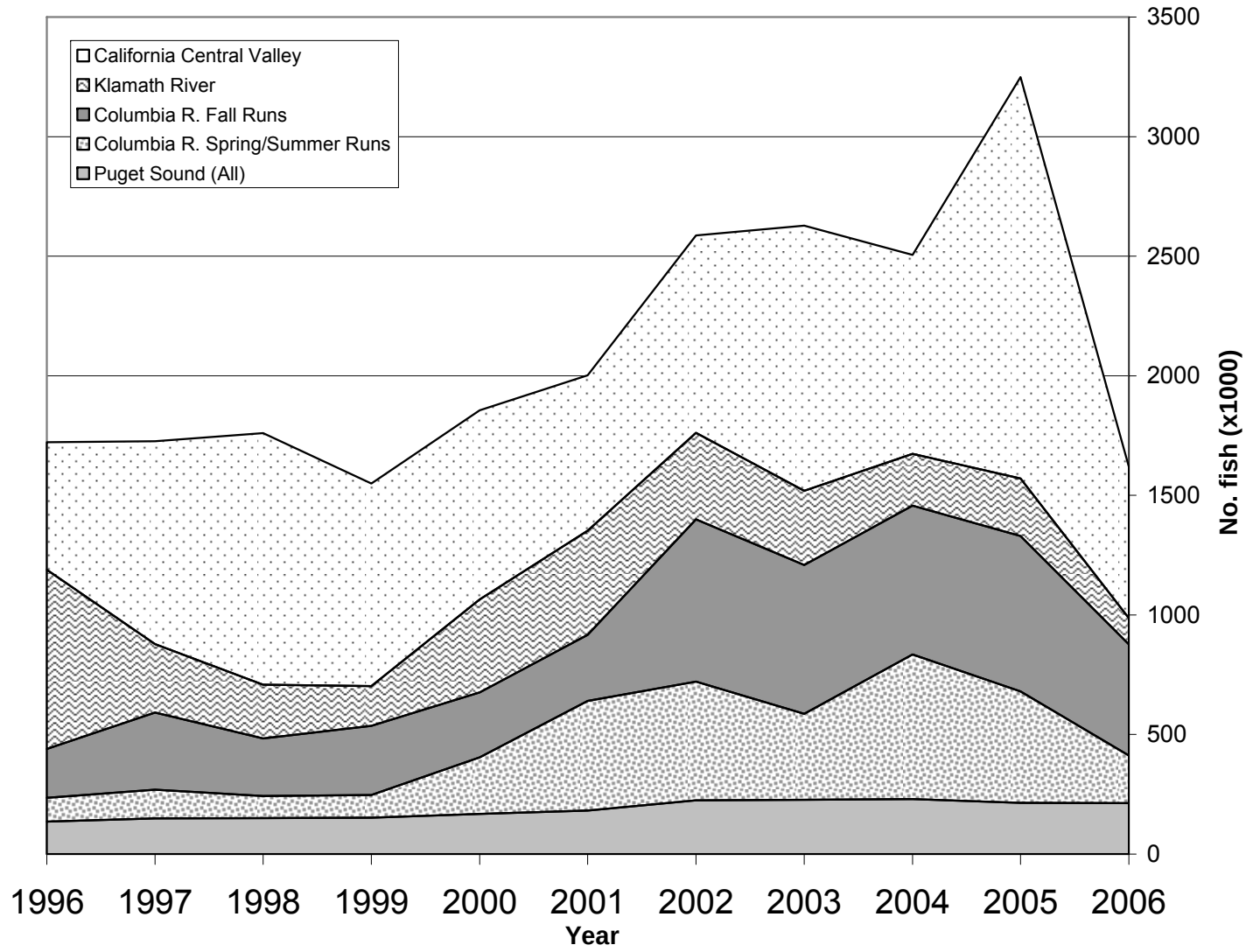

Figure 3-1. Preseason Chinook abundance forecasts.

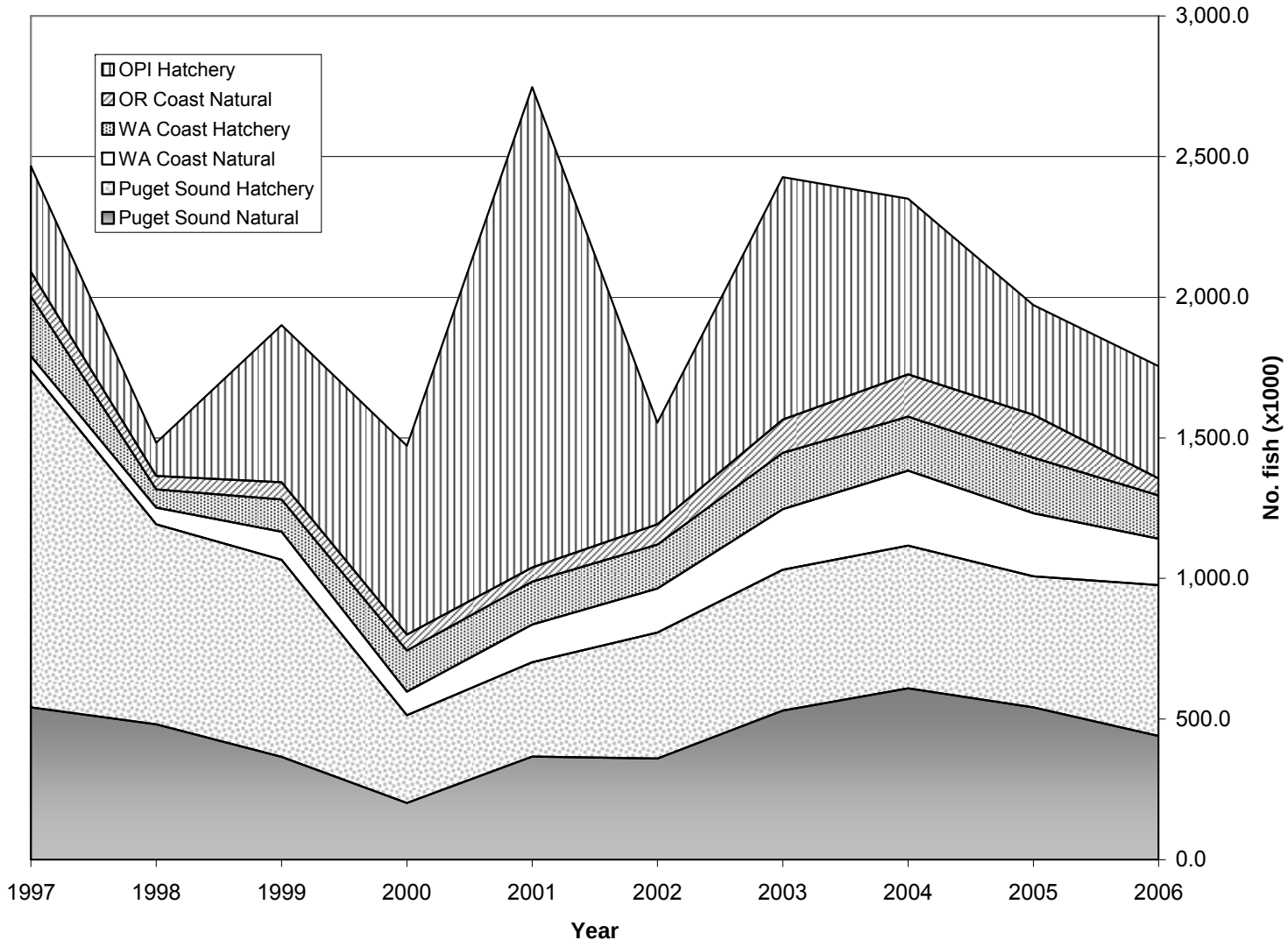

Figure 3-2. Preseason coho abundance forecasts.

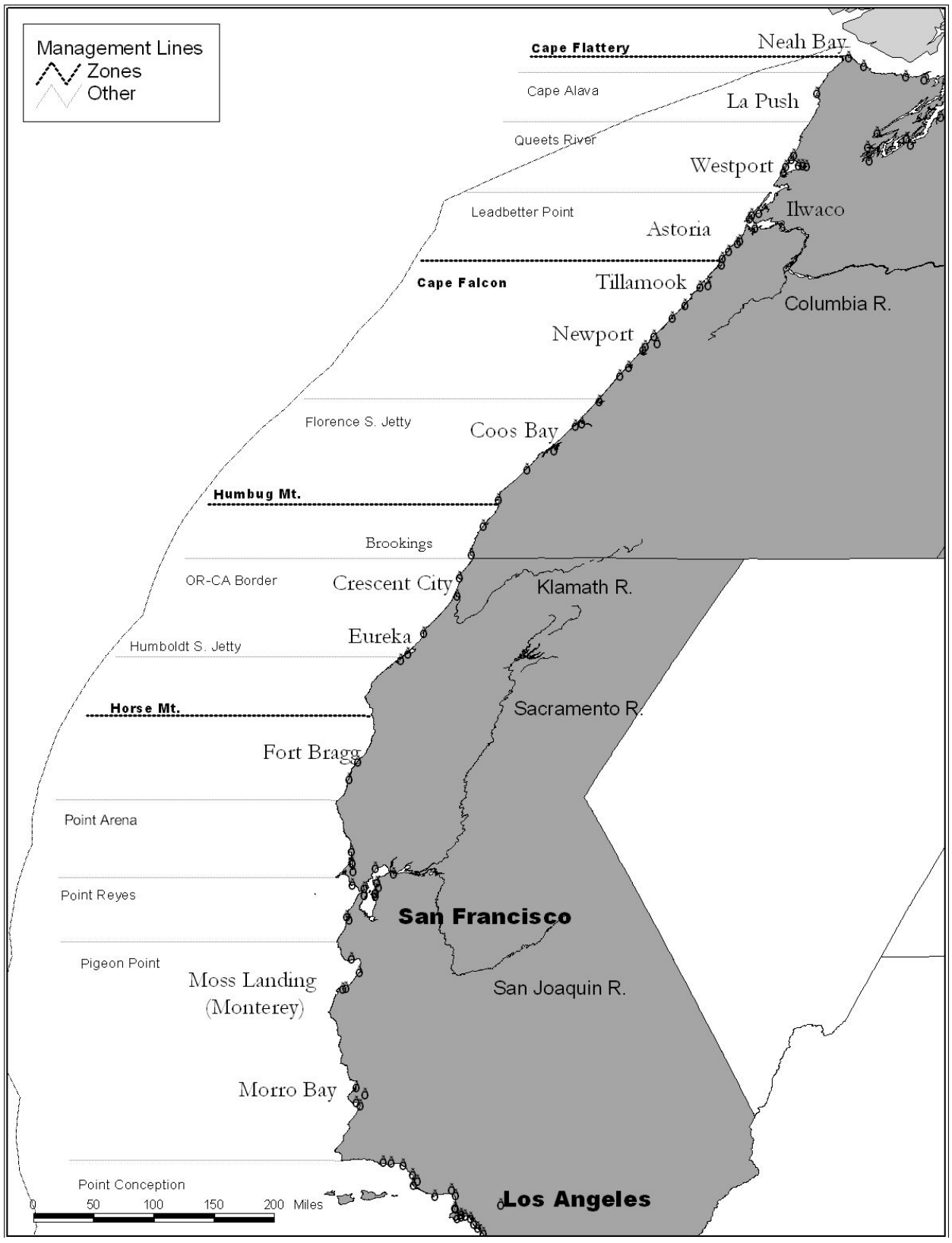

Figure 3-3. Salmon management zones and ports.

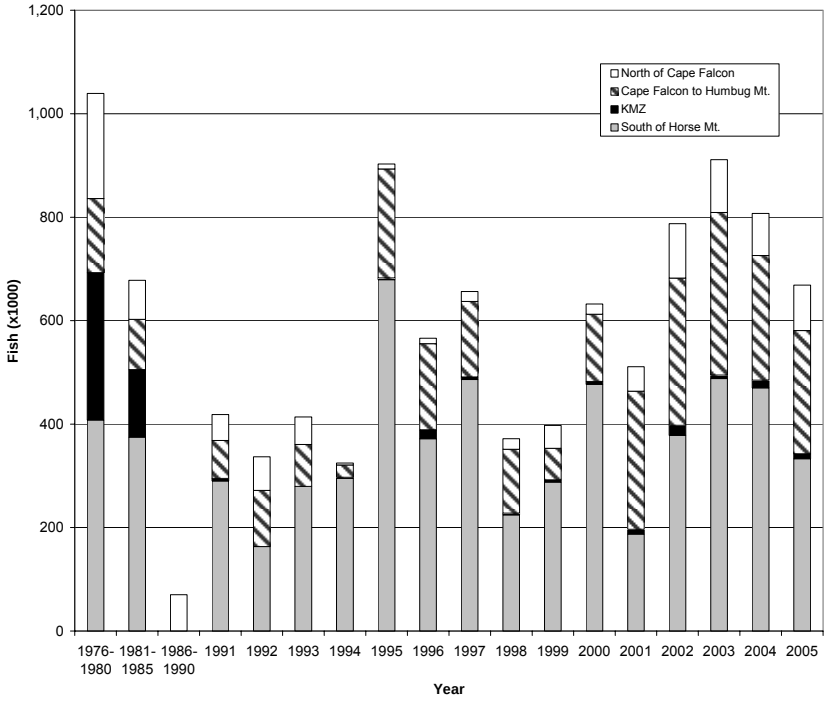

Figure 3-4a. Treaty Indian and non-Indian commercial Chinook landings by zone.

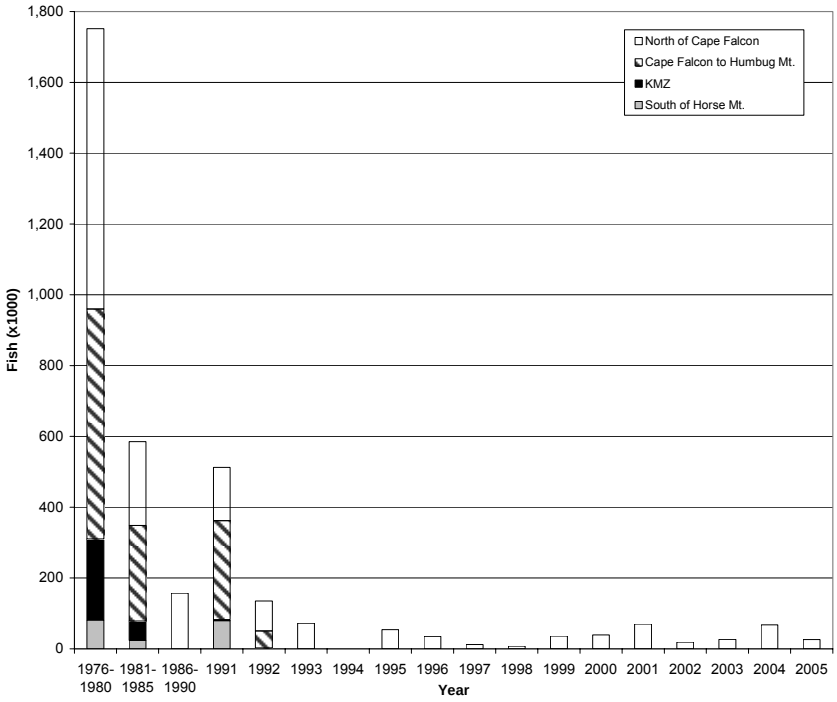

Figure 3-4b. Treaty Indian and non-Indian commercial coho landings by zone.

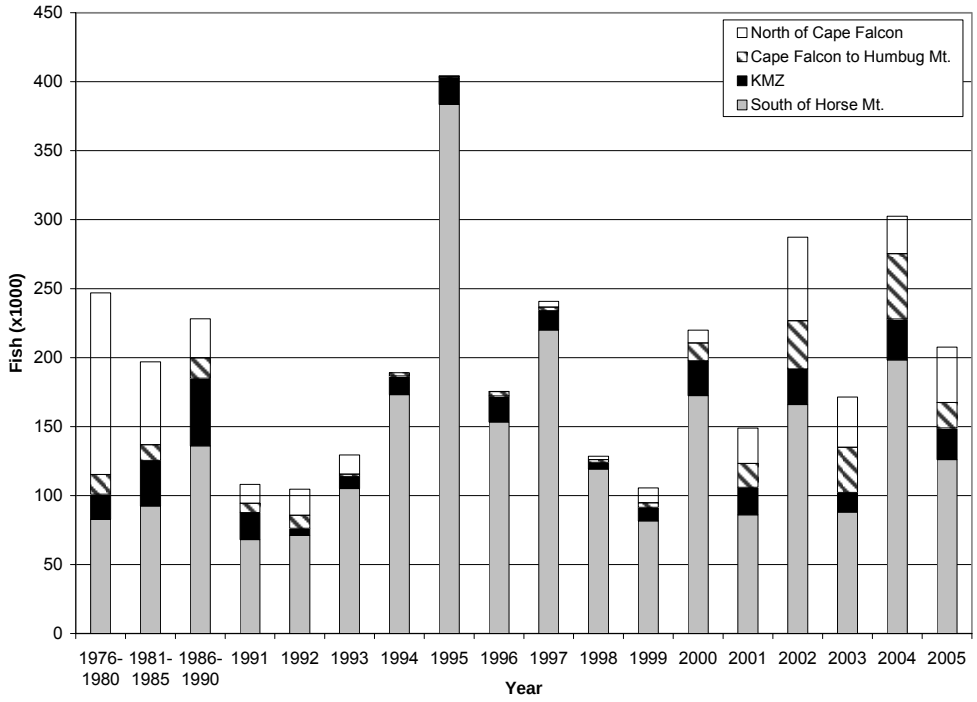

Figure 3-5a. Recreational Chinook landings by zone.

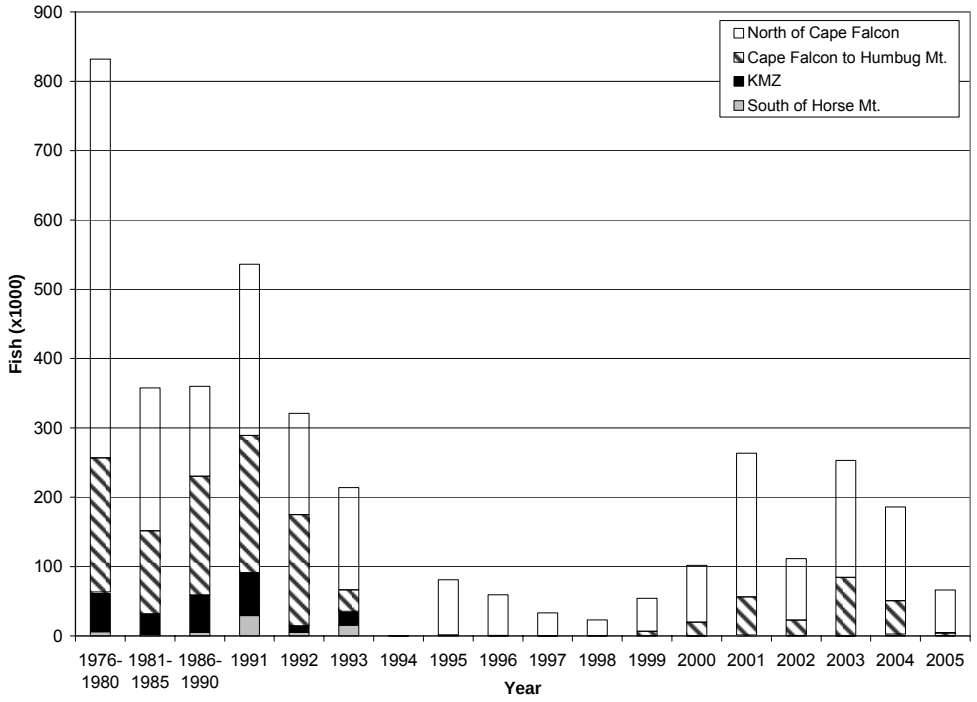

Figure 3-5b. Recreational coho landings by zone.

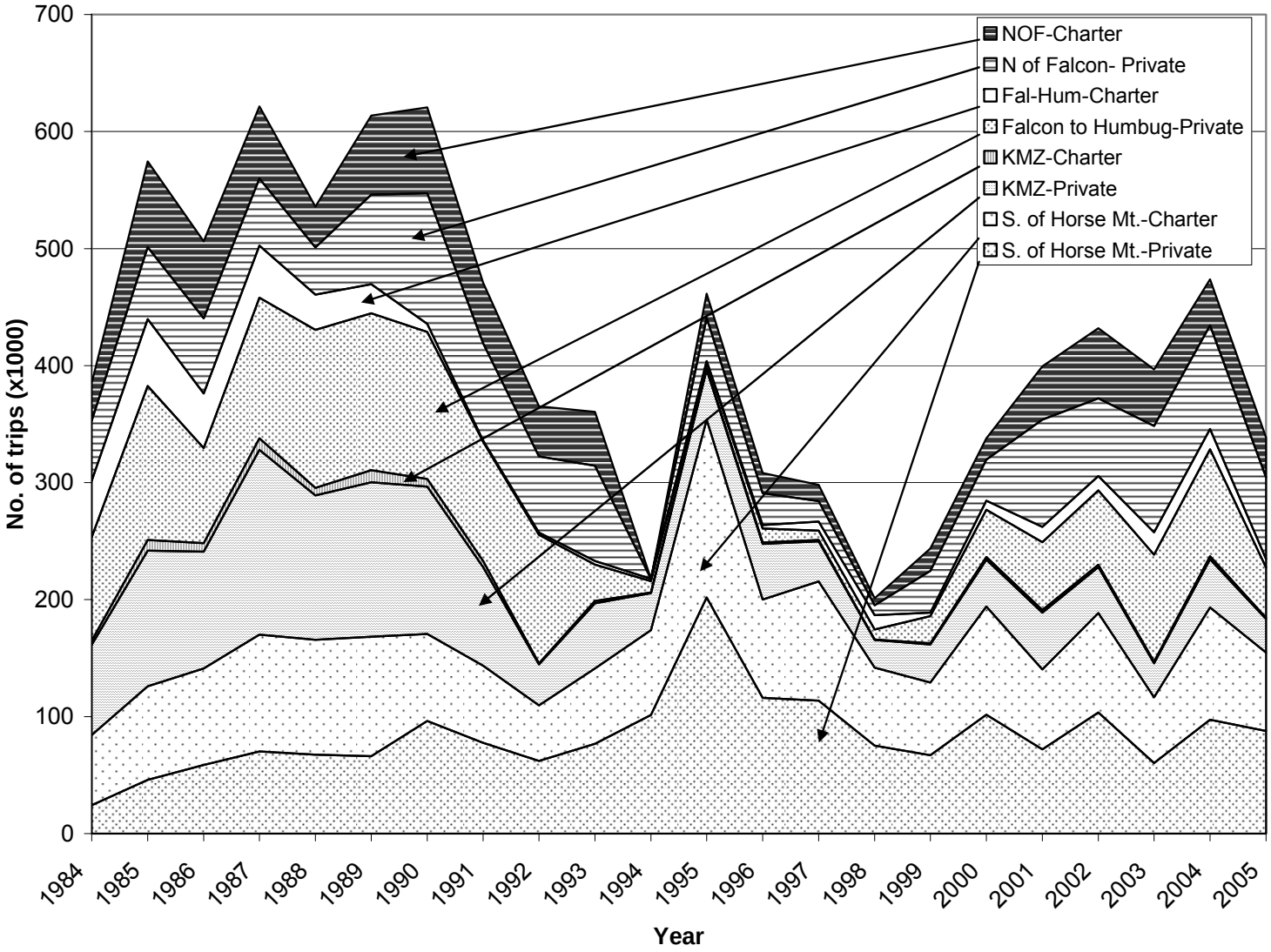

Figure 3-6 Recreational fishing effort by zone.

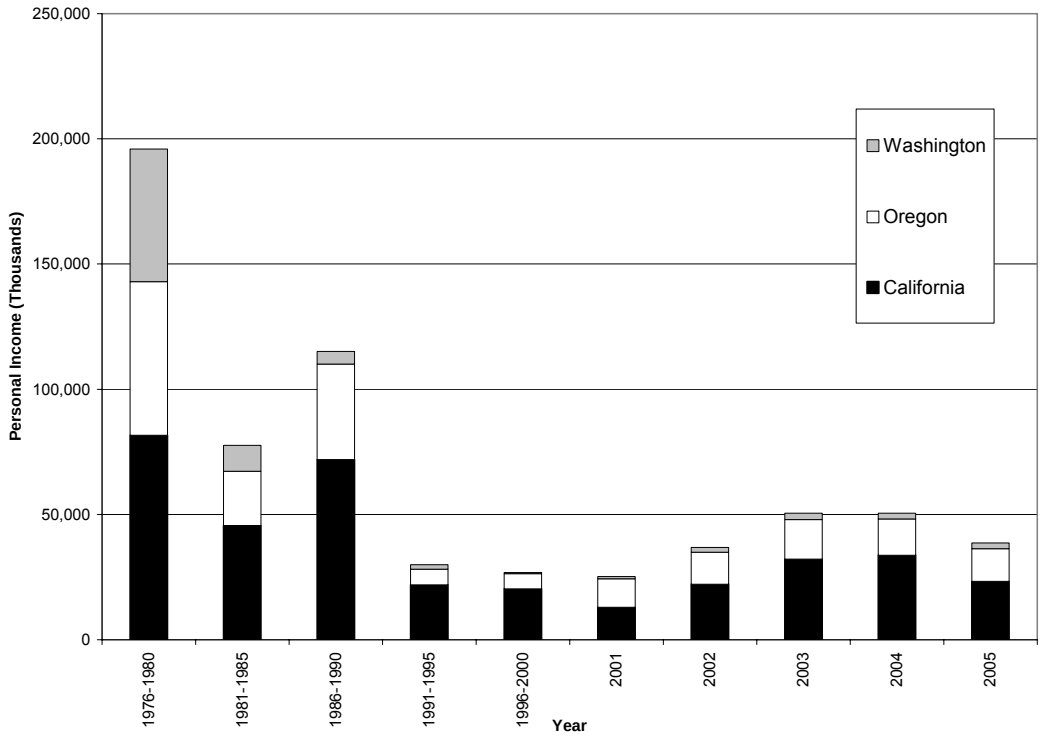

Figure 3-7a. Coast community level personal income impacts associated with Council-area commercial salmon fisheries.

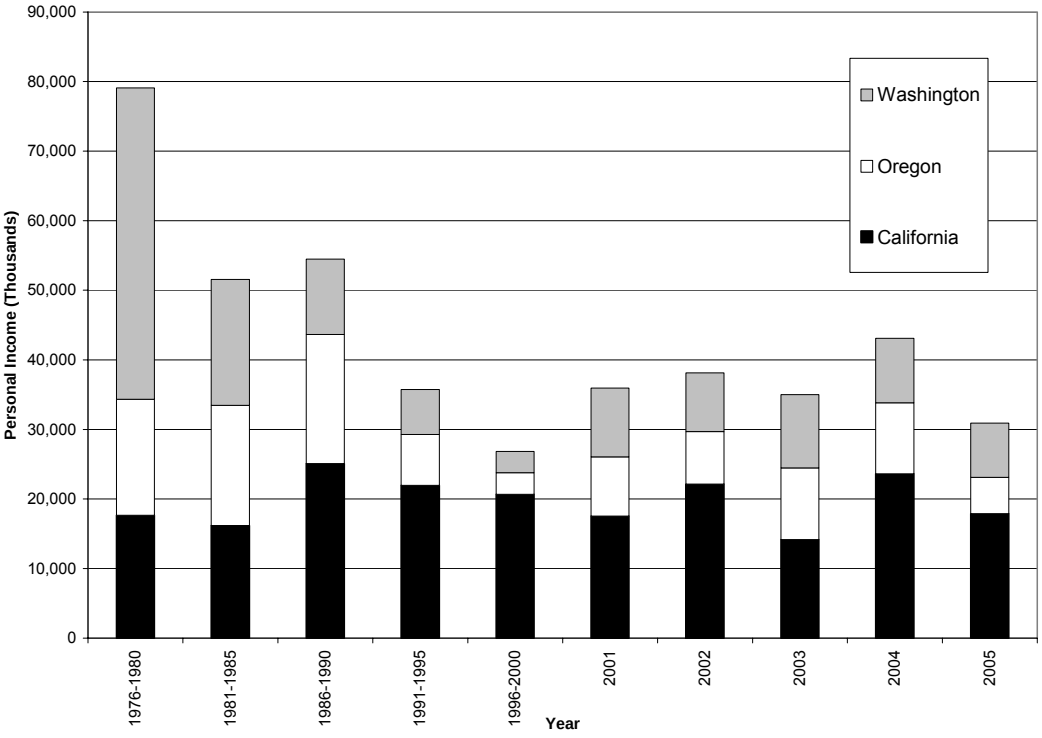

Figure 3-7a. Coast community level personal income impacts associated with Council-area recreational salmon fisheries.

4.0 ENVIRONMENTAL CONSEQUENCES

The factors evaluated for significance in this EA are those listed in Section 6.02 of NAO 216-6, with specific application to these alternatives as detailed in Section 1.5 of this EA. Some of those factors have already been eliminated from further consideration in this analysis through the screening process applied in Section 1.5 of this EA, including EFH; public health and safety; and biodiversity and ecosystem function. Criteria for evaluating significance of the remaining factors are described in Section 1.5 of this EA.

For purpose of analysis, alternatives are compared to the 2005 fishery as a baseline. Two views of the 2005 fishery are presented, one is the preseason estimates of expected 2005 harvest and impacts (projected) and the other is the postseason estimate of 2005 harvest and impacts (actual). The 2005 projected impacts provide a relevant comparison of the modeled fisheries on which the Council based their decisions. These comparisons are most appropriate for biological factors such as conservation objectives. Actual 2005 impacts provide a more appropriate context for the likely economic impacts of 2006 fisheries, since 2006 projections are based primarily on actual 2005 impacts.

The No Action Alternative is analyzed as application of the previous year's regulations (without any inseason modifications) to the current year's abundance forecasts. The primary purpose of this analysis is to provide context for the current preseason planning process by illustrating which fisheries will require modification to meet Salmon FMP, ESA, and other conservation and allocation objectives. Because of the dynamic nature and life history characteristics of salmon populations, and the numerous stocks that are intercepted in mixed stock ocean fisheries, application of the previous year's regulations is unlikely to meet all the criteria for conservation objectives while optimizing economic benefits from the fisheries.

Figures 4-1 and 4-2 display the projected total fishing mortality[7] of each option. In the annual season-setting process and in this EA, this combined mortality is referred to as the impact of management measures. Tables 4-1a through 4-1c compare projected impacts (harvest plus bycatch) of the Preferred Alternative, other alternatives considered, and 2005 projections.[8] Table 4-1c summarizes the distribution of impacts by species and fishery sector for each option. Table 4-1d compares projected escapement, harvest rates, and allocations, collectively referred to as conservation objectives, associated with the various alternatives. (The 2005 values in the tables and figures are projected harvest impacts, taken from the 2005 *Preseason Report II*. Actual harvest impacts are different.)

4.1 Impacts of the Preferred Alternative

4.1.1 Salmon Fishery FMU

Overall, comparing the projections of the Preferred Alternative for 2006 management measures to a baseline composed of projected 2005 landings for all ocean fisheries Council-area wide, fewer Chinook landings (401,700 fish in 2006 versus 935,300 fish in 2005) and coho landings (137,500 fish in 2006 versus 234,000 fish in 2005) are expected in 2006.

Differences in the relative and absolute distribution of impacts between areas and commercial versus recreational fisheries can be observed in Tables 4-1a through 4-1c. Council-area wide, more Chinook impacts occur from commercial fishing than recreational fishing under the Preferred Alternative, and vice-versa for coho impacts. This results from the combination of prohibiting coho retention in commercial fisheries in areas

[7] The values in these charts include both catch and bycatch mortality, as given in *Preseason Report II*, Table 6 and *Preseason Report III*, Table 6.

[8] The 2005 projected impacts are not equivalent to the No Action Alternative because they are projected on 2005 stock abundances rather than 2006 abundance.

south of Cape Falcon where commercial fisheries typically dominate the landings, and the allocation schedules in the Salmon FMP for areas north of Cape Falcon that emphasize Chinook for commercial fisheries and coho for recreational fisheries.

The distribution of impacts under the Preferred Alternative differs from the range of options considered by the Council in a few respects. Chinook impacts for the Preferred Alternative are lower for KMZ commercial fisheries as a result of assumptions regarding late season state water fisheries. Recreational impacts on Chinook and coho are slightly higher in areas south of Horse Mountain, California in comparison to the other options as a result different inriver fishery allocation assumptions. Commercial and recreational fishery impacts in other areas fall within the range of the other options considered.

The long-term impacts of the alternatives considered vary mainly in terms of their effect on spawning escapement. If inside harvest is adjusted such that total spawning escapement for a particular stock is the same among the alternatives, then higher or lower ocean harvest levels have no long-term impact on that particular stock. However, if there is no inside fishery to adjust, or the magnitude of adjustment is not sufficient to yield a neutral effect on spawning escapement among the options, then there may be differing long-term effects among the options.

The direction of the long-term effect of different spawner escapement levels depends on the size of the escapement relative to the real maximum sustainable yield (MSY) harvest level. If the number of spawners exceeds or is less than the real MSY spawner escapement level, adult recruitment will be less than would be expected at an MSY escapement, assuming a standard Ricker curve spawner-recruit relationship. Because management is inherently imprecise and the spawner escapement level that will produce MSY is uncertain, optimum escapement levels are not always reached. Our understanding of the relationship between salmon stock MSYs and conditions in the biophysical environment, combined with the difficulty in predicting both short- and long-term changes in the biophysical environment, makes it difficult to adjust the estimated MSY spawner escapement level in response to conditions present in a particular year. Spawner escapement goals are often set as proxies for MSY and are generally fixed targets or harvest rates. They are best estimates of the average MSY spawner escapement levels. Since environmental conditions vary from year to year, real MSY spawning escapement levels vary from these fixed proxies.

The Salmon FMP is structured such that in setting annual management measures, most stocks exceed their conservation objectives, while one or a few stocks constrain harvest because they approach their conservation objectives, without exceeding them. In theory then, most stocks experience escapement above the average MSY level (or other criteria) set as their conservation objective, while only the constraining stocks experience optimal escapement levels. In practice, however, some stocks have harvest-rate-based conservation objectives that allow some harvest impacts when escapement is projected to be at less than optimal levels. Target species are generally not constraining stocks, so surplus escapement is usually expected. This may result in some density-dependant effects that could reduce future production but may also contribute to greater ecosystem productivity that could increase future production.

In 2006, KRFC are projected to fall short of their Salmon FMP conservation objective, even if there were to be no fishing within their range in 2006. Fisheries that occurred in the fall of 2005 have already impacted 2006 spawning escapement, but even without those fisheries, KFRC would not have met the Salmon FMP conservation objective of 35,000 naturally spawning adults. The Hoopa Valley and Yurok tribes have Federally recognized fishing rights, beyond the jurisdiction of the Council, entitling them to 50 % of KRFC harvest, and therefore they are expected to match non-Indian KRFC harvest on a fish for fish basis, including those harvested in the fall of 2005.

Fisheries in the Preferred Alternative were structured to minimize impacts to KRFC and resulted in a projected escapement of approximately 21,100 naturally spawning adult KRFC - 17% fewer than if Council

area ocean fisheries between Cape Falcon and Point Sur were entirely closed. In developing the Preferred Alternative, NMFS and the Council considered a risk assessment conducted by scientists from the Northwest and Southwest Science Centers, and reviews of the assessment by the Council's Scientific and Statistical Committee and the STT. The intent of the assessment was to determine if there was a level of KRFC natural spawning escapement that would have a lower likelihood of jeopardizing the ability of the stock to produce MSY in the long-term.

The Council also reviewed the historical record of KRFC spawning escapement and subsequent production, and found credible evidence for rapid recovery to sustainable levels from escapements below the Salmon FMP conservation objective of 35,000 natural spawners. The escapement of natural spawners has been less than 35,000 in 13 of the past 23 years, including four years with escapements of 16,000 or less. In every case, subsequent recruitment has been positive and often quite strong. There was a period of three consecutive years from 1990-1992 where escapement levels averaged 13,100, with five consecutive years of escapements below the 35,000 floor. KRFC rebounded quickly from these low escapements when environmental conditions improved, even after periods of poor inriver or ocean conditions.

Based on the risk analysis of the probability of low recruitment associated with various levels of escapement possible in 2006 and the historical record of spawner/recruit levels, NMFS concluded that the marginal decrease in escapement that would result from the Council's proposed fisheries would not jeopardize the capacity of the fishery to produce maximum sustained yield on a continuing basis. The Council concurred with that conclusion and voted 13 to one in favor of the Preferred Alternative. However, given the circumstances, any fishing in the KRFC impact area would have to be implemented by emergency rule, temporarily modifying the conservation objective for KRFC set forth in the salmon FMP. The proposed emergency rule would also have to be consistent with the agency's policy on use of emergency actions under the Magnuson-Stevens Act published at 62 FR 44422. The assessment and other documents relevant to the conclusion reached by NMFS and Council concurrence are included in Appendix B.

The Preferred Alternative also contains weekly possession landing limits for commercial fisheries between Cape Falcon and Point Sur, which are intended as precautionary measures designed to further mitigate impacts to KRFC and increase the projected spawning escapement above 21,100. The effects of the possession and landing limits on projected spawning escapement are qualitative because they could not be estimated using the existing models employed by the STT. Restrictions on landing areas are also included in the Preferred Alternative to ensure that the intent of the possession and landing limits are properly assessed in post season analyses (see Section 4.1.4 of this EA for addition information).

All Salmon FMU stocks meet their conservation objectives under this alternative, including the conservation objective for KRFC as modified by emergency action described in Section 1.5 of this EA (Table 4-1d). Therefore, the effects of this alternative on Salmon FMU stocks are considered not to be significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02 for target species.

4.1.2 Non-target Species

As discussed in Section 3.1.2, impacts of the alternatives are related both to the changes in the amount of groundfish caught in the ocean salmon fishery and how this would interact with the trip limit regime governing this fishery and other open access groundfish fisheries. No analysis is available to project groundfish landings based on management measures contained in the Preferred Alternative. But in very general terms it is likely that changes in salmon fishing mortality and incidental catches correlate (assuming a rough correlation between salmon fishing mortality and fishing effort). In comparison to the 2005 baselines, both recreational and commercial Chinook fishing mortality for the Preferred Alternative is likely to be slightly to substantially less than in 2005. In comparison to the other management options, however,

projected commercial Chinook mortality is intermediate between Options II and III, while recreational Chinook mortality is slightly greater than Option I. Because Chinook salmon typically occur at greater depths than coho, rockfish incidental catch is more likely when targeting Chinook. Therefore, the Preferred Alternative is likely to result in slightly less rockfish catch than occurred in 2005 but slightly greater catches than Option and III. Projected 2006 coho catches are also less than the 2005 preseason projections, but they are greater than 2005 postseason estimates. Although rockfish are less commonly caught when targeting coho, the lower quotas and reduced opportunity for coho will likely decrease total fishing effort, especially if quotas are reached early. However, recreational bag limits, area closures, and seasons have been put in place for overfished rockfish under the Groundfish FMP. This discourages targeting rockfish during a recreational trip (once the salmon bag limit is reached). However, changes in catch per unit effort (CPUE) for both Chinook and coho could affect commercial and recreational fishing strategy, potentially increasing incidental rockfish catches. For example, if recreational fishermen take longer to reach their salmon bag limits, incidental groundfish catch opportunity may increase. If commercial fishermen target rockfish less when salmon CPUE is high, decreased salmon catch rates may modify this behavior.

For the above reasons, it is difficult to predict the effect of the Preferred Alternative (and the other alternatives) on groundfish catches. But assuming the correlation between salmon and groundfish harvests, impacts can be generally assessed. For both the recreational and commercial salmon fisheries, salmon harvests are expected to decrease coastwide compared to 2005 because of decreased abundance and fewer available impacts to constraining stocks like KRFC and LCR natural coho. However, the allocation of Pacific halibut has increased for 2006. Halibut fisheries are more prone to incidental catch of rockfish and lingcod, so combination salmon/halibut trips may account for a relatively larger impact to groundfish species than salmon-only trips. This may result in a slight increase in groundfish bycatch rates. Therefore, incidental harvest of groundfish associated with combination salmon/halibut trips is likely to be at about the same level in 2005. Any unexpected expansion in incidental groundfish harvest would be taken into account in management of the groundfish open access fishery and appropriate inseason adjustments made to groundfish regulations (e.g., season closures or reduced landing limits).

The likelihood of fewer, or similar, or groundfish landings compared to 2005 under this alternative meet the criteria for non-significance established in Section 1.5 of this EA based on the significance test in NOAA NAO 216-6 Section 6.02 regarding impacts to non-target species.

4.1.3 ESA-listed Species

Appendix A to *Preseason Report III* evaluates Council-managed fishery impacts on ESA-listed salmon. In addition, Table 4-1d compares the Preferred Alternative to conservation objectives for Salmon FMU stocks, including consultation standards applicable to ESA-listed stocks. It can be seen that all ESA listed stocks will achieve their objective under the Preferred Alternative. For Chinook these include Lower Columbia River natural tule, Lower Columbia River wild, Snake River, and California Coastal fall runs, and Sacramento winter run, all of which are impacted by Council area fisheries sufficiently to be constraints; other ESA listed Chinook stocks are impacted to a lesser degree in Council area salmon fisheries. Council area fisheries impact all Federal-ESA listed coho stocks at levels requiring some degree of management to achieve ESA consultation standards. ESA listed coho stocks include LCR natural, SONCC, and CCC ESUs.

LCR natural coho were listed as threatened on June 28, 2005, and NMFS is expected to complete a BO prior to May 1. NMFS guidance to the Council for adoptions 2006 ocean salmon management measures was to limit impacts in Council area marine and mainstem Columbia River fisheries to no more than a 15.0% total exploitation rate on LCR natural coho. The limit on LCR coho was the primary constraint on Council area coho fisheries north of the Oregon/California border. The Preferred Alternative is projected to have a 9.9% exploitation rate on LCR natural coho in Council area fisheries.

There are currently no ESA protections in place for OCN coho as a result of a 2006 status determination by NMFS (January 19, 2006; 71 FR 3033). However, OCN coho continue to be managed under the Salmon FMP harvest matrix upon which NMFS previously based its consultation standards. OCN and Rogue Klamath (R/K) hatchery (surrogate for SONCC coho) stocks are usually important in determining the impacts of management options because their status tends to act as a constraint to allowing more harvest of healthier target stocks, although for 2006, LCR coho have fulfilled that role. The ESA consultation standard for CCC coho requires non-retention of coho in California fisheries, and this requirement is met in the Preferred Alternative. *Preseason Report III*, Table 7 breaks down the total exploitation rate by management area for LCR, OCN, and R/K stocks. The Preferred Alternative meets the conservation objective for LCR, SONCC, and CCC coho (Table 4-1d).

The long-term effects of different spawning escapement levels on ESA-listed salmon species or other constraining stocks resulting from this alternative are likely to include reduced juvenile production and ecosystem productivity. The level of production associated with escapement expected under this alternative is not expected to substantially affect the recovery of depressed stocks or affect the intrinsic productivity of the stocks.

NMFS expects to complete ESA consultation for endangered southern resident killer whales by June 2006. While the consultation will not be completed prior to approval of this action, NMFS has determined that the anticipated fisheries would not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures. In the event that the review suggests that further constraints in the 2006 fisheries are necessary, appropriate corrections would be made by NMFS through in-season action.

All ESA-listed salmon stocks meet NMFS ESA consultation standards under this alternative. Consultation standards for southern resident killer whales have not been established, but are not anticipated to preclude NMFS from any inseason actions necessary to comply with any reasonable and prudent alternatives. Therefore, the effects of this alternative on ESA-listed speceis are considered not significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02.

4.1.4 Socioeconomic Impacts

Tables 4-2a and 4-2b present information shown in Tables 8 and 9 in *Preseason Report II* and Tables 9 and 10 in *Preseason Report III*, listing socioeconomic impacts in dollar terms. For the commercial fishery, these are expressed as exvessel value. For the recreational fishery, the tables show angler trips and local community personal income impacts associated with the recreational fishery. Short-term economic effects in the ocean fishery generally correlate with the harvest impacts discussed above. Council-area-wide, under the Preferred Alternative, commercial fishery management regulations result in a projected 64% decrease in exvessel revenue compared to the 2005 postseason baseline and 12% decrease in recreational fishery impacts for the same comparison. Coastal community level personal income impacts under this alternative are projected to be $27.2 million from recreational fisheries and $14.1 million from commercial fisheries, for a total of $41.4 million (Table 2-1). This total is substantially less than the 2005 level of $69.5 million, but still above the recent year low of $34.5 million in 1998 (Figure 3-7). The relative adverse effect for the commercial fishery is substantially greater then for the recreational fishery.
This alternative adheres to the Salmon FMP allocation provisions for sharing of Chinook and coho TAC between recreational and commercial fisheries north of Cape Falcon and for sharing the recreational coho allocation among port areas north of Cape Falcon. This alternative also meets the terms of the agreement reached in the *U.S. v. Oregon* forum for allocation of coho destined for areas above Bonneville Dam (Table 4-1d).

Ocean Commercial

This year's management measures are expected to allow substantially less harvest opportunity than has been the case in recent years, and revenues will continue to be down substantially from the recent historical baseline (2000-2005). Comparing the Preferred Alternative for the commercial fishery to the 2005 postseason baseline (see Table 4-2a), all areas will see decreases in exvessel revenue. Only the KMZ will be completely closed to commercial fishing, but other areas south of Cape Falcon will experience reductions of 52% to 81%. North of Cape Falcon a 21% decrease is expected. The decrease in areas south of Cape Falcon is due primarily to reduced abundance of KRFC. North of Cape Falcon the decrease is due primarily to reduced abundance of Columbia River tule fall Chinook and constraints for LCR natural coho. Overall, West Coast exvessel value is expected to decrease by 64%. The Preferred Alternative also contains daily, per opening, and weekly vessel limits for commercial fisheries north of Point Sur. North of Cape Falcon these limits will assist in quota monitoring and the distribution of fish among the fleet. Between Cape Falcon and Point Sur the possession and landing limits are intended as precautionary measures designed to further mitigate impacts to KRFC and increase the projected spawning escapement above 21,100. The Preferred Alternative broadens the use of this type of management measure which, over the last five years, has been used only in the north of Cape Falcon and KMZ fisheries (with the exception of 2003 when a 150 Chinook per day limit was applied in the Horse Mountain to Point Arena area). Although the effects of possession and landing limits could not be modeled by the Council's STT to estimate catch reduction, it is expected that there will be some effect. The limits may cap catch for some trips and may cause some vessels to reduce the number of trips they take or completely forego participation in the 2006 salmon fishery. Therefore, the economic impact estimates for commercial fisheries should be viewed as upper bounds for the purpose of this EA.

Vessel trip limits reduce vessel profits and related personal income more than proportionally relative to the reduction in catch and exvessel value. Limits are specified in terms of number of fish. Once a vessel is out on the fishing grounds, the marginal cost of catching additional fish is low relative to average harvesting costs. The personal income depicted in Figure 3 of Preseason Report III is based on average personal income per fish. The figure does not take into account the reductions resulting from loss of opportunity to catch additional fish at low marginal costs, nor is account taken of the effects of potential highgrading to take larger fish. Larger fish bring more revenue both because they weigh more and because larger fish bring a higher price per pound. At this time, information is not available to provide a complete quantitative assessment of the economic effects of the vessel limits. Qualitatively it can be noted that these limits will have a downward influence on personal income, not reflected in the Figure 3 of Preseason Report III, and that the 50 to 75 fish per week limits may be more restrictive than the 30 to 40 fish per day limits often used in the KMZ management area (depending on the number of trips per week and typical trip durations for a particular vessel in the KMZ). North of Cape Falcon, trips are often specified "per open period" and those open periods are often a certain number of days per calendar week. In the 2005 fishery, the "per open period" limits for the great majority of the season ran from 75 to 125 fish. In 2004, the majority of the season in this area was fished under "per open period" limits of 100 to 125 fish (note: 5 days in early May were fished with no catch limits). The proposed 50 to 75 fish per week limits may be more constraining than these other recent year trip limits.

The Preferred Alternative also includes restrictions for area of landing. These restrictions are generally intended to provide more timely and accurate management information to facilitate quota monitoring, compliance with weekly and daily landing limits, and postseason evaluation of stock specific impacts. The restrictions will allow the states to focus sampling efforts in or near areas with open fisheries. The restrictions will also prevent some exchange of economic impacts among areas as has occurred in the past. For example, the California portion of the KMZ will not be allowed any commercial salmon landings in 2006.

The landing requirements for commercial fishers north of Cape Falcon allow Oregon licensed fishers to land fish caught between Cape Falcon and Leadbetter Point to the north, into Oregon ports between Leadbetter

Point and Cape Falcon, and into Garibaldi, Oregon, a port south of Cape Falcon, and transport their fish to buyers outside the port of landing before recording the delivery on a fish receiving ticket. The intent is to allow small scale fishers the opportunity to seek out specialty markets, such as restaurants, where they can obtain higher prices for their catch, which would increase slightly the projected exvessel revenue. However, transport of fish away from the port of landing before recording the landing on a state fish receiving ticket is prohibited in the State of Washington. Therefore, the practice is not allowed for Washington ports. In order to enforce the state regulations and facilitate timely and accurate quota monitoring, and to ensure stock specific impacts are assigned to appropriate catch areas postseason, catch from north of Leadbetter Point must be landed north of Leadbetter Point and within the open fishing area. Catch from south of Leadbetter Point must be landed south of Leadbetter Point or in Garibaldi, Oregon. These landing restrictions are also included in the No Action and Other alternatives that are considered.

Council-area wide, the Preferred Alternative for the commercial fishery is expected to generate less revenue than Options I and II, but more than Option III, which included a near complete closure of fisheries between Cape Falcon and Point Sur.

Ocean Recreational

The recreational sector fares better than commercial sector when looking at the change in community income impacts from 2005. Under the Preferred Alternative, Council-area-wide community income is projected to decrease by 12%. This is still down, however, by 26% from the 2000-2005 historical baseline. Projections for areas south of Cape Falcon, Oregon are similar to, but slightly lower than, the 2005 actual baseline, except for the KMZ. The KMZ is expected to experience a decrease of 31% relative to the 2005 actual baseline because of constraints associated with KRFC The area north of Cape Falcon is projected to have a 30% decrease in income impacts due to constraints for LCR natural coho and reduced Columbia River hatchery tule fall Chinook abundance.

Council-area wide the Preferred Alternative ranks higher than Options I, II, and III in associated personal income, in part because the Klamath River recreational fishery was allocated no directed harvest of KRFC in the Preferred Alternative, as opposed to an allocation of 15% of the non-Indian share of KRFC assumed for Option I. This provided additional impacts for ocean fisheries which were used by both commercial and recreational ocean fisheries.

Inside Harvest and Spawner Escapement

Fish not taken in ocean harvest are either available for inside harvest or contribute to additional escapement. Thus, total economic effects may vary more or less between the options than is indicated by the short-term effects on the ocean fisheries described above. Options that provide lower ocean harvest may provide more inside harvest (more commercial revenue or more angler trips) or higher inside CPUE (lower costs for commercial fisheries, higher experience values for recreational fishers). Harvest forgone in ocean fisheries not taken in inside fisheries may have a long-term impact on future production. The direction of the impact will depend on the level of escapement compared to the MSY level of escapement and the nature of the spawner recruitment relationship.

The major allocations between inside and ocean harvest are set in processes coordinated with, but outside of the Council process. For the Columbia River, Washington coast and Puget Sound inside fisheries, allocation of impacts are negotiated through the North of Falcon Forum. This forum involves state, tribal, and Federal managers along with tribal, recreational, and commercial harvesters of ocean and inside fisheries north of Cape Falcon. These negotiations take place primarily between the March and April Council meetings and affect the selection of the Preferred Alternative. For example, in 2003 the negotiations resulted in reducing

the impacts on Interior Fraser coho from an exploitation rate in southern U.S. waters of about 13% to the objective of 10% with almost no changes to Council-area coho fisheries.

The other major ocean-inriver allocation decisions occur with respect to KRFC. Recommendations to the Council are negotiated on a consensus basis through the KFMC, but the ultimate authority for allocating catch to the Klamath River fishery rests with the California Fish and Game Commission (CFGC). The Preferred Alternative assumes the CFGC will act according to the recommendation of the Council and the KFMC, and restrict the river fishery to catch and release only for adult KRFC. This recommendation recognizes the relative economic benefit of allocating KRFC impacts to ocean fisheries, which generate greater revenue per impact than river fisheries. KRFC make up only a small fraction of ocean catch because of the relative abundance of other stocks such as Sacramento River Chinook, and therefore generate more angler trips per KRFC impact as opposed to the river fishery catch, which consists almost entirely of KRFC.

The Preferred Alternative meets the escapement obligations (ocean harvest level commitments) negotiated through these forums. These negotiation processes are designed to ensure spawning escapement objectives are met, while harvest is allocated between different users based on legal obligations and socioeconomic needs of the participants. Some additional detail on these negotiation processes are provided in Section 3.1 of Appendix B to the Salmon FMP.

Long-term socioeconomic and biological impacts are generally correlated. Changes in population productivity, due to spawning escapement levels and biophysical conditions, determine future harvest opportunity. By achieving established escapement goals including the conservation objective of protecting the long-term productivity of the stock established by emergency rule for temporary amendment to the Salmon FMP required for implementation of the 2006 management measures, the Preferred Alternative should allow sustained harvests while allowing recovery of depressed and ESA-listed stocks. Under this alternative, the combined commercial and recreational coastal community level personal income impacts fall within the range observed in the 1990's, (albeit with only one lower year, 1998), and conditions for all relevant allocation agreements are met (Table 4-1d). While for some sectors and areas socioeconomic impacts are likely to be below those previously observed (e.g., the commercial fishery in the California portion of the KMZ), the aggregate effects of this alternative on the socioeconomic environment are considered not significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02.N/A

4.1.5 Reasons for Choosing the Preferred Alternative

The Preferred Alternative was chosen because it achieves the most favorable balance of biological, economic, and social benefits in comparison to the other alternatives without a significant impact to the human environment, as stated in the purpose and need for action of this EA (Section 1.2.2). In summary, the Preferred Alternative:

- Distributes harvest opportunity among regions and sectors according to terms of the Salmon FMP and according to relative impacts constraining stocks, particularly KRFC.

- Meets conservation goals for all Salmon FMU stocks, including the conservation objective protecting the long-term productivity of the KRFC stock established by emergency rule for temporary amendment to the Salmon FMP required for implementation of the 2006 management measures, and NMFS ESA consultation standards for ESA-listed stocks.

- Would not require closure of commercial and recreational salmon fishing from Cape Falcon, Oregon to Point Sur, California, a stretch of approximately 700 miles, causing severe social and economic hardship in the coastal communities.

- Is unlikely to result in significant direct and indirect impacts on non-target species.

- Provides substantial harvest opportunity within management constraints intended to ensure sustained, long-term productivity of stocks.

4.2 Impacts of the No Action Alternative

This section analyzes impacts to the environment based on continuation of 2005 regulations in the 2006 season. Some of the resources analyzed are predicted to have significant impacts if those regulations were re-implemented, however, an EIS was not developed because the alternative selected for implementation was predicted to not have significant impacts.

4.2.1 Salmon FMU Stocks

The STT uses the Coho Fishery Regulation Assessment Model (FRAM) and Klamath Ocean Harvest Model (KOHM) to evaluate the impacts to coho stocks and KRFC, which are reported in *Preseason Report I*. The projected escapement of Sacramento River fall Chinook is estimated based on recent year average CVI harvest rates and stock composition, and is also reported in *Preseason Report I*. Impacts to other Chinook stocks, primarily those from the Columbia River north, which are modeled with the Chinook FRAM, can not be estimated until later in the preseason planning process. However, impacts under the No Action Alternative to Chinook stocks from the Columbia River north were analyzed for this EA.

Sacramento Fall Chinook: The CVI is used to assess the abundance of combined Central Valley Chinook stocks. The Sacramento River fall run comprises over 90 percent of Central Valley Chinook stocks. The CVI harvest index, based on the CVI, is a ratio of harvested fish to the population (as measured by harvest and escapement). A repeat of 2005 regulations in 2006 would result in a CVI index value substantially lower than recent years, however, the calculated escapement would be 359,200 fish, still substantially above the target range of 122,000-180,000 fish.

Klamath River Fall Chinook: The KOHM forecasts a spawning population of approximately 18,700 naturally spawning KRFC. This is below the current Salmon FMP conservation objective minimum of 35,000 naturally spawning adults, as well as the conservation objective of protecting the long-term productivity of the KRFC stock established by emergency rule for temporary amendment to the Salmon FMP required for implementation of the 2006 management measures. The river tribal and recreational harvest allocations under this scenario are, respectively, 12,200 and 1,800 KRFC, which exceed the 2006 allocations for these two sectors of by 2,200 and 1,500 KRFC, respectively. It should be noted the estimates for KRFC spawning escapement and allocation were generated for Preseason Report I, and that model assumptions for effort in Oregon commercial fisheries and contact rates for California commercial fisheries were different than those used for Preseason Reports II and III (the Preferred Alternative and Options I, II, and III). In making the changes, the STT sought to correct an observed bias in the model. If the new model assumptions had been employed, spawning escapement would have been lower for the No Action alternative, and allocation values would have been greater.

Oregon Coastal Chinook: The conservation objective of an aggregate 150,000 to 200,000 naturally spawning adults would be met if 2005 regulations were applied.

Columbia River Fall Chinook: All five major stock units (LRW, URB,MCB, SCH, and LRH) would exceed the conservation objectives set for them.

Washington Coast and Puget Sound Chinook: Council-managed fisheries have a minor impact on these stocks, since they are generally distributed further north in Canadian and Alaskan waters. For this reason, an evaluation of impacts was not made.

Oregon Production Index Coho: Ocean escapements into the Columbia River in 2006 would be sufficient to provide inside harvest and meet hatchery egg take goals. The Salmon FMP exploitation rate objective for OCN coho would be met under this alternative.

Washington Coast and Puget Sound Coho: Under 2005 regulations, ocean escapements for Washington coast and Puget Sound natural coho stocks would be expected to be at levels that would permit attainment of Salmon FMP escapement goals for all stocks. Impacts from inside (e.g., freshwater and Puget Sound) fisheries would ultimately determine levels of anticipated spawning escapements.

All Salmon FMU stocks meet their conservation objectives under this alternative, except for the Klamath fall Chinook natural spawning escapement (Table 4-1d). Therefore, the effects of this alternative on Salmon FMU stocks are considered significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02 for target species.

4.2.2 Non-target species

The rationale outlined in Section 4.1.2 applies to the other alternatives. The No Action Alternative would not necessarily result in the same level of incidental catch as occurred in 2005 because of changes in the abundance of non-target species stocks and the interaction between salmon CPUE and incidental species catch rates. This alternative allows greater harvest opportunity for Chinook and coho, suggesting that it would result in higher rockfish catches in comparison to the other alternatives; however, there is insufficient information to quantify this difference. However, based on the agency staffs' best professional judgment, the availability of such information would not substantially affect this analysis because the incidental nature of salmon fishery impacts on groundfish are minor in comparison to directed groundfish fisheries, and are not expected to increase. This alternative would likely result in similar landings of groundfish as occurred in 2005.

The likelihood of similar or reduced groundfish landings compared to 2005 under this alternative meet the criteria for non-significance established in Section 1.5 of this EA for meeting the requirements of NOAA NAO 216-6 Section 6.02 regarding non-target species.

4.2.3 ESA-listed Species

The STT modeled the expected impacts of 2005 regulations on ESA-listed Chinook and coho stocks that Council-area fisheries impact at greater than 5%, allowing comparison of the biological consequences of the No Action Alternative with those of the other alternatives. Consultation standards would not be met for LCR natural tule Chinook and Snake River fall Chinook. NMFS guidance for LCR natural coho would also not be met.

NMFS expects to complete ESA consultation for endangered southern resident killer whales by June 2006. While the consultation will not be completed prior to approval of this action, NMFS has determined that the anticipated fisheries would not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures. In the event that the review suggests that further constraints in the 2006 fisheries are necessary, appropriate corrections would be made by NMFS through in-season action.

The effects of this alternative on ESA-listed salmon stocks are considered significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02 because the consultation standards for Snake River fall Chinook and Sacramento River winter Chinook would not be met.

Consultation standards for southern resident killer whales have not been established, but are not anticipated to preclude NMFS from any inseason actions necessary to comply with any reasonable and prudent alternatives. Therefore, the effects of these alternatives on ESA-listed southern resident killer whales are considered not significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02.

4.2.4 Socioeconomic Impacts

Management measures are tailored to achieve the greatest fishing opportunity, and thus economic return, within the constraints of sustainable management. The 2006 Chinook and coho abundances are generally lower coastwide than those expected in 2005. The coastwide economic consequences of applying the 2005 management regulations to 2006 stock abundances are likely positive in the short-term, but negative in the long-term.

This alternative adheres to the Salmon FMP allocation provisions for sharing of Chinook and coho TAC between recreational and commercial fisheries north of Cape Falcon and for sharing the recreational coho allocation among port areas north of Cape Falcon. This alternative does meet the terms of the agreement reached in the *U.S. v. Oregon* forum for allocation of coho destined for areas above Bonneville Dam (Table 4-1d).

Short-Term

Dollar values have not been assigned to the short-term economic effects of this option because it is not considered a viable option, in that it would not meet the conservation objectives indicated in the purpose and need for these management actions (Section 1.2). This option would not be in the range of options discussed in the most recent EIS, prepared for Amendment 14 to the Salmon FMP because it would not meet the natural spawner escapement objective for Klamath fall Chinook or NMFS ESA consultation standards for Snake River fall Chinook, or Sacramento River winter Chinook, or the Salmon FMP objective for OCN coho.

The 2005 management measures would result in an over-harvest of Chinook salmon in the ocean fisheries. North of Cape Falcon, abundance projections in 2006 for all stocks on which Council-area fisheries rely are lower than in 2005, which is reflected in preseason catch projections for the two years: 60,000 to 115,000 Chinook in 2006 versus 135,000 fish estimated preseason for 2005. A similar situation will occur south of Cape Falcon, with a range of projected catch in 2006 of 5,000 to 407,000 versus a 2005 projection of 800,000. Thus, application of 2005 management measures would result in an over-harvest, providing greater short-term benefits to ocean fishers. Ocean escapement of Chinook would be lower for those stocks present in lower abundance. If declines in ocean escapement were not compensated for with reduced inside harvest, there would be long-term adverse effects on stock productivity from under escapement.

The situation for coho is similar to Chinook. The preseason projected harvest for 2005 was 235,000 coho coastwide, for commercial and recreational fisheries combined, versus a projected range of 75,000 to 190,000 coho for 2006. The difference between these values does not reflect the actual over-harvest (since other variables in the models are different). But environmentally sustainable harvest would be exceeded for some natural stocks.

This overall picture is further complicated by the implicit and explicit allocation of fishing opportunity among sectors and areas that would result from a repeat of 2005 management measures. Over the short term, relative to what would be allowed under regulations tailored to 2006 abundances, more opportunity to harvest coho will benefit recreational fishers and fisheries north of Cape Falcon, which take a large share of the total coho harvest, more than commercial fishers and fisheries south of Cape Falcon. Greater opportunity to harvest Chinook, relative to what would be allowed under regulations tailored to 2006 abundances, would tend to benefit commercial fisheries more and recreational fisheries south of Cape Falcon.

Long-Term

Effects on long-term harvest opportunities depend on the level of escapement relative to the real MSY escapement level given existing environmental conditions (the real MSY escapement is largely an unknown factor). Any substantial over- or under-escapement is likely to result in less future harvest opportunity than would otherwise have occurred. Assuming management targets are, on average, at MSY levels, and a standard Ricker type spawner-recruit relationship, it is likely that any deviation of spawning escapements below the management targets, or above the level associated with maximum production, will result in lower future production than would otherwise occur.

Although a specific analysis was not conducted, the coastal community-level personal income impacts of this alternative likely fall within the range observed in recent years (Figure 3-7). Therefore, the effects of this alternative on the socioeconomic environment are considered not significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02.

4.2.5 Reasons for Rejecting the No Action Alternative

The No Action Alternative would not respond to changes in the status of Chinook and coho stocks from 2005, and would, consequently, result in over-harvest of individual stocks. In particular, the natural spawning escapement objective for Klamath River fall Chinook would not be met, NMFS ESA consultation standards would not be met for Snake River fall Chinook, LCR natural tule fall Chinook, and LCR natural coho. This would have significant long-term biological and economic impacts because it would reduce population productivity, lowering potential yields over the long-term.

4.3 Impacts of Other Alternatives Considered

This section analyzes impacts of the range of options the Council adopted for public review prior to selection of the Preferred Alternative. Because these options were selected prior to completed negotiations for inside fisheries and before final assumptions for the levels expected in northern fisheries were finalized, some resources were found to have significant impacts. However, these options or elements thereof were used primarily as a comparison for, or as components of, the Preferred Alternative. For example, the Option I non-Indian Chinook TAC for the area north of Cape Falcon was incorporated into the Preferred Alternative, but the Option I coho TAC north of Cape Falcon and the coho quota for south of Cape Falcon were too high to allow adequate inside harvest for LCR natural coho, and so both were reduced in the Preferred Alternative.

4.3.1 Salmon FMU Stocks

Anticipated impacts of the options developed during the March Council meeting are described on pages 14-19 in *Preseason Report II.* Table 4-1d compares key stock escapements, ocean exploitation rates, or other criteria to objectives. All of the options would meet conservation objectives for Salmon FMP stocks, except objectives would not be met under Option I for Snake River fall Chinook and would provide insufficient flexibility to conclude inside negotiations with regard to LCR natural coho.

Both commercial and recreational Chinook impacts would decrease from a baseline of 2005 projected levels for all three options coastwide (Figure 4-1). Coho impacts in 2006 for both commercial and recreational fisheries would decrease in all areas under all three options compared to 2005 baseline (projected) levels (Figure 4-2).

In terms of overall impacts for both Chinook and coho, Option I has the greatest impacts, Option II is intermediate, and Option III has the fewest impacts, and the distribution of impacts follows the same pattern within all fishing zones.

The long-term effects of surplus escapement for Salmon FMU stocks associated with these alternatives would result in some density dependant effects that could reduce future production but may also contribute to greater ecosystem productivity that could increase future production. The long-term effects of under-escapement, although partially compensated for by density-dependant effects, would likely reduce future production and have negative impacts to ecosystem productivity.

All Salmon FMU stocks meet their conservation objectives under Option III, including KRFC, which meet the conservation objective of protecting the long-term productivity of the KRFC stock established by emergency rule for temporary amendment to the Salmon FMP required for implementation of the 2006 management measures. (Table 4-1d). However, under Option I for Snake River fall Chinook, and Options I and II for KRFC, conservation objectives would not be met (Table 4-1d). Therefore, the effects of Options I and II on Salmon FMU stocks are considered significant based on the criteria established in Section 1.5 of this EA for meeting the requirements of NOAA NAO 216-6 Section 6.02. The effects of Option III are not considered significant.

4.3.2 Non-target Species

Assuming an essentially linear correlation between salmon and non-target species impacts, as discussed previously, Options I, II, and III could result in lower rockfish bycatch than the No Action Alternative. Again, there is insufficient information to determine what these harvest levels might be. It is also possible that management measures in these options intended to reduce salmon catches could distort any correlation between salmon and rockfish catch rates by motivating more targeting on rockfish in response to the limits on salmon harvest opportunity. However, based on the agency staffs' best professional judgment, the availability of such information would not substantially affect this analysis because the incidental nature of salmon fishery impacts on groundfish are minor in comparison to directed groundfish fisheries, and are not expected to increase. These alternatives would likely result in similar to lower landings of groundfish compared to the Preferred Alternative, and less than the No Action Alternative.

The likelihood of similar or reduced groundfish landings compared to 2005 under this alternative meet the criteria for non-significance based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02 regarding non-target species.

4.3.3 ESA-listed Species

According to *Preseason Report II* (pages 14-19), consultation standards for most ESA listed salmon species were met by all the options, with the exception of Option I for Snake River fall Chinook and LCR natural tule fall Chinook. Although Option I technically met NMFS guidance for LCR natural coho, it would not provide sufficient flexibility to conclude inside negotiations with regard to LCR natural coho The Council adopted Option I as a viable alternative contingent on final preseason expectations for Snake River and LCR natural tule fall Chinook impacts consistent with the NMFS ESA consultation standard, conclusion of ocean/inside negotiations, and so elements of Option I could be incorporated into a Preferred Alternative if the consultation standard was not met.

Puget Sound Chinook are not impacted at significant rates by Council area salmon fisheries, and a complete assessment of impacts to Puget Sound Chinook stocks could not be made at the time *Preseason Report II* was published. The analyses in *Preseason Report II* of impacts for all stocks were based on preliminary estimates of inside fisheries and 2005 assumptions for Canadian and Alaskan, both of which were still under negotiation. The inside fisheries have significant impacts on these stocks, but it is likely that consultation standards and other management objectives could be met through those negotiations if one of these options were selected as a Preferred Alternative without modification. An analysis of impacts associated with ocean fisheries within the scope presented in the Salmon FMP is included in the NMFS BOs. (See Section 5.6 for a list of relevant BOs.) NMFS ESA consultation standards are identified in Appendix A of *Preseason Report III*.

The long-term effects of different spawning escapement levels on ESA-listed salmon species or other constraining stocks resulting from Option I, under the preliminary assumptions of Alaskan and Canadian fishery impacts, are likely to include reduced juvenile production and ecosystem productivity. If not effectively allocated to inside fisheries, reduced harvest impacts under Options II and III would allow higher spawning escapement and possibly increase production. However, the level of production associated with escapement expected under these options is not expected to substantially affect the recovery of depressed stocks or affect the intrinsic productivity of the stocks.

NMFS expects to complete ESA consultation for endangered southern resident killer whales by June 2006. While the consultation will not be completed prior to approval of this action, NMFS has determined that the anticipated fisheries would not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures. In the event that the review suggests that further constraints in the 2006 fisheries are necessary, appropriate corrections would be made by NMFS through in-season action.

All ESA-listed salmon stocks meet NMFS ESA consultation standards under Options II and III. Therefore, the effects of these alternatives on ESA-listed salmon stocks are considered not significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02. Option I, however, does not meet the consultation standard for lower Snake River fall Chinook and LCR natural tule Chinook. Therefore, Option I does not meet the criteria for non-significance.

Consultation standards for southern resident killer whales have not been established, but are not anticipated to preclude NMFS from any inseason actions necessary to comply with any reasonable and prudent alternatives. Therefore, the effects of these alternatives on ESA-listed southern resident killer whales are considered not significant based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02.

4.3.4 Socioeconomic Impacts

For the alternatives considered, coastal community level personal income impacts from recreational fisheries are projected to range from $4.8 million for Option III to $26.6 million for Option I (Table 2-1). The range for commercial fisheries is projected to be from $1.3 million in Option III to $20.5 million in Option I. Total personal income impacts range from $6.2 million to $47.2 million. These totals are substantially less than the 2005 level of $65.9 million, and with the exception of Option I, below the recent year low of $34.5 million in 1998 (Figure 3-7)

Options I, II, and III adhere to the Salmon FMP allocation provisions for sharing of Chinook and coho TAC between recreational and commercial fisheries north of Cape Falcon and for sharing the recreational coho allocation among port areas north of Cape Falcon, and the terms of the agreement reached in the *U.S. v.*

Oregon forum for allocation of coho destined for areas above Bonneville Dam based on preliminary assumptions for inriver fisheries (Table 4-1d). Options I provides community level income impacts within the range of recent years, but Option II and III impacts are significantly lower than any observed since the passage of the MSA in 1976.

Short Term

Tables 4-2a and 4-2b show the short-term ocean area economic impacts of the alternatives in comparison to the 2005 baseline (actual) derived from postseason estimates. For the commercial fishery these are expressed as exvessel value and local community income impacts (in dollar terms). For the recreational fishery the tables show angler trips and local community income impacts. Short-term economic effects in the ocean fishery generally correlate with the harvest impacts discussed above. Under these options, commercial fishers in most areas, and those relying on commercial fisheries, would experience modest to serious decreases in economic activity in 2006, as compared to the 2005 postseason (actual) baseline (Table 4-2a). Overall income impacts to commercial sector coastwide would be 47% to 97% less than in 2005.

Recreational fishing and those relying on recreational fisheries would experience activity ranging from a modest to substantial decrease, depending on area and the option considered (Table 4-2b), with the exception of Option I in the Cape Falcon to Humbug Mt. area, which might have resulted in a slight increase compared to 2005.

Long Term

Long-term socioeconomic and biological impacts are generally correlated. Changes in salmon population productivity, due to spawning escapement levels and biophysical conditions, determine future harvest opportunity. By achieving established escapement goals, the Preferred Alternative should allow sustained harvests while allowing recovery of depressed and ESA-listed stocks. Because Options I and II do not meet identified MSY escapement objectives, they are more likely to have adverse effects on stock productivity with long-term consequences, and not meet the objectives of the Salmon FMP.

Under these alternatives, the coastal community-level personal income impacts fall below the range observed in recent years (Table 4-1d), but except for Option III, within the range observed since management under the Salmon FMP. Therefore, the effects of Option III on the socioeconomic environment are considered significant, based on the criteria established in Section 1.5 of this EA for meeting the significance test in NOAA NAO 216-6 Section 6.02. The effects of Options I and II are not considered significant.

4.3.5 Reasons for Rejecting Other Alternatives Considered

Options I and II could have a significant biological impact because conservation objectives for Snake River fall Chinook, LCR natural tule fall Chinook, and KRFC would not be met. In addition, Option I provides insufficient flexibility for Columbia River mainstem fisheries to achieve the NMFS ESA guidance for LCR natural coho and meet inside fishery needs, including tribal trust requirements. Option III was found to have significant negative economic impacts in comparison with the criteria established in Section 1.5 of this EA.

4.4 Cumulative Impacts

Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable actions, including impacts outside the scope of the proposed action (in this case annual management measures). Two broad categories of cumulative impacts can be identified for salmon species affected by Council-managed ocean commercial and recreational fisheries. The first category includes other ocean fisheries, some of which are managed by the Council, and so-called inside fisheries prosecuted in internal waters (like Puget Sound) and in

rivers as salmon migrate towards their spawning grounds. Fishing mortality also has some broader ecological effects, since it removes salmon that might otherwise be consumed by other ecosystem components. The second category comprises human activities that affect the sustainability of salmon populations. Because salmon spend part of their life cycle in freshwater, they are more vulnerable to a broad range of human activities (since humans spend most of their time on land) that affect the 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 due to increased silt in the water from adjacent land use. A very large proportion of the long-term, and often permanent, declines in salmon stocks is attributable to this class of impacts. (For a detailed summary of non-fishing impacts to salmon habitat see Section 3.2.5 of the EFH Appendix A to Amendment 14.)

Consideration of cumulative effects is intrinsic to fishery management. When developing management measures, fishery managers try to account for all sources of mortality in a given population and the productivity of that population. This accounting does not have to be explicit, in that total mortality is exactly partitioned among each cause, except that natural and fishing mortality are distinguished. The aggregation accounts for a wide variety of effects, including past fishing mortality. Future fishing mortality is not accounted for in population models, but it can be broadly anticipated based on limits set by the management regime. Other actions (e.g., habitat degradation) are accounted for in estimates of natural mortality and population productivity. In the case of salmon, fishing mortality is reasonably accounted for because quotas or allocations to other fisheries are known or foreseeable. Natural mortality is estimated and accounts for all non-fishing impacts to a given population. By the same token, productivity estimates include reproductive success and recruitment to the adult, fishable population. This accounts for short- and long-term changes to spawning habitat, among other things. Although salmon's anadromous life cycle is its "Achilles heel" in one sense (because it exposes key life stages to human-induced impacts) it makes the task of stock assessment much easier because reproductive success can be estimated with a fair degree of certainty. Marine survival is harder to measure. But taken together, as part of the stock assessment, these measures effectively account for cumulative effects to salmon targeted by the proposed action. However, the effect of fishing on the ecosystem, due to the shift in balance between fishing and natural mortality, is much harder to predict. Fish removed by fishermen are unavailable to other trophic levels, to be eaten by predators or recycled by decomposers for example. These effects can not be readily assessed, but there is no indication fishing mortality substantially contributes to ecosystem-wide effects.

Despite the effectiveness of these management models in accounting for cumulative impacts, uncertainty by itself can be considered an additional source of cumulative impacts. Although easier for salmon than other marine species, it is inherently difficult to precisely measure many population parameters. These multiple uncertainties have a compound effect, and in this sense, uncertainty produces cumulative effects that must be accounted for in decision making. For example, drop-off mortality cannot be measured directly and must be estimated. Similarly, mortality from recreational fishing is, in many cases, difficult to estimate because it is hard to monitor fisheries with many thousands of participants fishing in the ocean, rivers and streams. The cumulative effect of error in parameter estimates ultimately determines managers' success in setting management targets that ensure sustained exploitation across all users. The discussion of abundance predictors and comparison of preseason predictions with postseason estimates, found in the *Review of 2005 Ocean Salmon Fisheries*, shows predictions are generally accurate. In comparison to other fisheries, these cumulative errors have not detracted from management performance.

The alternatives do not differ greatly in the context of cumulative impacts, since all other impacts besides those resulting from the proposed action, discussed here, apply equally to each of the alternatives. For this reason, the direct impacts of the alternatives, in this case the level of fishing mortality that would result, correlates directly with cumulative impacts. As a result, alternatives that allow greater harvest (e.g., Option I in comparison to Option III) produce a greater cumulative impact.

Cumulative impacts on salmon stocks and their habitat could be significant if conservation objectives are not met for Salmon FMU stocks, which could result in adversely affecting the productivity of those stocks and associated economic benefits of fisheries, and could diminish the quality of habitat used by juvenile salmon and other terrestrial organisms. The Preferred Alternative meets conservation objectives for all Salmon FMU stocks, including the conservation objective protecting the long-term productivity of the KRFC stock established by emergency rule for temporary amendment to the Salmon FMP required for implementation of the 2006 management measures, and therefore would not have significant cumulative effects.

4.5 Summary and Comparison of Impacts Between Alternatives

The Preferred Alternative would not have a significant impact on the environment because it meets the conservation objectives, including the conservation objective protecting the long-term productivity of the KRFC stock established by emergency rule for temporary amendment to the Salmon FMP required for implementation of the 2006 management measures, the allocation criteria, and other relevant objectives of the Salmon FMP; achieves applicable ESA consultation standards; and complies with obligations under the PST. Further, the impacts of this alternative were compared to criteria established for determination of significance based on NOAA NAO 216-6, Section 6.02, and found to be not significant. The harvest impacts of the Preferred Alternative are intermediate between Options II and III for Chinook, and between Options I and II for coho. For the commercial fishery, short-term economic value for this alternative is greater than the Option III Alternative, but less than the Option I and II Alternatives. For the recreational fishery, short-term economic value is slightly greater than the Option I Alternative, and substantially greater than Options II and III Alternatives. The commercial fishery would likely experience a substantial economic decrease relative to the 2005 postseason baseline, while the recreational fishery would experience a modest decrease relative to this baseline.

The No Action Alternative would have a significant negative impact because it would not respond to changes in Chinook and coho stock status, resulting in over-harvest of stocks. Re-application of 2005 management measures would increase impacts on some ESA-listed salmon, and the objective for natural spawning KRFC would not be met. The short-term economic value for this option was not estimated because the alternative does not meet the purpose and need for action. Further, the impacts of this alternative were compared to criteria established for determination of significance based on NOAA NAO 216-6, Section 6.02, and found to be significant.

Option I has the highest overall harvest impacts to both Chinook and coho of the three options and the Preferred Alternative, but would not meet all conservation and management objectives. Short-term commercial and recreational economic value is higher than Options II, III, and higher than the Preferred Alternative for commercial fisheries. Further, the impacts of this alternative under preseason assumptions were compared to criteria established for determination of significance based on NOAA NAO 216-6, Section 6.02, and found to be significant.

Option II is intermediate in terms of overall harvest impacts. This option would not meet the conservation objective for KRFC. The short-term commercial economic value of this option is intermediate between Options I and III, and less than the Preferred Alternative. Further, the impacts of this alternative were compared to criteria established for determination of significance based on NOAA NAO 216-6, Section 6.02, and found to be significant.

Option III has the lowest overall harvest impacts. It would also meet conservation and allocation objectives for all stocks. The short-term commercial and recreational economic value of this option is less than Options I and II, and the Preferred Alternative, as a result of closing commercial and recreational fisheries between Cape Falcon, Oregon and Point Sur, California. The impacts of this alternative were compared to criteria

established for determination of significance based on NOAA NAO 216-6, Section 6.02, and found to be significant.

Table 4-1a. Chinook harvest impacts (catch and bycatch mortality combined, thousands of fish) and percent distribution within each alternative**. (Page 1 of 1)**

Chinook	Troll						Recreational					
	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**
Treaty Indian	55.6	48.1	74.6	49.7	39.1	**48.4**						
North of Cape Falcon	56.4	56.1	46.1	35.3	24.6	**43.9**	48.9	45.2	36.8	28.3	19.8	**35.2**
Cape Falcon to Humbug Mt.	160.4	264.6	165.1	117.1	0.0	**50.9**	18.6	20.2	16.4	14.0		**16.4**
KMZ	11.2	8.1	5.3	2.5	0.8	**0.0**	23.9	19.9	11.4	4.7		**8.4**
South of Horse Mt.	393.5	376.3	173.4	134.6	0.0	**158.9**	275.9	145.7	90.4	32.2	4.9	**100.8**
Total	677.1	753.3	464.5	339.2	64.5	**302.0**	367.3	231.0	155.0	79.2	24.7	**160.8**

	Troll						Recreational					
	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**
Treaty Indian	8.2%	6.4%	16.1%	14.7%	60.6%	**16.0%**						
N. of Falcon	8.3%	7.5%	9.9%	10.4%	38.2%	**14.5%**	13.3%	19.6%	23.8%	35.7%	80.2%	**21.9%**
Falcon to Humbug	23.7%	35.1%	35.5%	34.5%	0.0%	**16.9%**	5.1%	8.8%	10.6%	17.7%	0.0%	**10.2%**
KMZ	1.7%	1.1%	1.1%	0.7%	1.2%	**0.0%**	6.5%	8.6%	7.4%	5.9%	0.0%	**5.2%**
S. of Horse	58.1%	50.0%	37.3%	39.7%	0.0%	**52.6%**	75.1%	63.1%	58.3%	40.7%	19.8%	**62.7%**
	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**
(Commercial vs. Rec.)	64.8%	76.5%	75.0%	81.1%	72.3%	**65.3%**	35.2%	23.5%	25.0%	18.9%	27.7%	**34.7%**

Table 4-1. Coho harvest impacts (catch and bycatch mortality combined, thousands of fish) and percent distribution within each alternative**. (Page 1 of 1)**

Coho	Troll						Recreational					
	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**
Treaty Indian	54.1	25.9	48.3	37.4	26.7	**40.1**						
North of Cape of Falcon	37.4	6.6	28.1	20.5	12.9	**13.0**	151.1	76.5	111.7	80.8	50.6	**87.9**
South of Cape Falcon	4.3	6.2	3.3	3.2	0.0	**3.4**	57.3	5.2	48.9	28.6	0.1	**31.2**
Total	213.6	38.7	79.7	61.1	39.6	**56.5**	208.4	81.7	160.6	109.4	50.7	**119.1**
Total fish (rec and comm)	1,713.0	1,104.7	859.9	588.9	179.5	**638.5**						

	Troll						Recreational					
	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**	2005 proj.	2005 act.	Option I	Option II	Option III	**Preferred**
Treaty Indian	56.5%	66.9%	60.6%	61.2%	67.4%	**71.0%**		0.0%				
N. of Falcon	39.0%	17.1%	35.3%	33.6%	32.6%	**23.0%**	72.5%	93.6%	69.6%	73.9%	99.8%	**73.8%**
South of Cape Falcon	4.5%	16.0%	4.1%	5.2%	0.0%	**6.0%**	27.5%	6.4%	30.4%	26.1%	0.2%	**26.2%**
	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**
(Commercial vs. Rec.)	31.5%	32.1%	33.2%	35.8%	43.9%	**32.2%**	68.5%	67.9%	66.8%	64.2%	56.1%	**67.8%**

Table 4-1c. Distribution of impacts within each alternative (thousands of fish and percent of total). (Page 1 of 1)

2005 (projected)	Commercial		Recreational		Total	
Chinook	677.1	46.2%	367.3	25.0%	1044.4	71.2%
Coho	213.6	14.6%	208.4	14.2%	422.0	28.8%
Total	890.7	60.7%	575.7	39.3%	1466.4	100.0%
2005 (actual)						
Chinook	753.3	68.2%	231.0	20.9%	984.3	89.1%
Coho	38.7	3.5%	81.7	7.4%	120.4	10.9%
Total	791.9	71.7%	312.8	28.3%	1104.7	100.0%
Option I					Total	
Chinook	464.5	54.0%	155.0	18.0%	619.6	72.1%
Coho	79.7	9.3%	160.6	18.7%	240.3	27.9%
Total	544.2	63.3%	315.6	36.7%	859.9	100.0%
Option II					Total	
Chinook	339.2	57.6%	79.2	13.4%	418.4	71.0%
Coho	61.1	10.4%	109.4	18.6%	170.5	29.0%
Total	400.3	68.0%	188.6	32.0%	588.9	100.0%
Option III					Total	
Chinook	64.5	35.9%	24.7	13.8%	89.2	49.7%
Coho	39.6	22.1%	50.7	28.2%	90.3	50.3%
Total	104.1	58.0%	75.4	42.0%	179.5	100.0%
Preferred					Total	
Chinook	302.0	47.3%	160.8	25.2%	462.9	72.5%
Coho	56.5	8.8%	119.1	18.7%	175.6	27.5%
Total	358.5	56.2%	279.9	43.8%	638.5	100.0%

Table 4-1d. Projected key stock escapements (thousands of fish) or management criteria for 2006 ocean fishery management measures adopted by the Council.[a/]
(Page 1 of 3)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fisheries) Option I	Option II	Option III	Preferred	Spawner Objective or Other Comparative Standard as Noted
					CHINOOK
PUGET SOUND:					
Elwha Summer/Fall	N/A	N/A	N/A	2.2%	≤10.0% Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Dungeness Spring	N/A	N/A	N/A	2.1%	≤10.0% Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Mid-Hood Canal Summer/Fall	N/A	N/A	N/A	8.9%	≤12.0% Preterminal Southern U.S. CERC (NMFS ESA consultation standard)
Skokomish Summer/Fall	N/A	N/A	N/A	9.0%	≤15.0% Preterminal Southern U.S. Rebuilding Exploitation Rate and
	N/A	N/A	N/A	1.230	≥1.200 Natural spawning escapement (NMFS ESA consultation standard)
Nooksack Spring	N/A	N/A	N/A	3.6%	≤7.0% Southern U.S. CERC, not to exceed in four out of five years (NMFS ESA consultation standard)
	N/A	N/A	N/A	12.1%	≤60.0% ISBM Index (PSC general obligation).
Skagit Summer/Fall	N/A	N/A	N/A	30.3%	≤50.0% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
	N/A	N/A	N/A	25.8%	≤60.0% ISBM Index (PSC general obligation).
Skagit Spring	N/A	N/A	N/A	18.4%	≤38.0% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
	N/A	N/A	N/A	16.1%	≤60.0% ISBM Index (PSC general obligation).
Stillaguamish Summer/Fall	N/A	N/A	N/A	12.2%	≤15.0% Southern U.S. CERC (NMFS ESA consultation standard)
	N/A	N/A	N/A	49.2%	≤60.0% ISBM Index (PSC general obligation).
Snohomish Summer/Fall	N/A	N/A	N/A	14.7%	≤15.0% Southern U.S. CERC (NMFS ESA consultation standard)
	N/A	N/A	N/A	19.8%	≤60.0% ISBM Index (PSC general obligation).
Lake Washington Summer/Fall	N/A	N/A	N/A	10.4%	≤15.0% Preterminal Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
	N/A	N/A	N/A	61.3%	≤60.0% ISBM Index (PSC general obligation).
Green River Summer/Fall	N/A	N/A	N/A	10.4%	≤15.0% Preterminal Southern U.S. Rebuilding Exploitation Rate and
	N/A	N/A	N/A	13.527	≥5.800 Natural spawning escapement (NMFS ESA consultation standard)
	N/A	N/A	N/A	36.1%	≤60.0% ISBM Index (PSC general obligation).
White River Spring	N/A	N/A	N/A	19.7%	≤20.0% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Puyallup Summer/Fall	N/A	N/A	N/A	50.0%	≤50.0% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Nisqually River Summer/Fall	N/A	N/A	N/A	1.752	≥1.100 Spawning escapement goal (NMFS ESA consultation standard)
WASHINGTON COAST:					
Hoko Fall	N/A	N/A	N/A	44.2%	≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
Quillayute Fall	N/A	N/A	N/A	67.3%	≤60.0% ISBM Index (PSC general obligation) not applicable for 2006 because escapement objective met.
Hoh Fall	N/A	N/A	N/A	149.3%	≤60.0% ISBM Index (PSC general obligation) not applicable for 2006 because escapement objective met.
Queets Fall	N/A	N/A	N/A	102.2%	≤60.0% ISBM Index (PSC general obligation) not applicable for 2006 because escapement objective met.
Grays Harbor Fall	N/A	N/A	N/A	54.4%	≤60.0% ISBM Index (PSC general obligation)

TABLE 4-1d. Projected key stock escapements (thousands of fish) or management criteria for 2006 ocean fishery management measures adopted by the Council.[a/] (Page 2 of 3)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fish				Spawner Objective or Other Comparative Standard as Noted	
					CHINOOK	
COLUMBIA RIVER:						
Columbia Upriver Brights	250.5	251.7	252.7	249.1	57.3	Minimum ocean escapement to attain 46.0 adults over McNary Dam, with normal distribution and no mainstem harvest.
				73.4%	≤60.0%	ISBM Index (PSC general obligation) not applicable because escapement objective met.
Deschutes River Fall	N/A	N/A	N/A	43.7%	≤60.0%	ISBM Index (PSC general obligation)
Mid-Columbia Brights	86.8	87.2	87.6	86.6	16.6	Minimum ocean escapement to attain 5.75 adults for Bonneville Hatchery and 2.0 for Little White Salmon Hatchery egg-take, assuming average conversion and no mainstem harvest.
Columbia Lower River Hatchery Tules	54.0	57.0	61.3	57.5	31.1	Minimum ocean escapement to attain 14.1 adults for hatchery egg-take, with average conversion and no lower river mainstem or tributary harvest.
Columbia Lower River Natural Tules[c/] (threatened)	52.4%	48.1%	41.8%	47.2%	≤49.0%	ESA guidance met by a total adult equivalent fishery exploitation rate on Coweeman tules (NMFS ESA consultation standard).
	16.6	16.7	16.8	16.6[d/]	5.7	MSY spawner goal for North Lewis River fall chinook (NMFS ESA consultation standard).
Columbia Lower River Wild (threatened)				186.1%	≤60.0%	ISBM Index (PSC general obligation) not applicable because escapement objective met.
Spring Creek Hatchery Tules	49.9	54.7	59.0	51.8	11.1	Minimum ocean escapement to attain 7.0 adults for Spring Creek Hatchery egg-take, assuming average conversion and no mainstem harvest.
Snake River Fall (threatened) SRFI	77.0%	68.6%	58.4%	64.3%	≤70.0%	Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard).
OREGON COAST:						
Nehalem Fall	N/A	N/A	N/A	119.2%	≤60.0%	ISBM Index (PSC general obligation)
Siletz Fall	N/A	N/A	N/A	123.7%	≤60.0%	ISBM Index (PSC general obligation)
Siuslaw Fall	N/A	N/A	N/A	109.5%	≤60.0%	ISBM Index (PSC general obligation)
CALIFORNIA :						
Klamath River Fall	13.8	18.8	25.4	21.1	35.0	Minimum number of adult spawners to natural spawning areas. NMFS guidance for 2006 requires escapement sufficient to not jeopardize capacity of stock to achieve MSY in the long term.
Spawner reduction rate	57.6%	42.2%	21.8%	35.2%	≤66.7%	Equals 18.7, 13.7, 7.1, and 11.4 (thousand) fewer adult natural spawners due to fishing.
Federally recognized tribal harvest	50.0%	50.0%	50.0%	50.0%	50.0%	Equals 10.0 (thousand) adult fish for Yurok and Hoopa tribal fisheries.
Adult river mouth return	44.2	45.7	50.7	47.6	NA	Includes natural and hatchery returns.
Age 4 ocean harvest rate	17.0%	14.8%	6.7%	11.5%	≤16.0%	NMFS ESA consultation standard for threatened California coastal chinook.
KMZ sport fishery share	7.7%	5.9%	8.4%	8.8%	17.0%	2006 KFMC recommendation.
CA:OR troll fishery share	55:45	50:50	19:81	44:56	50:50	2006 KFMC recommendation.
River recreational fishery allocation	15.0%	0.0%	0.0%	0.0%	15.0%	2005 California Fish and Game Commission specification; none specified for 2006. Equals 2.5, 0.0, 0.0, and 0.3 (thousand) adult fish catch and release mortality associated with other recreational inriver fisheries for anadromous species.
Sacramento River Winter (endangered)	yes	yes	yes	yes		
						Recreational season 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 season 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. Commercial seasons 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 season 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. (NMFS ESA consultation standard).
Sacramento River Fall	385.3	440.1	550.3	368.0	122.0-180.0	Sacramento River fall natural and hatchery adult spawners.

TABLE 4-1d. Projected key stock escapements (thousands of fish) or management criteria for 2006 ocean fishery management measures adopted by the Council.[a/] (Page 3 of 3)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fish				Spawner Objective or Other Comparative Standard as Noted
					COHO
Interior Fraser (Thompson River)	9.2%(4.0%)	8.1%(3.0%)	7.3%(2.2%)	9.2%(3.4%)	≤10.0% Total exploitation rate for southern U.S. fisheries based on 2002 PSC coho agreement.
Skagit	36%(4.5%)	35%(2.7%)	35%(2.0%)	36%(2.9%)	≤60.0% 2006 total exploitation rate ceiling based on 2002 PSC coho agreement[c/]
	87.6	88.5	89.2	87.8	30.0 MSP level of adult spawners Identified in FMP.
Stillaguamish	41%(5.2%)	40%(3.9%)	37%(2.7%)	40%(4.2%)	≤50.0% 2006 total exploitation rate ceiling based on 2002 PSC coho agreement[c/]
	32.4	33	33.4	32.7	17.0 MSP level of adult spawners Identified in FMP.
Snohomish	39%(5.2%)	38%(3.9%)	35%(2.7%)	39%(4.2%)	≤60.0% 2006 total exploitation rate ceiling based on 2002 PSC coho agreement[c/]
	97.3	98.9	100.2	98.0	70.0 MSP level of adult spawners Identified in FMP.
Hood Canal	38%(3.2%)	37%(2.4%)	34%(1.9%)	37%(2.8%)	≤65.0% 2006 total exploitation rate ceiling based on 2002 PSC coho agreement[c/]
	46.8	47.3	47.7	46.4	21.5 MSP level of adult spawners Identified in FMP.
Strait of Juan de Fuca	11%(3.7%)	10%(2.8%)	7%(1.7%)	11%(3.0%)	≤40.0% 2006 total exploitation rate ceiling based on 2002 PSC coho agreement[c/]
	23.6	23.8	24.1	23.5	12.8 MSP level of adult spawners Identified in FMP.
Quillayute Fall	12.8	13.1	13.4	13.0	6.3-15.8 MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Hoh	5.4	5.6	5.7	5.6	2.0-5.0 MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Queets Wild	7.0	7.2	7.4	7.1	5.8-14.5 MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Grays Harbor	59.8	60.7	61.7	60.3	35.4 MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Lower Columbia River Natural (threatened)	14.0%	10.0%	5.9%	9.9%	≤15.0% Council area and mainstem Columbia River fishery exploitation rate (NMFS ESA consultation standard). Value depicted is ocean fishery exploitation rate only.
Upper Columbia	>50%	>50%	>50%	78%	50% Minimum percentage of the run to Bonneville Dam.
Columbia River Hatchery Early	162.2	184.4	210.4	182.7	38.7 Minimum ocean escapement to attain hatchery egg-take goal of 16.0 early adult coho, with average conversion and no mainstem or tributary fisheries.
Columbia River Hatchery Late	52.7	66.4	83.1	64.7	15.2 Minimum ocean escapement to attain hatchery egg-take goal of 9.7 late adult coho, with average conversion and no mainstem or tributary fisheries.
Oregon Coastal Natural	11.7%	8.0%	3.0%	9.6%	≤15.0% Marine and freshwater fishery exploitation rate.
Northern California (threatened)	6.2%	2.3%	0.5%	5.2%	≤13.0% Marine fishery exploitation rate for R/K hatchery coho (NMFS ESA consultation standard).

a/ Projections for coho assume fishery harvest rate scalar values derived from the 2005 post-season Coho FRAM, which employs post-season observed fishery impact levels and 2005 pre-season abundance forecasts. Assumptions for Canadian and Southeast Alaska chinook fisheries operating under aggregate abundance based management regimes are based on allowable catch levels determined under the 1999 PST chinook agreement and the 2006 calibration of the PSC Chinook Model.. The allowable catch levels are for an Alaska all-gear catch of 346,800, a Northern BC troll and Queen Charolette Islands catch of 223,200, and a WCVI troll and outside sport catch of 160,400.

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 OCN coho include impacts of freshwater fisheries.

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. Total exploitation rate includes Alaskan, Canadian, Council area, Puget Sound, and freshwater fisheries and is calculated as total fishing mortality divided by total fishing mortality plus spawning escapement.

d/ Includes minor contributions from East Fork Lewis River and Sandy River.

Table 4-2a. Preliminary projected exvessel value under Council-adopted 2006 non-Indian commercial troll regulatory options. (Page 1 of 1)

		Exvessel Value (thousands of dollars)[a/]				
Management Area	Option	2006 Projected[b/]	2005 Actual	Percent Change from 2005	2001-2005 Average[c/]	Percent Change From 2001-2005 Average
North of Cape Falcon	I	1,415	1,686	-16%	1,318	7%
	II	1,079		-36%		-18%
	III	743		-56%		-44%
	Preferred	1,330		-21%		1%
Cape Falcon to Humbug Mt.	I	4,942	8,138	-39%	7,195	-31%
	II	3,505		-57%		-51%
	III	0		-100%		-100%
	Preferred	1,524		-81%		-79%
Humbug Mt. to Horse Mt.	I	156	314	-50%	353	-56%
	II	72		-77%		-80%
	III	22		-93%		-94%
	Preferred	0		-100%		-100%
Horse Mt. to Pt. Arena	I	880	1,464	-40%	2,685	-67%
	II	440		-70%		-84%
	III	0		-100%		-100%
	Preferred	129		-91%		-95%
South of Pt. Arena	I	4,868	10,974	-56%	8,381	-42%
	II	4,068		-63%		-51%
	III	0		-100%		-100%
	Preferred	5,227		-52%		-38%
Total South of Cape Falcon	I	10,845	20,890	-48%	18,614	-42%
	II	8,085		-61%		-57%
	III	22		-100%		-100%
	Preferred	6,880		-67%		-63%
West Coast Total	I	12,260	22,576	-46%	19,932	-38%
	II	9,164		-59%		-54%
	III	765		-97%		-96%
	Preferred	8,210		-64%		-59%

a/ Exvessel values are not comparable to the community income impacts shown in Table 4-2b.
b/ Dollar value estimates are based on expected catches in the Council management area, 2005 exvessel prices and 2005 average weight per fish.
c/ Values adjusted to 2005 dollars.

Table 4-2b. Preliminary projected angler trips and coastal community income impacts generated under Council-adopted 2006 recreational ocean salmon fishery regulatory options compared to 2005 and the 2000-2005 average (inflation adjusted). (Page 1 of 1)

		Angler Trips (thousands)			Coastal Community Income Impacts (thousands of dollars)[a/]			Percent Change in Income Impacts	
Management Area	Option	Estimates Based on the Options	2005 Actual	2001-2005 Avg.	Estimates Based on the Options	2005 Actual	2001-2005 Avg.	Compared to 2005 Actual	Compared to 2001-2005 Avg.
North of Cape Falcon[b/]	I	81.2	103.9	122.9	6,844	8,753	10,460	-22%	-35%
	II	61.8			5,207			-41%	-50%
	III	40.4			3,401			-61%	-67%
	Preferred	73.1			6,162			-30%	-41%
Cape Falcon to Humbug Mt.	I	53.7	50.2	83.3	3,770	3,519	5,976	7%	-37%
	II	49.7			3,487			-1%	-42%
	III	0.0			0			-100%	-100%
	Preferred	50.2			3,519			0%	-41%
Humbug Mt. to Horse Mt.	I	26.9	29.7	39.3	1,851	2,047	2,711	-10%	-32%
	II	10.0			692			-66%	-74%
	III	0.0			0			-100%	-100%
	Preferred	20.6			1,418			-31%	-48%
Horse Mt. to Pt. Arena	I	23.7	24.0	28.2	2,375	2,403	2,796	-1%	-15%
	II	4.7			471			-80%	-83%
	III	2.2			223			-91%	-92%
	Preferred	21.9			2,190			-9%	-22%
South of Pt. Arena	I	108.6	130.8	131.0	11,776	14,188	14,759	-17%	-20%
	II	37.9			4,116			-71%	-72%
	III	11.1			1,205			-92%	-92%
	Preferred	128.6			13,955			-2%	-5%
Total South of Cape Falcon[c/]	I	212.8	234.6	281.7	19,771	22,157	26,242	-11%	-25%
	II	102.4			8,767			-60%	-67%
	III	13.3			1,428			-94%	-95%
	Preferred	221.2			21,081			-5%	-20%
West Coast Total	I	294.1	338.5	404.6	26,616	30,910	36,702	-14%	-27%
	II	164.2			13,975			-55%	-62%
	III	53.7			4,829			-84%	-87%
	Preferred	294.4			27,243			-12%	-26%

a/ Income impacts are sums of the impacts for individual communities within each management area. Note that these exclude some of the additional income impacts resulting from economic linkages between individual communities and between the communities and the greater economic region. Income impacts are not comparable to the exvessel values shown in Table 4-2a. All dollar values are adjusted to 2005 real values.

b/ Based on 2005 effort success rates for selective fisheries.

c/ South of Cape Falcon estimates based on selective coho fishery quotas and season dates as compared to the 2005 seasons.

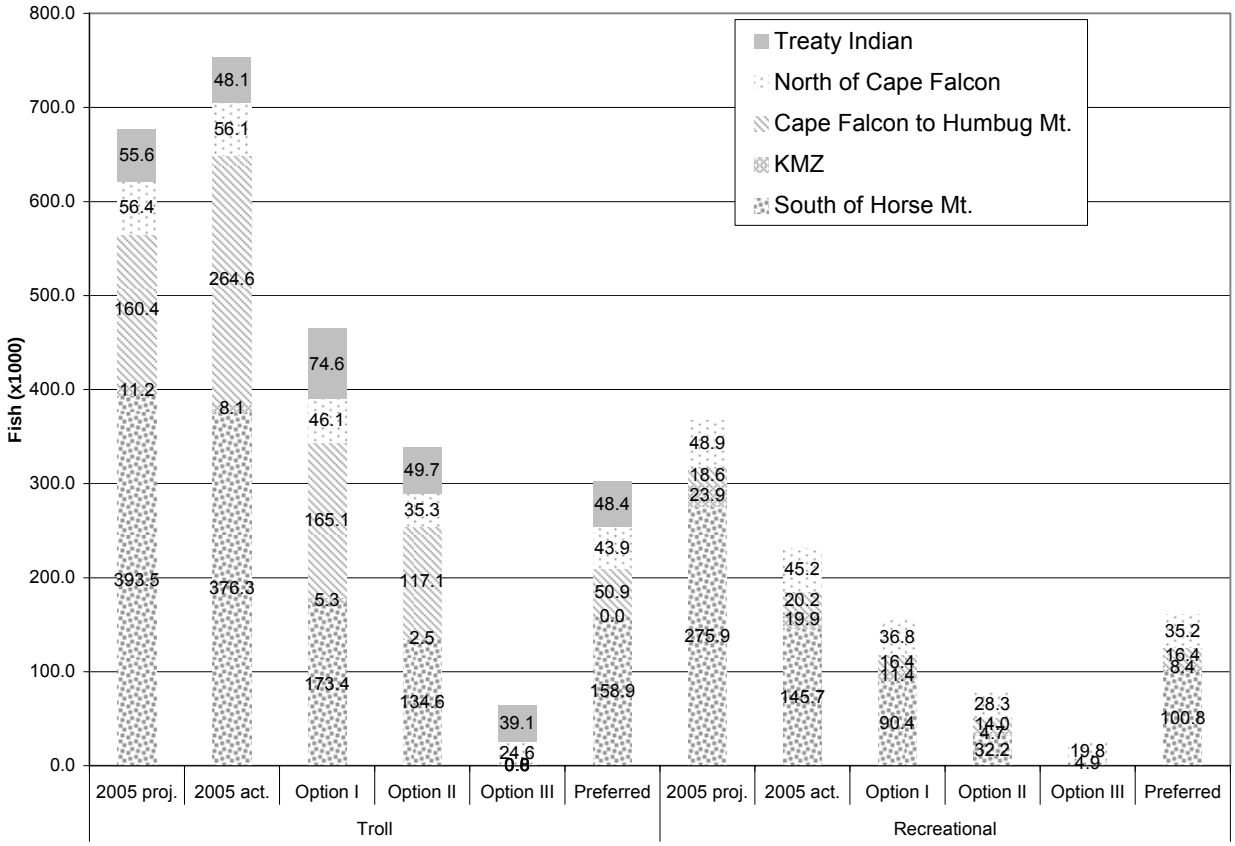

Figure 4-1: Chinook harvest impacts (landed catch plus bycatch mortality).

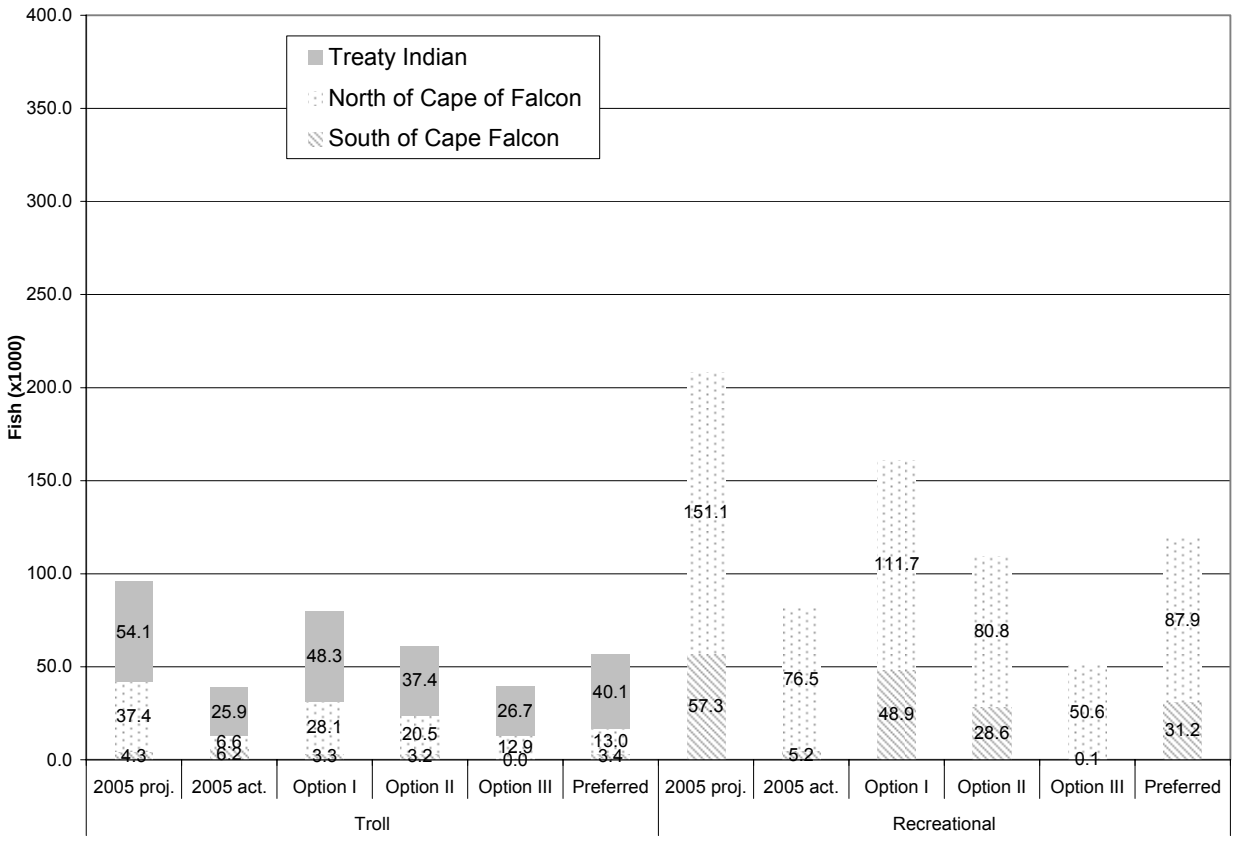

Figure 4-2: Coho harvest impacts (landed catch plus bycatch mortality).

5.0 CONSISTENCY WITH OTHER APPLICABLE LAW

5.1 Magnuson-Stevens Conservation and Management Act

The MSA provides parameters and guidance for Federal fisheries management, requiring the Councils and NMFS adhere to a broad array of policy ideals. Overarching principles for fisheries management are found in the MSA's National Standards. In crafting fisheries management regimes, the Councils and NMFS must balance their recommendations to meet these different national standards.

National Standard 1 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 2006 ocean salmon management measures in the Preferred Alternative are specifically designed to meet National Standard 1. Season structure, quotas, and other specifications are expected to allow optimal harvest opportunity given the constraints of achieving all conservation objectives (as amended through emergency action), NMFS guidance, and ESA consultation objectives for Salmon FMU stocks.

National Standard 2 requires the use of the best available scientific information. The analyses of impacts to Salmon FMU stocks are based on models that have undergone review by the Council's Scientific and Statistical Committee and been approved for use by the Council. Input data are obtained from scientifically designed surveys and data recording systems administered by state, Federal, and tribal agencies, and verified during the preseason planning process by the STT. Most stock forecasts are reviewed by multiagency scientific bodies to ensure accurate and appropriate methodology are used and to facilitate agreement between the relevant parties. All alternatives are subject to this same level of scientific analysis.

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 are established for individual stocks in the Salmon FMP and are based on either escapement or on total exploitation rate, both of which account for impacts to stocks throughout their range. All Salmon FMU stocks are managed as a unit in Council-area fisheries to ensure all conservation objectives are met.

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…" All alternatives meet this standard.

National Standard 5 requires efficiency, where practicable, in the utilization of fishery resources. All alternatives 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 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." Fishing communities could be

negatively affected by Option III, which has substantially lower short term economic benefits than the Preferred Alternative, and by Options I, II, and the No Action Alternative, which could have reduced long term economic benefits associated with overharvest of stocks of concern. The Preferred Alternative may also negatively affect fishing communities, but represents a 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 have specifications that reduce both bycatch and bycatch mortality of non-target and sublegal target species.

National Standard 10 requires, to the extent practicable, conservation and management measures to promote the safety of human life at sea. Salmon seasons in all alternatives provide for extended openings through staggered days on and off or weekly possession limits to provide flexibility with respect to weather considerations. The Council's recommendations are consistent with Council Operating Procedure #16, Weather-related Adjustment to Salmon Fishery. All alternatives are consistent with National Standard 10.

The emergency rule modifying the conservation objective for Klamath River fall Chinook is consistent with NMFS policy on use of emergency actions under the Magnuson-Stevens Act published at 62 FR 44422. The emergency, in this case, is a consequence of a KRFC predicted run size that is less than the Salmon FMP conservation objective of 35,000 natural spawners. The run size forecast was not available until February of 2006 and was thus unforeseen. The emergency circumstances present serious conservation and management problems. The emergency regulations provide the opportunity to address the conservation problem consistent with the requirement to manage, on a continuing basis, for optimum yield, and still provide some limited harvest opportunity. Without use of emergency regulations, the Salmon FMP would require closure of all salmon fishing between Cape Falcon, Oregon, and Point Sur, California, causing severe social and economic hardship in the coastal communities.

The SEIS for the Salmon FMP concluded that Council-area salmon fisheries would have no significant effects on EFH. Further, NMFS conducted an EFH consultation and prepared an EFH Assessment that was incorporated into the NMFS BO on the effects of the Salmon FMP on ESA listed salmon dated April 30, 2001. The consultation concluded that the Council had adopted appropriate conservation measures related to fishing actions that occur under the Salmon FMP.

The alternatives considered in this EA are within the scope of impacts considered in the SEIS and the NMFS BO, and therefore, are not expected to have any additional effects on EFH.

5.2 Consistency with the FMP

Similar to the MSA National Standards Guidelines, the goals and objectives of the Salmon FMP are intended to provide a framework to guide the Council's decisions. The Preferred Alternative meets all conservation and management objectives in the Salmon FMP. The SEIS for the Salmon FMP analyzed the effects anticipated Council-area salmon fisheries would have on the biological and socioeconomic environment. The effects of the Preferred Alternative are within the scope of impacts considered in the SEIS.

5.3 Paperwork Reduction Act

The Preferred Alternative includes an existing collection-of-information requirement which is to be implemented under Federal regulations. Specific requirements on when and where to land fish is being imposed 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 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 provision is important to be retained for safety purposes.

5.4 Marine Mammal Protection Act

The Marine Mammal Protection Act (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 U.S. Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, the Steller sea lion (*Eumetopias jubatus*) Eastern stock, Guadalupe fur seal (*Arctocephalus townsendi*), and Southern sea otter (*Enhydra lutris*) California stock are listed as threatened under the ESA, and the sperm whale (*Physeter macrocephalus*) Washington, Oregon, and California (WOC) Stock, humpback whale (*Megaptera novaeangliae*) WOC - Mexico Stock, blue whale (*Balaenoptera musculus*) Eastern north Pacific stock, and Fin whale (*Balaenoptera physalus*) WOC Stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The West Coast ocean salmon fisheries are considered a Category III fishery, indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals, in the annual list of fisheries published in the *Federal Register*. Based on its Category III status, the incidental take of marine mammals in the West Coast salmon fisheries does not significantly impact marine mammal stocks.

5.5 NEPA

This EA is intended to meet the NEPA requirements that apply to the proposed action.

5.6 Endangered Species Act (ESA)

Compliance with the ESA is addressed in Sections 1.5, 2.1, 3.2, 4.1.3, 4.2.3, and 4.3.3 of this EA. All alternatives would meet NMFS ESA consultation standards for listed salmon stocks except for the No Action Alternative and Option I, which would exceed the exploitation rate for Snake River fall Chinook and LCR natural tule fall Chinook.

While the consultation process for endangered southern resident killer whales will not be completed prior to approval of this action, NMFS has determined that the anticipated fisheries would not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures. In the event that the review suggests that further constraints in the 2006 fisheries are necessary, appropriate corrections would be made by NMFS through in-season action.

The following BOs and Section 4(d) determinations have been prepared for West Coast stocks by NMFS.

NMFS' Endangered Species Act consultations and Section 4(d) determinations on ocean fisheries implemented under the Salmon FMP and their duration.

Date	Evolutionarily Significant Unit covered and effective period
March 8, 1996	Snake River Chinook and sockeye (until reinitiated)
April 28, 1999	Oregon coastal coho, Southern Oregon/ Northern California coastal coho, Central California coastal coho (until reinitiated)[1/]
April 28, 2000	Central Valley spring Chinook and California coastal Chinook (until reinitiated)
April 27, 2001	Hood Canal summer chum 4(d) limit (until reinitiated)
April 30, 2001	Upper Columbia River spring Chinook and Upper Willamette River Chinook (until reinitiated)
April 30, 2001	Lower Columbia River Chinook, Upper Willamette Chinook, Upper Columbia spring Chinook, Lake Ozette sockeye, ten steelhead ESUs and Columbia River chum (until reinitiated)
April 27, 2004	Sacramento River winter Chinook (April 30, 2010)
April 29, 2004	Puget Sound and Lower Columbia River Chinook (until reinitiated)
Expected Prior to May 1, 2006	Lower Columbia River natural coho (through April 30, 2007)

Many of these documents are available from the NMFS Northwest Region website at: http://www.nwr.noaa.gov/1publcat/allbiops.htm

5.7 Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act (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. The Preferred Alternative would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of WOC. This determination has been submitted to the responsible state agencies for review under section 307(c)(1) of the CZMA. The relationship of the Salmon FMP with the CZMA is discussed in Section 3.3 of the SEIS for Salmon FMP Amendment 14. The Salmon FMP has been found to be consistent with the WOC coastal zone management programs. The recommended action is consistent and within the scope of the actions contemplated under the framework FMP.

Under the CZMA, each state develops its own coastal zone management program, which is then submitted for Federal approval. This has resulted in programs which vary widely from one state to the next. None of the alternatives are expected to affect any state's coastal management program.

5.8 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 are likely to affect the incidental take of seabirds protected by the Migratory Bird Treaty Act.

5.9 Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments

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, tribal allocations and regulations have been developed in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

5.10 Executive Order 12866 – Regulatory Planning and Review

These management measures have been determined to be not significant for purposes of E.O. 12866.
This rule does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under E.O. 13132.

5.11 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.

The conservation and management objectives established in the Salmon FMP, and by extension, the alternatives considered in this EA, are not expected to 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 SEIS show that coastal counties where fishing communities are located are variable in terms of social indicators like income, employment, and race and ethnic composition. Generally, the Preferred Alternatives are intended to maintain current fishing practices and schedules while improving Council and NMFS efficiency in implementing specifications and management measures. As a result, the alternatives are not expected to have notable effects on fishing communities in general, nor on minority and low income groups in particular.

5.12 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 and process offers many opportunities for states and Indian tribes (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management measures. This process encourages states and tribes to institute complementary measures to manage fisheries under their jurisdiction that may affect federally managed stocks.

The proposed actions would not have federalism implications subject to Executive Order 13132.

5.12 Regulatory Impact Review

Executive Order 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The Executive Order covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the Order deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this

analysis, approaches should be chosen that maximize net benefits to society, unless a statute requires another regulatory approach.

The regulatory principles in Executive Order 12866 emphasize careful identification of the problem to be addressed. The agency is to identify and assess alternatives to direct regulation, including economic incentives such as user fees or marketable permits, to encourage the desired behavior. Each agency is to assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only after reasoned determination the benefits of the intended regulation justify the costs. In reaching its decision agency must use the best reasonably obtainable information, including scientific, technical and economic data, about the need for and consequences of the intended regulation. The regulatory impact review (RIR) provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure the regulatory agency systematically and comprehensively considers all available alternatives, so the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of Executive Order 12866.

The RIR analysis and an environmental analyses required by NEPA have many common elements and they have been combined in this document. The following table shows where the elements of an RIR, as required by Executive Order 12866, are located.

Required RIR Elements	**Corresponding Sections**
Description of management objectives	Sections 1.2 & 1.3, Tables 2-1 and 4-1d
Description of the fishery[i]	Chapter 3
Statement of the problem	Section 1.2.2
Description of each alternative considered in the analysis	Chapter 2
An analysis of the expected economic effects of each alternative	Sections 4.1.4, 4.2.4, and 4.3.4

The RIR is designed to determine whether the proposed actions could be considered "significant regulatory actions" according to Executive Order 12866. The Executive Order 12866 test requirements used to assess whether or not an action would be a "significant regulatory action" and the expected outcomes of the proposed management alternative are discussed below. A regulatory program is "economically significant" if it is likely to result in the following effects:

1. Have a annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.

   Income impacts in these fisheries have been less than $100 million since at least 1991. Combined commercial and recreational coastal community impacts are not expected to be greater than $100 million under any of the alternatives considered in this analysis.

   Risk to Long Term Productivity:
   The risk to long term stock productivity is within Magnuson-Stevens Act guidelines under the Preferred Alternative and Option III. Under Options I and II, there is a risk that long term productivity of at least one salmon stock would be adversely impacted

2. Create a serious inconsistency or otherwise interfere with action taken or planned by another agency.

None identified under any of the alternatives.

3. Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof.

None identified under any of the alternatives.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

None identified under any of the alternatives.

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6.2 List of Public Meetings, Agencies, and Persons Consulted

The following public meetings were held as part of the salmon management process (Council-sponsored meetings in bold):

October 23, 2003:	**Salmon Technical Team/Scientific and Statistical Committee Salmon Subcommittee joint meeting**, Portland, Oregon.
January 17-20:	**Salmon Technical Team (Review preparation)**, Portland, Oregon.
February 2-3:	California Fish and Game Commission meeting, Sacramento, California.
February 11:	Washington Fish and Wildlife Commission meeting, Olympia, Washington.
February 9-10:	Oregon Fish and Wildlife Commission meeting, Salem, Oregon.
February 7-10:	**Salmon Technical Team (Preseason Report I preparation)**, Portland, Oregon.
February 21:	California Department of Fish and Game Public Meeting, Santa Rosa, California.
February 21-23:	Klamath Fishery Management Council meeting, Eureka, California.
February 28:	Washington Department of Fish and Wildlife public meeting, Olympia, Washington.
March 2:	Oregon Salmon Industry Group meeting, Newport, Oregon.
March 2-3:	California Fish and Game Commission meeting, Riverside, California.
March 5-10:	Klamath Fishery Management Council meeting concurrent with the Pacific Fishery Management Council, Seattle, Washington.
March 6-10:	**Pacific Fishery Management Council meeting**, Seattle, Washington.
March 8:	Washington Coastal Fisheries Discussion, South Bend, Washington.
March 9:	Puget Sound Fisheries Discussion, Mill Creek, Washington.
March 13:	Columbia River Fisheries Discussion, Vancouver, Washington.
March 15:	North of Falcon and *U.S.* v. *Oregon Forums*, Lynwood, Washington.
March 16-17:	Oregon Fish and Wildlife Commission meeting, Newport, Oregon.
March 27-28:	**Public hearings on management options** in Westport, Washington; Coos Bay, Oregon; and Santa Rosa, California.
March 30:	North of Falcon and *U.S.* v. *Oregon Forums*, Lynwood, Washington.
April 2-7:	Klamath Fishery Management Council meeting concurrent with the Pacific Fishery Management Council, Sacramento, California.

April 3-7: **Pacific Fishery Management Council meeting**, Sacramento, California.

April 6-7: California Fish and Game Commission public hearing on ocean fishing options and Klamath River regulations, Monterey, California.

April 7-8: Washington Fish and Wildlife Commission meeting, Tumwater, Washington.

April 13-14: Oregon Fish and Wildlife Commission meeting, Salem, Oregon.

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

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

National Marine Fisheries Service, Sustainable Fisheries Division, Northwest Region
National Marine Fisheries Service, Sustainable Fisheries Division, Southwest Region
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

West Coast Indian Tribes

6.3 List of Preparers

Pacific Fishery Management Council:

Mr. Chuck Tracy
Dr. Christopher Dahl
Mr. Jim Seger

Salmon Technical Team:

Mr. Dell Simmons, National Marine Fisheries Service
Mr. Allen Grover, California Department of Fish and Game
Dr. Robert Kope, National Marine Fisheries Service
Mr. Craig Foster, Oregon Department of Fish and Wildlife
Mr. Doug Milward, Washington Department of Fish and Wildlife
Mr. Michael Mohr, National Marine Fisheries Service
Dr. Gary Morishima, Northwest Indian Tribes
Mr. Henry Yuen, U.S. Fish and Wildlife Service

National Marine Fisheries Service:

Mr. Chris Wright
Mr. Eric Chavez
Mr. Tony Morton

7.0 APPENDIX A: DETAILED DESCRIPTION ON MANAGEMENT ALTERNATIVES

TABLE 1. Commercial troll management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 1 of 5)

North of Cape Falcon

A. SEASON OPTION DESCRIPTIONS

Supplemental Management Information

1. Overall non-Indian TAC: 65,000 Chinook and 80,000 marked coho.
   Trade:6,000 coho to the recreational fishery in exchange for 1,500 Chinook.
2. Non-Indian commercial troll TAC: 34,000 Chinook and 6,800 marked coho.
3. Treaty Indian commercial ocean troll quotas of: 42,200 Chinook (22,700 in May and June; 19,500 for all-salmon season July through Sept. 15 with no rollover allowed from Chinook season); and 37,500 coho.

U.S./Canada Border to Cape Falcon

- May 1 through earlier of June 30 or 22,450 Chinook quota.

Open May 1-2 with a 75 Chinook per vessel landing and possession limit for the two-day open period; beginning May 6, open Saturday through Tuesday with an 80 Chinook possession and landing limit for each four-day open period. If insufficient quota remains to prosecute openings prior to the June 24-27 open period, the remaining quota will be provided for a June 27-30 open period with a per vessel landing and possession limit to be determined inseason. All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3). Vessels must land and deliver their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land and deliver their fish within the area and north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land and deliver their fish within the area and south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. 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 calling 541-867-0300 Ext. 271. 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).

U.S./Canada Border to Cape Falcon

- July 15 through earlier of September 15 or 11,550 preseason Chinook guideline (C.8) or a 6,800 marked coho quota (C.8.d). Cape Flattery and Columbia Control Zones closed (C.5).

Open Saturday through Tuesday July 15 through August 1. All salmon; landing and possession limit of 35 Chinook and 35 marked coho per vessel per four day open period (C.2, C.3). Open August 5 through September 15; Saturday through Monday. All Salmon except no chum retention north of Cape Alava, Washington in August and September (C.7); landing and possession limit of 30 Chinook and 40 marked coho per vessel per three day open period. Gear restricted to plugs 6 inches (15.2 cm) or longer (C.2, C.3) Vessels must land and deliver their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land and deliver their fish within the area and north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land and deliver their fish within the area and south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. 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 calling 541-867-0300 Ext. 271. 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).

TABLE 1. Commercial troll management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 2 of 5)

A. SEASON OPTION DESCRIPTIONS

South of Cape Falcon

Supplemental Management Information

1. Klamath River recreational fishery allocation: Non-retention mortality of 300 adult fall Chinook associated with fisheries for other anadromous species.
2. Non-Indian commercial troll Klamath fall Chinook impact allocation 56% Oregon:44% California.
3. Tribal allocation equal to non-Indian catch

Cape Falcon to Florence South Jetty (Newport)

- June 4-7, 11-14, 18-21, 25-28; July 9-11, 16-18, 23-25; August 1-3; September 17-30; October 17-31 (C.9).

All salmon except coho (C.7). Landing and possession limit of 75 Chinook per vessel per calendar week during June, July, and August; 50 Chinook per calendar week September and October. Chinook 28 inch total length minimum size limit (B). All vessels fishing in the area must land their fish 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.

In 2007, the season will open March 15 for all salmon except coho, with a 28 inch total length Chinook minimum size limit. This opening could be modified following Council review at its March 2007 meeting.

Florence South Jetty to Humbug Mt. (Coos Bay)

- Closed (C.9)

In 2007, the season will open March 15 for all salmon except coho, with a 28 inch Chinook minimum size limit. This opening could be modified following Council review at its March 2007 meeting.

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

- Closed (C.9)

In 2007, the season will open March 15 for all salmon except coho, with a 28 inch Chinook minimum size limit. This opening could be modified following Council review at its March 2007 meeting.

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

Closed (C.9)

Humboldt South Jetty to Horse Mt.

Closed (C.9)

Horse Mt. to Point Arena (Fort Bragg)

- September 1 through the earlier of September 15 or a Chinook quota of 4,000 (C.9).

All salmon except coho. Landing and possession limit of 30 Chinook per vessel per day. Fish caught in the area must be landed in the area (C.1). Chinook minimum size limit 27 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2007, the season will open March 15 for all salmon except coho, with a 27 inch total length Chinook minimum size limit (B). This opening could be modified following Council review at its March 2007 meeting.

Pt. Arena to Pigeon Pt. (San Francisco)

- July 26-31; August 1-31;
- September 1 through the earlier of September 30 or a Chinook quota of 20,000 (C.9).

All salmon except coho. Landing and possession limit of 75 Chinook per vessel per calendar week during July and August; fish must be landed in an area south of Horse Mt. In September, fish caught in the area must be landed in the area, or in an adjacent closed area, if that area has been closed for at least 96 hours (C.1). Chinook minimum size limit 28 inches total length in July and August; 27 inches in September (B). See gear restrictions and definitions (C.2, C.3).

Pt. Reyes to Pt. San Pedro (Fall Area Target Zone)

- October 2-6; 9-13.

Open Monday through Friday. All salmon except coho. All fish caught in the area must be landed in the area between Ptl Arena and Pigeon Point (C.1). Chinook minimum size limit 26 inches total length (B). See gear restrictions and definitions (C.2, C.3).

TABLE 1. Commercial troll management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 3 of 5)

A. SEASON OPTION DESCRIPTIONS

Pigeon Pt. to Pt. Sur (Monterey)

- May 1-31; July 26-31; August 1-31; September 1-30 (C.9).

All salmon except coho. Landing and possession limit of 75 Chinook per vessel per calendar week during May, July, and August; fish must be landed in an area south of Point Arena. In September, fish must be landed in an area south of Pigeon Point, or in an adjacent closed area, if that area has been closed for at least 96 hours (C.1). Chinook minimum size limit 28 inches total length in July and August; 27 inches in May and September (B). See gear restrictions and definitions (C.2, C.3).

Pt. Sur to U.S./Mexico Border (Monterey)

- May 1 through September 30 (C.9).

All salmon except coho. Fish must be landed south of Pigeon Point (C.1). Chinook minimum size limit 27 inches total length in May, June and September; 28 inches total length in July and August (B). See gear restrictions and definitions (C.2, C.3).

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

	Chinook		Coho		
Area (when open)	Total Length	Head-off	Total Length	Head-off	Pink
North of Cape Falcon	28.0	21.5	16.0	12.0	None
Cape Falcon to OR/CA Border	28.0	21.5	-	-	None
OR/CA Border to Horse Mt.	-	-	-	-	-
Horse Mt. To Pt. Arena	27.0	20.5	-	-	None
Pt. Arena to U.S./Mexico Border					
Prior to July 1 and September 1-30	27.0	20.5	-	-	None
July 1-August 31	28.0	21.5	-	-	None
October 3-14	26.0	19.5	-	-	None

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. Salmon may be landed in an area that has been closed more than 96 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 be landed in an area that has been closed less than 96 hours only if they meet the minimum size, landing/possession limit, or other special requirements for the areas in which they were caught and landed.

States may require fish landing/receiving tickets be kept on board the vessel for 90 days after landing to account for all previous salmon landings.

C.2. Gear Restrictions:

a. Single point, single shank, barbless hooks are required in all fisheries.
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. In that portion of the fishery management area (FMA) 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 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. Transit Through Closed Areas with Salmon on Board: It is unlawful for a vessel to have troll or recreational gear in the water while transiting any area closed to fishing for a certain species of salmon, while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.

TABLE 1. Commercial troll management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 4 of 5)

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. *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.

c. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six 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 six nautical miles south of the Klamath River mouth).

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 amount of salmon (by species) on board, and the estimated time of arrival.

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. License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to April 1 of each year. Incidental harvest is authorized only during May and June troll seasons and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825). ODFW and Washington Department of Fish and Wildlife (WDFW) will monitor landings. If the landings are projected to exceed the 41,464 pound preseason allocation or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to close the incidental halibut fishery.

Beginning May 1, license holders may land no more than one Pacific halibut per each three Chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

A "C-shaped" yelloweye rockfish conservation area is an area to be 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 on a fishery impact equivalent basis.

b. NMFS may transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the areas' representatives on the SAS.

c. At the March 2007 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2006).

d. If retention of unmarked coho is permitted in the area from the U.S./Canada border to Cape Falcon, Oregon, by inseason action, the allowable coho quota will be adjusted to ensure preseason projected mortality of critical stocks is not exceeded.

TABLE 1. Commercial troll management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 5 of 5)

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

C.9. Consistent with Council management objectives:

a. the State of Oregon may establish additional late-season, Chinook-only 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 Department of Fish and Game (CDFG) Code, Section 8232.5, the definition of the KMZ for the ocean salmon season shall be that area from Humbug Mt., Oregon, to Horse Mt., California.

TABLE 2. Recreational management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 1 of 4)

A. SEASON OPTION DESCRIPTIONS

North of Cape Falcon

Supplemental Management Information

1. Overall non-Indian TAC: 65,000 Chinook and 80,000 coho marked with a healed adipose fin clip (marked).
   Trade: 1,500 Chinook to the commercial fishery in exchange for 6,000 coho.
2. Recreational TAC: 31,000 Chinook and 73,200 marked coho.
3. Area 4B add-on fishery opens upon ocean closure with a quota of 3,000 marked coho and Chinook non-retention (C.5).
4. Buoy 10 fishery opens Aug. 1 with an expected landed catch of 8,300 marked coho in August and September.

U.S./Canada Border to Cape Alava (Neah Bay)

- June 30 through earlier of Sept. 17 or 7,058 marked coho subarea quota with a subarea guideline of 3,200 Chinook (C.6).

Tuesday through Saturday. All salmon, except no chum retention August 1 through Sept. 18, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit) (B). All retained coho must be marked. See gear restrictions (C.2). Beginning August 1, Chinook non-retention east of the Bonilla-Tatoosh line (C.4.d) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.4).

Cape Alava to Queets River (La Push Subarea)

- June 30 through earlier of September 17 or 1,889 marked coho subarea quota with a subarea guideline of 1,300 Chinook. Tuesday through Saturday;
- Sep. 23 through Oct. 8 or 50 marked coho quota or 100 Chinook quota: In the area north of 47° 50'00 N. Lat. and south of 48°00'00" N. Lat. (C.5); Seven days per week (C.6).

All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit) (B). All retained coho must be marked. See gear restrictions (C.2). Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.4).

Queets River to Leadbetter Point (Westport Subarea)

- July 3 through earlier of September 17 or 27,603 marked coho subarea quota with a subarea guideline of 18,100 Chinook (C.6).

Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit) (B). All retained coho must be marked. See gear restrictions and definitions (C.2, C.3). Beginning August 1, Grays Harbor Control Zone closed (C.4.b). Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).

Leadbetter Point to Cape Falcon (Columbia River Subarea)

- July 3 through earlier of September 30 or 36,600 marked coho subarea quota with a subarea guideline of 8,300 Chinook (C.6).

Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit) (B). All retained coho must be marked. See gear restrictions and definitions (C.2, C.3). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning Aug. 1. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).

TABLE 2. **Recreational** management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 2 of 4)

A. SEASON OPTION DESCRIPTIONS

South of Cape Falcon

Supplemental Management Information

1. Klamath River recreational fishery allocation: Non-retention mortality of 300 adult fall Chinook associated with fisheries for other anadromous species.
2. KMZ ocean recreational fishery share: 8.8%.
3. Tribal allocation equal to non-Indian catch.

Cape Falcon to Humbug Mt.

- Except as provided below during the selective fishery, the season will be March 15 through October 31 (C.6).

All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3).

- Mark selective fishery: Cape Falcon to OR/CA Border

June 17 through earlier of July 31 or a landed catch of 20,000 marked coho, except that the area south of Humbug Mt. will close July 5-31, concurrent with the KMZ season listed below.

If quota remains, September 1 through the earlier of September 6 or a landed catch of any remaining quota from the June 17 through July 31 fishery.

Open seven days per week, all salmon, two fish per day (C.1). All retained coho must be marked with a healed adipose fin clip. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (see 70 FR 20304, and call the halibut fishing hotline 1-800-662-9825 for additional dates) (C.3, C.4.e). Open days may be adjusted inseason to utilize the available quota (C.5). All salmon except coho seasons reopen the day following the closure of the mark selective coho fishery.

In 2007, the season will open March 15 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).

Humbug Mt. to Horse Mt. (Klamath Management Zone)

- Except as provided above during the selective fishery, the season will be May 15 through July 4; and September 1-6 (C.6).

All salmon except coho, except as noted above in the coho mark selective fishery. Chinook minimum size limit 24 inches total length (B). Seven days per week, two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed in August (C.4.c). See California State regulations for additional closures adjacent to the Smith, Klamath, and Eel rivers.

Horse Mt. to Point Arena (Fort Bragg)

- February 18 through May 31; June 1-4, 7-11, 14-18, 21-25, 28-30; July 1-9, 15-16, 22-23, 26-31; August 1 through November 12 (C.6).

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2007, season opens February 17 (nearest Saturday to February 15) for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).

Point Arena to Pigeon Point (San Francisco)

- April 1-30 inside 3 nm (state waters only; C.6).
- May 1 through June 11; June 14 through July 9; July 12 through November 12 (C.6).

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2007, the season will open April 7 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).

Pigeon Point to Pt. Sur (Monterey)

- April 1-30 inside 3 nm (state waters only; C.6).
- May 1 through September 24 (C.6).

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2007, the season will open April 7 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).

Pt. Sur to U.S./Mexico Border (Monterey)

- April 1 through September 24 (C.6).

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2007, the season will open April 7 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).

TABLE 2. Recreational management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 3 of 4)

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

Area (when open)	Chinook	Coho	Pink
North of Cape Falcon	24.0	16.0	None
Cape Falcon to Humbug Mt.	20.0	16.0	None
Humbug Mt. to Horse Mountain	24.0	-	None, except 20.0 off CA
Horse Mt. to U.S./Mexico Border	20.0	-	20.0

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.

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 salmon for all licensed and juvenile anglers aboard has been attained (additional state restrictions may apply).

C.2. Gear Restrictions: 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 Point Conception, California: No more than one rod may be used per angler; and single point, single shank, barbless hooks are required for all fishing gear. [Note: ODFW regulations in the state-water fishery off Tillamook Bay may allow the use of barbed hooks to be consistent with inside regulations.]
b. Cape Falcon, Oregon, to Point Conception, California: Anglers must use no more than two single point, single shank, barbless hooks.
c. Horse Mt., California, to Point Conception, California: Single point, single shank, barbless circle hooks (below) must be used if angling 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*: Angling tackle consisting of a line with no more than one artificial lure or natural bait attached. Off Oregon and Washington, the line 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 Point 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. Recreational management measures adopted by the Council for 2006 non-Indian ocean salmon fisheries. (Page 4 of 4)
C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (continued)

C.4. Control Zone Definitions:

a. *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.

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° 36'00" N. lat., 124°10'51" W. long.).

c. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six 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).

d. *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°28'00" N. lat., 124°45'00" W. long.), then in a straight line to Bonilla Point (48°35'30" N. lat., 124°43'00" W. long.) on Vancouver Island, British Columbia.

e. *Stonewall Bank Groundfish 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.

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 on an impact neutral basis 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.

c. Chinook and coho may be transferred between the recreational and commercial fisheries north of Cape Falcon on an impact neutral basis if there is agreement among the representatives of the SAS.

d. If retention of unmarked coho is permitted in the area from the U.S./Canada border to Cape Falcon, Oregon, by inseason action, the allowable coho quota will be adjusted to ensure preseason projected mortality of critical stocks is not exceeded.

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

TABLE 3. Treaty Indian ocean troll management measures adopted by the Council for 2006 ocean salmon fisheries. (Page 1 of 1)

A. SEASON OPTION DESCRIPTIONS

Supplemental Management Information

1. Overall Treaty-Indian TAC: 42,200 Chinook and 37,500 coho.

U.S./Canada Border to Cape Falcon

• May 1 through the earlier of June 30 or 22,700 Chinook quota.
All salmon except coho. If the Chinook quota for the May-June fishery is not fully utilized, the excess fish cannot be transferred into the later all-salmon season. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season. See size limit (B) and other restrictions (C).

• July 1 through the earlier of September 15, or 19,500 preseason Chinook quota, or 37,500 coho quota.
All salmon. See size limit (B) and other restrictions (C).

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

	Chinook		Coho		
Area (when open)	Total Length	Head-off	Total Length	Head-off	Pink
North of Cape Falcon	24.0	18.0	16.0	12.0	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 (All)

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 - That portion of the FMA between 48°07'36" N. lat. (Sand Pt.) and 47°31'42" N. lat. (Queets River) and east of 125°44'00" W. long.

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 - That portion of the FMA between 47°40'06" N. lat. (Destruction Island) and 46°53'18"N. lat. (Point Chehalis) and east of 125°44'00" W. long

C.2 Gear restrictions
- a. Single point, single shank, barbless hooks are required in all fisheries.
- b. No more than 8 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 Makah encounter rate study will occur between May 1 and September 15. Salmon taken in the study by treaty Indian vessels will be counted towards the overall treaty Indian troll quota.
- c. The Quileute Tribe will continue a ceremonial and subsistence fishery during the time frame of September 15 through October 15 in the same manner as in 2004 and 2005. Fish taken during this fishery are to be counted against treaty troll quotas established for the 2006 season (estimated harvest during the October ceremonial and subsistence fishery: 100 Chinook; 200 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.

TABLE 1. Council-adopted **non-Indian commercial troll** management measures for ocean salmon fisheries, 2004. (Page 1 of 4)

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian total allowable catch (TAC): 89,000 chinook and 270,000 coho, with no preseason trade between recreational and commercial fisheries.
2. Non-Indian commercial troll TAC: 44,500 chinook and 67,500 coho.
3. Treaty Indian commercial ocean troll quotas of: 49,000 chinook (22,500 in May/June; 26,500 for all-salmon season July through September 15 with no rollover allowed from the May/June season); and 75,000 coho.

U.S./Canada Border to Cape Falcon

- May 1 through earlier of June 30 or 29,800 chinook quota. The fishery will be managed to provide a remaining quota of 500 chinook for a June 26 through 30 open period with a 50 fish, per vessel landing limit for the five-day open period.

All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3). Washington permitted vessels must land their fish within the area, and within 24 hours of any closure of this fishery. Oregon permitted vessels must land their fish within the area or in Garibaldi, Oregon, and within 24 hours of any closure of this fishery. State regulations require Oregon licensed limited fish sellers and fishers intending to transport and deliver their catch outside the area notify ODFW one hour prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, 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).

U.S./Canada Border to Cape Falcon

- July 8 through earlier of September 15 or 14,700 preseason chinook guideline or a 67,500 coho quota. The 67,500 coho quota includes a subarea quota of 8,000 coho for the area between the U.S./Canada border and the Queets River (C.8).

Fishery is open Thursday through Monday prior to August 11, and Wednesday through Sunday thereafter. Landing and possession limit of 125 chinook per vessel per five-day open period. An inseason conference call may occur no later than August 10 to consider reducing the landing and possession limit beginning August 11. All salmon, except no chum retention north of Cape Alava, Washington in August and September (C.7); all retained coho must have a healed adipose fin clip, except an inseason conference call may occur to consider allowing retention of all legal sized coho between Cape Falcon and the Queets River no earlier than September 1. Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3). Washington permitted vessels must land their fish within the area, and within 24 hours of any closure of this fishery. Oregon permitted vessels must land their fish within the area or in Garibaldi, Oregon, and within 24 hours of any closure of this fishery. State regulations require Oregon licensed limited fish sellers and fishers intending to transport and deliver their catch outside the area notify ODFW one hour prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery. Trip limits, gear restrictions, and guidelines may be implemented or adjusted inseason (C.8).

South of Cape Falcon

Cape Falcon to Florence South Jetty

- March 15 through June 30; July 7 through 12; July 19 through 27; August 1 through 14; August 19 through 24; and September 1 through October 31 (C.9).

All salmon except coho (C.7). Chinook 26 inch total length minimum size limit prior to May 1, 27 inches total length May 1 through September 30, and 28 inches total length October 1 through 31 (B). 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.

In 2005, the season will open March 15 for all salmon except coho, with a 27 inch chinook minimum size limit. This opening could be modified following Council review at its November 2004 meeting.

Florence South Jetty to Humbug Mt.

- March 15 through July 6; July 13 through 18; July 26 through 29; August 1 through 8; August 15 through 22; August 26 through 29; and September 1 through October 31 (C.9).

All salmon except coho (C.7). Chinook 26 inch total length minimum size limit prior to May 1, 27 inches total length May 1 through September 30, and 28 inches total length October 1 through 31 (B). See gear restrictions and definitions (C.2, C.3).

In 2005, the season will open March 15 for all salmon except coho, with a 27 inch total length chinook minimum size limit. This opening could be modified following Council review at its November 2004 meeting.

A. SEASON DESCRIPTION (Continued)

Humbug Mt. to OR/CA Border

- March 15 through May 31.
- June 1 through earlier of June 30 or 2,600 chinook quota;
- July 1 through earlier of July 31 or 1,600 chinook quota;
- August 1 through earlier of August 29 or 2,500 chinook quota;
- September 1 through earlier of September 30 or 3,000 chinook quota (C.9)

All salmon except coho. Chinook 26 inch total length minimum size limit prior to May 1, 27 inches total length May 1 through August 29, and 28 inches total length September 1 through 30. No transfer of remaining quota from earlier fisheries allowed (C.9). Possession and landing limit of 50 fish per trip, per vessel June 1 through August 31, and 65 fish per trip per vessel in September. See gear restrictions and definitions (C.2, C.3). For seasons from June 1 through September 30, vessels must land their fish in Gold Beach, Port Orford, or Brookings, Oregon, and within 24 hours of closure. State regulations require fishers intending to transport and deliver their catch to other locations after first landing in one of these ports notify ODFW prior to transport away from the port of landing by calling 541-867-0300 Ext. 271, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery.

In 2005 the season will open March 15 for all salmon except coho, with a 27 inch total length minimum size limit. This opening could be modified following Council review at its November 2004 meeting.

OR/CA Border to Humboldt South Jetty

- September 1 through earlier of September 30 or 6,000 chinook quota.

All salmon except coho. Chinook minimum size limit of 28 inches total length. Possession and landing limit of 30 fish per day per vessel. All fish caught in this area must be landed within the area. See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.). When the fishery is closed between the OR-CA border and Humbug Mt. 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.

Horse Mt. to Point Arena (Fort Bragg)

- July 10 through August 29; September 1 through 30.

All salmon except coho. Chinook minimum size limit of 27 inches total length through August 31; 28 inches total length September 1 through 30. Vessels must land and deliver their fish within 24 hours of any closure of this fishery. See gear restrictions and definitions (C.2, C.3).

Point Arena to U.S./Mexico Border

- May 1 through August 29; September 1 through 30.

All salmon except coho. Chinook minimum size limit 26 inches total length prior to July 1 and 27 inches total length beginning July 1 through September 30. Vessels must land and deliver their fish within 24 hours of any closure of this fishery. See gear restrictions and definitions (C.2, C.3).

Point Reyes to Point San Pedro

- October 1; October 4 through 8; and October 11 through 15.

All salmon except coho. Chinook minimum size limit 26 inches total length. See gear restrictions and definitions (C.2, C.3).

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

Area (when open)	Chinook		Coho		Pink
	Total	Head-off	Total	Head-off	
North of Cape Falcon	28.0	21.5	16.0	12.0	None
Cape Falcon to Humbug Mt.					
Prior to May 1, 2004	26.0	19.5	-	-	None
May 1 to September 30, and beginning March 15, 2005	27.0	20.5	-	-	None
October 1 through 31	28.0	21.5	-	-	None
Humbug Mt. to OR/CA Border					
Prior to May 1, 2004	26.0	19.5	-	-	None
May 1 to August 31, and beginning March 15, 2005	27.0	20.5	-	-	None
September 1 through 30	28.0	21.5	-	-	None
OR/CA Border to Point Arena					
July 1 through August 31	27.0	20.5	-	-	None
September 1 through 30	28.0	21.5	-	-	None
Point Arena to U.S./Mexico Border					
May 1 to June 30, and October 1 to 15	26.0	19.5	-	-	None
July 1 through September 30	27.0	20.5	-	-	None

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 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.

C.2. Gear Restrictions:

a. Single point, single shank, barbless hooks are required in all fisheries.

b. *Cape Falcon, Oregon to the OR/CA border*: No more than 4 spreads are allowed per line.

c. *OR/CA border to U.S./Mexico border*: No more than 6 lines are allowed per vessel, and barbless circle hooks are required when fishing with bait by any means other than trolling.

C.3. Gear Definitions:

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

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

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

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

C.4. Transit Through Closed Areas with Salmon on Board: It is unlawful for a vessel to have troll or recreational gear in the water while transiting 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.

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

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48°23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to 48°10'00" N. lat. and east of 125°05'00" W. long.

b. *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°14'48" 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.

c. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six 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 six nautical miles south of the Klamath River mouth).

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 amount of salmon (by species) on board, and the estimated time of arrival.

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. License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to April 1 of each year. Incidental harvest is authorized only during May and June troll seasons and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825). ODFW and Washington Department of Fish and Wildlife (WDFW) will monitor landings. If the landings are projected to exceed the 44,554 pound preseason allocation or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to close the incidental halibut fishery.

License holders may land no more than one Pacific halibut per each three chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

A "C-shaped" yelloweye rockfish conservation area is an area to be 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 on a fishery impact equivalent basis.

b. NMFS may transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

c. At the March 2005 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2004).

C.9. Consistent with Council management objectives, the State of Oregon may establish additional late-season, chinook-only fisheries in state waters. Check state regulations for details.

C.10. For the purposes of California Department of Fish and Game (CDFG) Code, Section 8232.5, the definition of the KMZ for the ocean salmon season shall be that area from Humbug Mt., Oregon, to Horse Mt., California.

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian TAC: 89,000 chinook and 270,000 coho, with no preseason trade between commercial and recreational fisheries.
2. Recreational TAC: 44,500 chinook and 202,500 coho.
3. No Area 4B add-on fishery.
4. Buoy 10 fishery opens August 1, with an expected landed catch of 10,500 coho in August and 4,500 coho in September.

U.S./Canada Border to Cape Alava (Neah Bay Area)

- June 27 through earlier of September 19 or 21,050 coho subarea quota, with a subarea guideline of 3,700 chinook.

Seven days per week. All salmon, except no chum retention August 1 through September 19, two fish per day (C.1), no more than one of which may be a chinook (chinook 26-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions and definitions (C.2, C.3). Beginning August 1, chinook non-retention east of the Bonilla-Tatoosh line (C.4.c) during the Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall recreational TAC for north of Cape Falcon (C.5).

Cape Alava to Queets River (La Push Area)

- June 27 through earlier of September 19 or 5,200 coho subarea quota with a subarea guideline of 1,900 chinook;
- September 25 through October 10 or 100 coho quota or 100 chinook quota in the area north of 47°50'00 N. lat. and south of 47°58'00" N. lat. in state waters (inside three nautical miles) (C.6).

Seven days per week. All salmon, two fish per day (C.1), no more than one of which may be a chinook (chinook 26-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. 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 recreational TAC for north of Cape Falcon (C.5).

Queets River to Leadbetter Point (Westport Area)

- June 27 through earlier of September 19 or 74,900 coho subarea quota with a subarea guideline of 30,800 chinook.

Sun. through Thurs, except there may be a conference call no later than July 28 to consider opening seven days per week. All salmon, two fish per day (C.1), no more than one of which may be a chinook (chinook 26-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. 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 recreational TAC for north of Cape Falcon (C.5).

Leadbetter Point to Cape Falcon (Columbia River Area)

- June 27 through earlier of September 30 or 101,250 coho subarea quota with a subarea guideline of 8,000 chinook.

Sunday through Thursday, except there may be a conference call no later than July 28 to consider opening seven days per week. All salmon, two fish per day (C.1), no more than one of which may be a chinook (chinook 26-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions and definitions (C.2, C.3). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning August 1. Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.5).

South of Cape Falcon

Cape Falcon to Humbug Mt.

- Except as provided below during the selective fishery, the season will be March 15 through October 31 (C.6).

All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3).

In 2005 the season will open March 15 for all salmon except coho. Two fish per day (C.1). Same gear restrictions as in 2004. This opening could be modified following Council review at its November 2004 meeting.

Selective fishery: **Cape Falcon to OR/CA Border**

- June 19 through earlier of August 31 or a landed catch of 75,000 coho.

Open seven days per week, all salmon, two fish per day (C.1). All retained coho must have a healed adipose fin clip. Open days may be adjusted inseason to utilize the available quota (C.5). All salmon except coho seasons reopen the earlier of September 1 or attainment of the coho quota.

Humbug Mt. to Horse Mt. (Klamath Management Zone)

- Except as provided above during the selective fishery, the season will be May 15 through September 12 (C.6).

All salmon except coho. Seven days per week, two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed August 1 through 31 (C.4.b).

A. SEASON DESCRIPTION (Continued)

Horse Mt. to Point Arena (Fort Bragg)

- February 14 through November 14.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 24 inches total length through April 30 and 20 inches total length thereafter (B). See gear restrictions and definitions (C.2, C.3).

In 2005, season opens February 12 (nearest Saturday to February 15) for all salmon except coho. Two fish per day (C.1), chinook minimum size limit 20 inches total length and the same gear restrictions as in 2004.

Point Arena to Pigeon Point (San Francisco)

- April 17 through November 14.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 24 inches total length through April 30 and 20 inches total length thereafter (B). See gear restrictions and definitions (C.2, C.3).

In 2005, the season will open April 2 for all salmon except coho. Two fish per day (C.1), 20-inch total length minimum size limit and the same gear restrictions as in 2004.

Pigeon Point to U.S./Mexico Border

- April 3 through October 3.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 24 inches total length through April 30 and 20 inches total length thereafter (B). See gear restrictions and definitions (C.2, C.3).

In 2005, the season will open April 2 for all salmon except coho. Two fish per day (C.1), chinook 20-inch total length minimum size limit and the same gear restrictions as in 2004.

B. MINIMUM SIZE (Total Length in Inches) (See C.1)

Area (when open)	Chinook	Coho	Pink
North of Cape Falcon	26.0	16.0	None
Cape Falcon to Horse Mt.	20.0	16.0	None, except 20.0 off CA
Horse Mountain to U.S./Mexico Border: Prior to May 1, 2004	24.0	-	20.0
Beginning May 1, 2004	20.0	-	20.0

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.

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 salmon for all licensed and juvenile anglers aboard has been attained (additional state restrictions may apply).

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

C.2. Gear Restrictions: 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 Point Conception, California*: No more than one rod may be used per angler; and single point, single shank, barbless hooks are required for all fishing gear. [Note: ODFW regulations in the state-water fishery off Tillamook Bay may allow the use of barbed hooks to be consistent with inside regulations.]

b. *Cape Falcon, Oregon to Point Conception, California*: Anglers must use no more than two single point, single shank, barbless hooks.

c. *Horse Mt., California to Point Conception, California*: Single point, single shank, barbless circle hooks (below) must be used if angling 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*: Angling tackle consisting of a line with no more than one artificial lure or natural bait attached. Off Oregon and Washington, the line 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 Point 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. *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°14'48" 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.

b. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six 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. *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˚28'00" N. lat., 124˚45'00" W. long.), then in a straight line to Bonilla Point (48˚35'30" N. lat., 124˚43'00" W. long.) on Vancouver Island, British Columbia.

C.5. Inseason Management: Regulatory modifications may become necessary inseason to meet preseason management objectives such as quotas, harvest guidelines, and season duration. Actions could include modifications to bag limits, or days open to fishing, and extensions or reductions in areas open to fishing. NMFS may transfer coho 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 SAS recreational representatives north of Cape Falcon. NMFS may also transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

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

TABLE 3. Council adopted treaty Indian ocean troll salmon fishery management measures, 2004. (Page 1 of 1)

Tribe and Area Boundaries[a/]	Open Seasons	Salmon Species	Minimum Size[b/] (Inches) Chinook	Minimum Size[b/] (Inches) Coho	Special Restrictions by Area
S'KLALLAM - Washington State Statistical Area 4B (All)	May 1 through earlier of June 30 or chinook quota.[c/]	All except coho	24	-	Barbless hooks. No more than eight fixed lines per boat; 72 hook maximum per boat.
	July 1 through earliest of September 15 or chinook or coho quota.[c/]	All	24	16	
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.	May 1 through earlier of June 30 or chinook quota.[c/]	All except coho	24	-	Barbless hooks. No more than eight fixed lines per boat or no more than four hand-held lines per person.
	July 1 through earliest of September 15 or chinook or coho quota[c/]	All	24	16	
QUILEUTE - That portion of the FMA between 48°07'36" N. lat. (Sand Point) and 47°31'42" N. lat. (Queets River) and east of 125°44'00" W. long.	May 1 through earlier of June 30 or chinook quota.[c/]	All except coho	24	-	Barbless hooks. No more than eight fixed lines per boat.[d/]
	July 1 through earliest of September 15 or chinook or coho quota.[c/]	All	24	16	
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.	May 1 through earlier of June 30 or chinook quota.[c/]	All except coho	24	-	Barbless hooks. No more than eight fixed lines per boat.[d/]
	July 1 through earliest of September 15 or chinook or coho quota.[c/]	All	24	16	
QUINAULT - That portion of the FMA between 47°40'06" N. lat. (Destruction Island) and 46°53'18" N. lat. (Point Chehalis) and east of 125°44'00" W. long.	May 1 through earlier of June 30 or chinook quota.[c/]	All except coho	24	-	Barbless hooks. No more than eight fixed lines per boat.[d/]
	July 1 through earliest of September 15 or chinook or coho quota.[c/]	All	24	16	

a/ 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.

b/ Applicable lengths in inches for dressed, head-off salmon, are 18 inches for chinook and 12 inches for coho. There are no minimum size or retention limits for ceremonial and subsistence harvest.

c/ The overall treaty Indian troll ocean quotas are 49,000 chinook and 75,000 coho. The overall chinook quota is divided into 22,500 chinook in the May/June chinook-directed fishery and 26,500 chinook in the July through September all-salmon season. If the chinook quota for the May/June fishery is not fully utilized, the excess fish cannot be transferred into the later all-salmon season. The quotas include troll catches by the S'Klallam and Makah tribes in Washington State Statistical Area 4B from May 1 through September 15. If the treaty Indian troll catch taken from areas 4/4B is projected inseason to exceed 55,000 coho, the total treaty Indian troll quota will be adjusted to ensure the exploitation rate impact of the treaty Indian troll fishery on Interior Fraser coho does not exceed the level anticipated under the assumptions employed for impact assessment. The Quileute Tribe will continue a ceremonial and subsistence fishery during the time frame of September 15 through October 15; fish taken during this fishery are to be counted against treaty troll quotas established for the 2004 season.

d/ 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. 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.

TABLE 1. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 1 of 9)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION 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 110,000 coho marked with a healed adipose fin clip (marked). Trade: May be considered at the April Council meeting. 2. Non-Indian commercial troll TAC: 32,500 Chinook and 17,600 marked coho; all retained coho must be marked. 3. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.	1. Overall non-Indian TAC: 50,000 Chinook and 80,000 coho marked with a healed adipose fin clip (marked). Trade: May be considered at the April Council meeting. 2. Non-Indian commercial troll TAC: 25,000 Chinook and 12,800 marked coho; all retained coho must be marked. 3. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.	1. Overall non-Indian TAC: 35,000 Chinook and 50,000 coho marked with a healed adipose fin clip (marked). Trade: May be considered at the April Council meeting. 2. Non-Indian commercial troll TAC: 17,500 Chinook and 8,000 marked coho; all retained coho must be marked. 3. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.
U.S./Canada Border to Cape Falcon • May 1 through earlier of June 30 or 21,500 Chinook quota. Open May 1-2 with a 75 Chinook per vessel landing and possession limit for the two-day open period; beginning May 6, open Saturday through Tuesday with a 100 Chinook possession and landing limit per four-day open periods. If insufficient quota remains to prosecute openings prior to the June 24-27 open period, the remaining quota will be provided for a June 29-30 open period with a 30 Chinook per vessel landing and possession limit. All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3).	**U.S./Canada Border to Cape Falcon** • May 1 through earlier of June 30 or 16,666 Chinook quota. Open May 1-2 with a 75 Chinook per vessel landing and possession limit for the two-day open period; beginning May 6, open Saturday through Tuesday with a 75 Chinook possession and landing limit per four-day open periods. If insufficient quota remains to prosecute openings prior to the June 24-27 open period, the remaining quota will be provided for a June 29-30 open period with a 30 Chinook per vessel landing and possession limit. All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3).	**U.S./Canada Border to Cape Falcon** • May 1 through earlier of June 30 or 11,666 Chinook quota. Open May 1-2 with a 50 Chinook per vessel landing and possession limit for the two-day open period; beginning May 6, open Saturday through Tuesday with a 50 Chinook possession and landing limit per four-day open periods. If insufficient quota remains to prosecute openings prior to the June 24-27 open period, the remaining quota will be provided for a June 29-30 open period with a 30 Chinook per vessel landing and possession limit. All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3).

Vessels must land and deliver their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land and deliver their fish within the area and north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land and deliver their fish within the area and south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. 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 calling 541-867-0300 Ext. 271. 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).

TABLE 1. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 2 of 9)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION III
U.S./Canada Border to Cape Falcon • July 8 through earlier of Sept. 12 or 11,000 preseason Chinook guideline (C.8) or a 17,600 marked coho quota (C.8.d). Cape Flattery and Columbia Control Zones closed (C.5). Open Saturday through Tuesday July 8 through July 25. All salmon; landing and possession limit of 50 Chinook per vessel per four day open period. Gear restricted to plugs 6 inches (15.2 cm) or longer (C.2, C.3). **U.S./Canada Border to Leadbetter Point**: Open August 5 through September 12; Saturday through Tuesday. All Salmon except no chum retention north of Cape Alava, Washington in August and September (C.7); landing and possession limit of 50 Chinook per vessel per four day open period. All retained coho must be marked. Gear restricted to plugs 6 inches (15.2 cm) or longer (C.2, C.3). Vessels fishing in the area are not permitted to fish or land fish in the area between Leadbetter Point and Cape Falcon during the same weekly open period. **Leadbetter Point to Cape Falcon** August 5 through September 12; open Saturday through Tuesday. All Salmon (C.7); landing and possession limit of 20 Chinook and 100 marked coho per four-day open period. No special gear restrictions. Vessels fishing in the area are not permitted to fish or land fish in the area between Leadbetter Point and the U.S./Canada border during the same weekly open period.	**U.S./Canada Border to Cape Falcon** • July 15 through earlier of Sept. 12 or 8,334 preseason Chinook guideline (C.8) or a 12,800 marked coho quota. Open Saturday through Tuesday through August 8. All salmon except no chum retention north of Cape Alava, Washington in August; landing and possession limit of 40 Chinook per vessel per four day open period. Gear restricted to plugs or whole herring 6 inches (15.2 cm) or longer; one flasher per line without hooks allowed (C.2, C.3). Cape Flattery and Columbia Control Zones closed (C.5). August 12 through September 12; open Saturday through Tuesday. All Salmon except no chum retention north of Cape Alava, Washington in August and September (C.7); landing and possession limit of 15 Chinook and 100 marked coho per four-day open period. All retained coho must be marked, **except an inseason conference call may occur to consider allowing retention of all legal sized coho beginning no earlier than September 1** (C.8.d). No special gear restrictions. Cape Flattery and Columbia Control Zones closed (C.5).	**U.S./Canada Border to Cape Falcon** • July 22 through earlier of Sept. 25 or 5,834 preseason Chinook guideline (C.8) or an 8,000 marked coho quota. Open Saturday through Monday through August 15. All salmon except no chum retention north of Cape Alava, Washington in August and September (C.7); landing and possession limit of 35 Chinook per vessel per three day open period. Gear restricted to plugs 6 inches (15.2 cm) or longer (C.2, C.3). Cape Flattery and Columbia Control Zones closed (C.5). August 19 through September 25; open Saturday through Monday. All Salmon except no chum retention north of Cape Alava, Washington in August and September (C.7); landing and possession limit of 15 Chinook and 75 marked coho per three-day open period. All retained coho must be marked. No special gear restrictions. Cape Flattery and Columbia Control Zones closed (C.5).

Vessels must land and deliver their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land and deliver their fish within the area and north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land and deliver their fish within the area and south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. 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 calling 541-867-0300 Ext. 271. 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).

TABLE 1. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 3 of 9)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION III
South of Cape Falcon	**South of Cape Falcon**	**South of Cape Falcon**
Supplemental Management Information	**Supplemental Management Information**	**Supplemental Management Information**
1. Klamath River recreational fishery allocation: 15%. Fisheries may need to be adjusted to meet NMFS ESA consultation standards or other management objectives if the California Fish and Game Commission recommends a different allocation. 2. Non-Indian commercial troll Klamath fall Chinook impact allocation 55% California:45% Oregon. 3. Tribal allocation equal to non-Indian Klamath catch.	1. Klamath River recreational fishery allocation: 0%. Fisheries may need to be adjusted to meet NMFS ESA consultation standards or other management objectives if the California Fish and Game Commission recommends a different allocation. 2. Non-Indian commercial troll Klamath fall Chinook impact allocation 50% California:50% Oregon. 3. Tribal allocation equal to non-Indian Klamath catch.	1. Klamath River recreational fishery allocation: 0%. Fisheries may need to be adjusted to meet NMFS ESA consultation standards or other management objectives if the California Fish and Game Commission recommends a different allocation. 2. Non-Indian commercial troll Klamath fall Chinook impact allocation 19% California:81% Oregon. 3. Tribal allocation equal to non-Indian Klamath catch.
Cape Falcon to Humbug Mt. (Newport –Coos Bay) • May 1-3, 8-10, 15-17, 22-24, 29-30; June 1-30; • September 1-23; October 1-31 with a 50 Chinook landing and possession limit per calendar week (C.9). All salmon except coho (C.7). Chinook 28 inch total length minimum size (B). All vessels fishing in the area must land their fish in the area. In September and October, vessels landing fish in the area are prohibited from participating in any other commercial salmon fishery in the State of Oregon south of Cape Falcon during the open period in which salmon were landed in the area. 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. In 2007, the season will open March 15 for all salmon except coho, with a 28 inch total length Chinook minimum size limit.	**Cape Falcon to Florence South Jetty (Newport)** • May 1-3, 8-10, 15-17, 22-24, 29-30; June 1-30; with a 100 Chinook landing and possession limit per vessel per open period (per calendar week in June). • September 5-9, 20-25; with a 50 Chinook landing and possession limit per open period (C.9). All salmon except coho (C.7). Chinook 28 inch total length minimum size (B). All vessels fishing in the area must land their fish in the area. Vessels fishing in the area are not permitted to fish or land fish in the area between Florence South Jetty and the Oregon/California border during the same open period (or calendar week in June). 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. In 2007, same as Option I	**Cape Falcon to Humbug Mt. (Newport-Coos Bay)** Closed in 2006. In 2007, same as Option I.

TABLE 1.Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 4 of 9)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION III
	Florence South Jetty to Cape Arago (Coos Bay) • May 1-3, 8-10, 15-17, 22-24, 29-30; June 1-30; with a 75 Chinook landing and possession limit per vessel per open period (per calendar week in June). • September 5-9, 20-25; with a 50 Chinook landing and possession limit per period (C.9). • (C.9) All salmon except coho (C.7). Chinook 28 inch total length minimum size (B). All vessels fishing in the area must land their fish in the area. Vessels fishing in the area are not permitted to fish or land fish in the area between Florence South Jetty and Cape Falcon or the area between Cape Arago and the Oregon/California border during the same open period (or calendar week in June). See gear restrictions and definitions (C.2, C.3). In 2007, same as Option I	
	Cape Arago to Humbug Mt. (Coos Bay) Closed in 2006. In 2007, same as Option I	
Humbug Mt. to OR/CA Border (Oregon KMZ) • September 3 through earlier of September 30, or a 2,000 Chinook quota (C.9) All salmon except coho. Chinook 28 inch total length minimum size. Possession and landing limit of 45 fish per day per vessel in September. See gear restrictions and definitions (C.2, C.3). Vessels must land their fish in Gold Beach, Port Orford, or Brookings, Oregon, and within 24 hours of closure. State regulations require fishers intending to transport and deliver their catch to other locations after first landing in one of these ports notify ODFW prior to transport away from the port of landing by calling 541-867-0300 Ext. 271, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery. In 2007, the season will open March 15 for all salmon except coho, with a 28 inch Chinook minimum size limit.	**Humbug Mt. to OR/CA Border (Oregon KMZ)** • September 3 through earlier of September 30, or a 1,500 Chinook quota (C.9) All salmon except coho. Chinook 28 inch total length minimum size limit. Possession and landing limit of 45 fish per day per vessel in September. See gear restrictions and definitions (C.2, C.3). Vessels must land their fish in Gold Beach, Port Orford, or Brookings, Oregon, and within 24 hours of closure. State regulations require fishers intending to transport and deliver their catch to other locations after first landing in one of these ports notify ODFW prior to transport away from the port of landing by calling 541-867-0300 Ext. 271, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery. In 2007, the season will open March 15 for all salmon except coho, with a 28 inch Chinook minimum size limit.	**Humbug Mt. to OR/CA Border (Oregon KMZ)** Closed in 2006. In 2007, the season will open March 15 for all salmon except coho, with a 28 inch Chinook minimum size limit.

TABLE 1. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 5 of 9)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION III
OR/CA Border to Humboldt South Jetty (California KMZ) • September 3 through earlier of September 30, or 2,000 Chinook quota. All salmon except coho. Chinook minimum size limit of 28 inches total length. Possession and landing limit of 30 fish per day per vessel. All fish caught in this area must be landed within the area. See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.). See California State regulations for additional closures adjacent to the Smith and Klamath rivers. When the fishery is closed between the OR/CA border and Humbug Mt. 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.	**OR/CA Border to Humboldt South Jetty (California KMZ)** Closed in 2006.	**OR/CA Border to Humboldt South Jetty (California KMZ)** Closed in 2006
Humboldt South Jetty to Horse Mt. Closed.	**Humboldt South Jetty to Horse Mt.** Closed.	**Humboldt South Jetty to Horse Mt.** Closed.
Horse Mt. to Point Arena (Fort Bragg) • September 1-30. All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3). In 2007, the season will open March 15 for all salmon except coho, with a 27 inch total length Chinook minimum size limit. This opening could be modified following Council review at its March 2007 meeting.	**Horse Mt. to Point Arena (Fort Bragg)** • September 1-15. All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3). In 2007, same as Option I.	**Horse Mt. to Point Arena (Fort Bragg)** Closed in 2006. In 2007, same as Option I.

TABLE 1. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 6 of 9)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION III
Pt. Arena to Pigeon Pt. (San Francisco) • July 4 through August 29; September 1-30 with a 50 Chinook landing and possession limit per vessel per calendar week. All salmon except coho. Chinook minimum size limit 27 inches total length in September; 28 inches in July and August. All vessels fishing in the area must land their fish in the area. Vessels landing fish in the area are prohibited from participating in any other commercial salmon fishery in the State of California during the same calendar week in which salmon were landed in the area. See gear restrictions and definitions (C.2, C.3). **Pt. Reyes to Pt. San Pedro (Fall Area Target Zone)** • October 2-13. Open Monday through Friday. All salmon except coho. Chinook minimum size limit 26 inches total length. See gear restrictions and definitions (C.2, C.3).	**Pt. Arena to Pigeon Pt. (San Francisco)** • July 1-15; August 1-29; September 1-30 with a 50 Chinook landing and possession limit per vessel per calendar week. All salmon except coho. Chinook minimum size limit 27 inches total length in September; 28 inches in July and August. All vessels fishing in the area must land their fish in the area. Vessels landing fish in the area are prohibited from participating in the Pigeon Point to Point Sur commercial salmon fishery during the same calendar week in which salmon were landed in the area. See gear restrictions and definitions (C.2, C.3). **Pt. Reyes to Pt. San Pedro (Fall Area Target Zone)** • October 2-13. Open Monday through Friday. All salmon except coho. Chinook minimum size limit 26 inches total length. See gear restrictions and definitions (C.2, C.3).	**Pt. Arena to Pigeon Pt. (San Francisco)** Closed in 2006. **Pt. Reyes to Pt. San Pedro (Fall Area Target Zone)** Closed in 2006.
Pigeon Point to Pt. Sur (Monterey) • May 1-31; July 4 through August 29; September 1-30 with a 100 Chinook landing and possession limit per vessel per calendar week. All salmon except coho. Chinook minimum size limit 27 inches total length in May and September; 28 inches total length in July and August. All vessels fishing in the area must land their fish in the area. Vessels landing fish in the area are prohibited from participating in any other commercial salmon fishery in the State of California during the same calendar week in which salmon were landed in the area. See gear restrictions and definitions (C.2, C.3).	**Pigeon Point to Pt. Sur (Monterey)** • May 1-31; August 1-29; September 1-30 with a 100 Chinook landing and possession limit per vessel per week. All salmon except coho. Chinook minimum size limit 27 inches total length in May and September; 28 inches total length in August. All vessels fishing in the area must land their fish in the area. Vessels landing fish in the area are prohibited from participating in the Point Arena to Pigeon Point commercial salmon fishery during the same calendar week in which salmon were landed in the area. See gear restrictions and definitions (C.2, C.3).	**Pigeon Point to Pt. Sur (Monterey)** Closed in 2006.
Pt. Sur to U.S./Mexico Border (Monterey) • May 1 through September 30. All salmon except coho. Chinook minimum size limit 27 inches total length in May, June, and September; 28 inches total length in July and August. See gear restrictions and definitions (C.2, C.3).	**Pt. Sur to U.S./Mexico Border (Monterey)** Same as Option I.	**Pt. Sur to U.S./Mexico Border (Monterey)** Same as Option I

TABLE 1. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 7 of 9)

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

Area (when open)	Chinook Total Length	Chinook Head-off	Coho Total Length	Coho Head-off	Pink
North of Cape Falcon	28.0	21.5	16.0	12.0	None
Cape Falcon to OR/CA Border	28.0	21.5	-	-	None
OR/CA Border to Horse Mt.	28.0	21.5	-	-	None
Horse Mt. To Pt. Arena	27.0	20.5	-	-	None
Pt. Arena to U.S./Mexico Border					
Prior to July 1 and September 1-30	27.0	20.5	-	-	None
July 1-August 31	28.0	21.5	-	-	None
October 3-14	26.0	19.5	-	-	None

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 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.

C.2. Gear Restrictions:
a. Single point, single shank, barbless hooks are required in all fisheries.
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. In that portion of the fishery management area (FMA) 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 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. Transit Through Closed Areas with Salmon on Board: It is unlawful for a vessel to have troll or recreational gear in the water while transiting any area closed to fishing for a certain species of salmon, while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.

TABLE 1. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 8 of 9)

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

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48°23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to Cape Alava (48°10'00" N. lat.) and east of 125°05'00" W. long.

b. *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.

c. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six 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 six nautical miles south of the Klamath River mouth).

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 amount of salmon (by species) on board, and the estimated time of arrival.

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. License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to April 1 of each year. Incidental harvest is authorized only during May and June troll seasons and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825). ODFW and Washington Department of Fish and Wildlife (WDFW) will monitor landings. If the landings are projected to exceed the 39,918 pound preseason allocation or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to close the incidental halibut fishery.

Option I Beginning May 1, license holders may land no more than one Pacific halibut per each three Chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

Option II: Beginning May 1, license holders may land no more than one Pacific halibut per each 2 Chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 40 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

Option III: Beginning May 1, license holders may land no more than one Pacific halibut per each 3 Chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 24 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

A "C-shaped" yelloweye rockfish conservation area is an area to be 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. Commercial troll management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 9 of 9)

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 on a fishery impact equivalent basis.
b. NMFS may transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the areas' representatives on the SAS.
c. At the March 2007 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2006).
d. If retention of unmarked coho is permitted in the area from the U.S./Canada border to Cape Falcon, Oregon, by inseason action, the allowable coho quota will be adjusted to ensure preseason projected mortality of critical stocks is not exceeded.

C.9. 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. Oregon State-water fisheries are limited to Chinook salmon. Check state regulations for details.

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C.10. For the purposes of California Department of Fish and Game (CDFG) Code, Section 8232.5, the definition of the KMZ for the ocean salmon season shall be that area from Humbug Mt., Oregon, to Horse Mt., California.

TABLE 2. Recreational management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 1 of 8)

A. SEASON OPTION DESCRIPTIONS		
OPTION I	OPTION II	OPTION 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 110,000 coho marked with a healed adipose fin clip (marked). Trade: May be considered at the April Council meeting. 2. Recreational TAC: 32,500 Chinook and 92,400 marked coho; all retained coho must be marked. 3. No Area 4B add-on fishery. 4. Buoy 10 fishery opens Aug. 1 with an expected landed catch of 7,700 marked coho in August and September. 5. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.	1. Overall non-Indian TAC: 50,000 Chinook and 80,000 coho marked with a healed adipose fin clip (marked). Trade: May be considered at the April Council meeting. 2. Recreational TAC: 25,000 Chinook and 67,200 marked coho; all retained coho must be marked. 3. No Area 4B add-on fishery. 4. Buoy 10 fishery opens Aug. 1 with an expected landed catch of 8,300 marked coho in August and September. 5. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.	1. Overall non-Indian TAC: 35,000 Chinook and 50,000 coho marked with a healed adipose fin clip (marked). Trade: May be considered at the April Council meeting. 2. Recreational TAC: 17,500 Chinook and 42,000 marked coho; all retained coho must be marked. 3. Area 4B add-on fishery of 6,000 marked coho with Chinook non-retention opens upon ocean closure (C.5). 4. Buoy 10 fishery opens Aug. 1 with an expected landed catch of 8,900 marked coho in August and September. 5. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.
U.S./Canada Border to Cape Alava (Neah Bay Subarea) • June 20 through earlier of September 2 or 9,610 marked coho subarea quota with a subarea guideline of 3,400 Chinook. Tuesday through Saturday. All salmon, except no chum retention August 1 through Sept. 2, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). See gear restrictions and definitions (C.2, C.3). Beginning August 1, Chinook non-retention east of the Bonilla-Tatoosh line (C.4.d) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).	**U.S./Canada Border to Cape Alava (Neah Bay**) • June 30 through earlier of Sept. 16 or 6.989 marked coho subarea quota with a subarea guideline of 2,600 Chinook. Tuesday through Saturday. All salmon, except no chum retention August 1 through Sept. 16, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). See gear restrictions and definitions (C.2, C.3). Beginning August 1, Chinook non-retention east of the Bonilla-Tatoosh line (C.4.d) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).	**U.S./Canada Border to Cape Alava (Neah Bay**) • July 11 through earlier of Sept. 16 or 3,260 marked coho subarea quota with a subarea guideline of 1,800 Chinook. Tuesday through Saturday. All salmon, except no chum retention August 1 through Sept. 16, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). See gear restrictions and definitions (C.2, C.3). Beginning August 1, Chinook non-retention east of the Bonilla-Tatoosh line (C.4.d) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).

TABLE 2. **Recreational** management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 2 of 8)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION III
Cape Alava to Queets River (La Push Subarea) • · June 20 through earlier of September 2 or 2,352 marked coho subarea quota with a subarea guideline of 1,300 Chinook. Tuesday through Saturday. • September 23 through October 8 or 50 marked coho quota or 100 Chinook quota: In the area north of 47°50'00 N. lat. and south of 48°00'00" N. lat. (C.5). Seven days per week. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). 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 recreational TAC for north of Cape Falcon (C.5).	**Cape Alava to Queets River (La Push Subarea)** • · June 30 through earlier of September 16 or 1,697 marked coho subarea quota with a subarea guideline of 1,000 Chinook. Tuesday through Saturday. • September 23 through October 8 or 50 marked coho quota or 100 Chinook quota: In the area north of 47°50'00 N. lat. and south of 48°00'00" N. lat. (C.5). Seven days per week. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). 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 recreational TAC for north of Cape Falcon (C.5).	**Cape Alava to Queets River (La Push Subarea)** • · July 11 through earlier of September 16 or 1,114 marked coho subarea quota with a subarea guideline of 700 Chinook. Tuesday through Saturday. • September 23 through October 8 or 50 marked coho quota or 100 Chinook quota: In the area north of 47°50'00 N. lat. and south of 48°00'00" N. lat. (C.5). Seven days per week. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). 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 recreational TAC for north of Cape Falcon (C.5).
Queets River to Leadbetter Point (Westport Subarea) • June 18 through earlier of September 4 or 34,188 marked coho subarea quota with a subarea guideline of 19,000 Chinook. Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). 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 recreational TAC for north of Cape Falcon (C.5).	**Queets River to Leadbetter Point (Westport Subarea)** • July 3 through earlier of September 17 or 24,860 marked coho subarea quota with a subarea guideline of 14,600 Chinook. Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). See gear restrictions and definitions (C.2, C.3). Beginning August 1, Grays Harbor Control Zone closed (C.4.b). Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).	**Queets River to Leadbetter Point (Westport Subarea)** • July 10 through earlier of September 17 or 16,578 marked coho subarea quota with a subarea guideline of 10,200 Chinook. Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). 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 recreational TAC for north of Cape Falcon (C.5).

TABLE 2. **Recreational** management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 3 of 8)

A. SEASON OPTION DESCRIPTIONS		
OPTION I	OPTION II	OPTION III
Leadbetter Point to Cape Falcon (Columbia River Subarea) • July 3 through earlier of September 4 or 46,200 marked coho subarea quota with a subarea guideline of 8,700 Chinook. Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). See gear restrictions and definitions (C.2, C.3). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning Aug. 1. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).	**Leadbetter Point to Cape Falcon (Columbia River Subarea)** • July 3 through earlier of September 30 or 33,600 marked coho subarea quota with a subarea guideline of 6,700 Chinook. Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). See gear restrictions and definitions (C.2, C.3). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning Aug. 1. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).	**Leadbetter Point to Cape Falcon (Columbia River Subarea)** • July 17 through earlier of September 30 or 21,000 marked coho subarea quota with a subarea guideline of 4,700 Chinook. Sunday through Thursday. All salmon, two fish per day, no more than one of which may be a Chinook (Chinook 24-inch total length minimum size limit); all retained coho must be marked (B). See gear restrictions and definitions (C.2, C.3). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning July 15. Inseason management may be used to sustain season length and keep harvest within the overall Chinook recreational TAC for north of Cape Falcon (C.5).

TABLE 2. **Recreational** management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 4 of 8)

A. SEASON OPTION DESCRIPTIONS		
OPTION I	OPTION II	OPTION III
South of Cape Falcon	**South of Cape Falcon**	**South of Cape Falcon**
Supplemental Management Information	**Supplemental Management Information**	**Supplemental Management Information**
1. Klamath River recreational fishery allocation: 15%. Fisheries may need to be adjusted to meet NMFS ESA consultation standards or other management objectives if the California Fish and Game Commission recommends a different allocation. 2. KMZ recreational fishery share: 7.7%. 3. Tribal allocation equal to non-Indian Klamath catch. 4. All retained coho must be marked with a healed adipose fin clip (marked).	1. Klamath River recreational fishery allocation: 0%. Fisheries may need to be adjusted to meet NMFS ESA consultation standards or other management objectives if the California Fish and Game Commission recommends a different allocation. 2. KMZ recreational fishery share: 5.9%. 3. Tribal allocation equal to non-Indian Klamath catch. 4. All retained coho must be marked with a healed adipose fin clip (marked).	1. Klamath River recreational fishery allocation: 0%. Fisheries may need to be adjusted to meet NMFS ESA consultation standards or other management objectives if the California Fish and Game Commission recommends a different allocation. 2. KMZ recreational fishery share: 8.4%. 3. Tribal allocation equal to non-Indian Klamath catch.
Cape Falcon to Humbug Mt. • Except as provided below during the selective fishery, the season will be March 15 through October 31 (C.6). All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Selective fishery: Cape Falcon to OR/CA Border June 17 through earlier of August 31 or a landed catch of 35,000 marked coho, except that the area south of Humbug Mt. will only be open June 17 through July 4 and August 14-31, concurrent with the KMZ season listed below. Open seven days per week, all salmon, two fish per day (C.1). All retained coho must be marked. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (see 70 FR 20304, and call the halibut fishing hotline 1-800-662-9825 for additional dates) (C.3, C.4.e). Open days may be adjusted inseason to utilize the available quota (C.5). All salmon except coho seasons reopen the earlier of September 1 or attainment of the coho quota. In 2007, the season will open March 15 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).	**Cape Falcon to Humbug Mt.** • Except as provided below during the selective fishery, the season will be March 15 through October 31 (C.6). All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Selective fishery: Cape Falcon to OR/CA Border June 17 through earlier of July 31 or a landed catch of 20,000 marked coho, except that the area south of Humbug Mt. will only be open July 1-4. Open seven days per week, all salmon, two fish per day (C.1). All retained coho must be marked. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (see 71 FR 10850, and call the halibut fishing hotline 1-800-662-9825 for additional dates) (C.3, C.4.e). Open days may be adjusted inseason to utilize the available quota (C.5). All salmon except coho seasons reopen the earlier of August 1 or attainment of the coho quota. In 2007, same as Option I.	**Cape Falcon to Humbug Mt.** • March 15 through April 30 (C.6). All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). In 2007, same as Option I.

TABLE 2. **Recreational** management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 5 of 8)

A. SEASON OPTION DESCRIPTIONS		
OPTION I	OPTION II	OPTION III
Humbug Mt. to Horse Mt. (Klamath Management Zone) • Except as provided above during the selective fishery, the season will be May 26 through July 4; and August 14 through September 11 (C.6). All salmon except coho, except as noted above in the coho selective fishery. Chinook minimum size limit 24 inches total length (B). Seven days per week, two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed in August (C.4.c). See California State regulations for additional closures adjacent to the Smith, Klamath, and Eel rivers.	**Humbug Mt. to Horse Mt. (Klamath Management Zone)** • Except as provided above during the selective fishery, the season will be May 28-31; July 1-4; and August 23 through September 6 (C.6). All salmon except coho, except as noted above in the coho selective fishery. Chinook minimum size limit 24 inches total length (B). Seven days per week, two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed in August (C.4.c). See California State regulations for additional closures adjacent to the Smith, Klamath, and Eel rivers.	**Humbug Mt. to Horse Mt. (Klamath Management Zone)** Closed in 2006.
Horse Mt. to Point Arena (Fort Bragg) • February 18 through July 10; July 16-17; July 23 through November 12. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, season opens February 17 (nearest Saturday to February 15) for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).	**Horse Mt. to Point Arena (Fort Bragg)** • February 18 through April 30; July 1-9; September 16 through October 15; November 1-7. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, same as Option I.	**Horse Mt. to Point Arena (Fort Bragg)** • February 18 through April 30. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, same as Option I.
Point Arena to Pigeon Point (San Francisco) • May 1 through November 12. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, the season will open April 7 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).	**Point Arena to Pigeon Point (San Francisco)** • May 1-15; June 24-July 9; September 1-15; October 16 through November 6. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, same as Option I.	**Point Arena to Pigeon Point (San Francisco)** Closed in 2006. In 2007, same as Option I.

TABLE 2. **Recreational** management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 6 of 8)

A. SEASON OPTION DESCRIPTIONS		
OPTION I	OPTION II	OPTION III
Pigeon Point to Point Sur (Monterey) • May 1 through September 24. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, the season will open April 7 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).	**Pigeon Point to Point Sur (Monterey)** • May 1-31; September 1-12. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, same as Option I.	**Pigeon Point to Point Sur (Monterey)** Closed in 2006. In 2007, same as Option I.
Point Sur to U.S./Mexico Border (Monterey) • April 1 through September 24. All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3). In 2007, the season will open April 7 for all salmon except coho, two fish per day (C.1), Chinook minimum size limit of 20 inches total length (B), and the same gear restrictions as in 2006 (C.2, C.3).	**Point Sur to U.S./Mexico Border (Monterey)** Same as Option I In 2007, same as Option I	**Point Sur to U.S./Mexico Border (Monterey)** Same as Option 1. In 2007, same as Option I.

TABLE 2. **Recreational** management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 7 of 8)

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

Area (when open)	Chinook	Coho	Pink
North of Cape Falcon	24.0	16.0	None
Cape Falcon to Humbug Mt.	20.0	16.0	None
Humbug Mt. to Horse Mountain	24.0	-	None, except 20.0 off CA
Horse Mt. to U.S./Mexico Border	20.0	-	20.0

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.

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 salmon for all licensed and juvenile anglers aboard has been attained (additional state restrictions may apply).

C.2. Gear Restrictions: 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 Point Conception, California: No more than one rod may be used per angler; and single point, single shank, barbless hooks are required for all fishing gear. [Note: ODFW regulations in the state-water fishery off Tillamook Bay may allow the use of barbed hooks to be consistent with inside regulations.]
b. Cape Falcon, Oregon, to Point Conception, California: Anglers must use no more than two single point, single shank, barbless hooks.
c. Horse Mt., California, to Point Conception, California: Single point, single shank, barbless circle hooks (below) must be used if angling 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*: Angling tackle consisting of a line with no more than one artificial lure or natural bait attached. Off Oregon and Washington, the line 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 Point 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. **Recreational** management options adopted by the Council for non-Indian ocean salmon fisheries, 2006. (Page 8 of 8)

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

C.4. Control Zone Definitions:

a. *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.

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° 36'00" N. lat., 124°10'51" W. long.).

c. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six 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).

d. *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°28'00" N. lat., 124°45'00" W. long.), then in a straight line to Bonilla Point (48°35'30" N. lat., 124°43'00" W. long.) on Vancouver Island, British Columbia.

e. *Stonewall Bank Groundfish 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.

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 on an impact neutral basis 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.

c. Chinook and coho may be transferred between the recreational and commercial fisheries north of Cape Falcon on an impact neutral basis if there is agreement among the representatives of the SAS.

d. If retention of unmarked coho is permitted in the area from the U.S./Canada border to Cape Falcon, Oregon, by inseason action, the allowable coho quota will be adjusted to ensure preseason projected mortality of critical stocks is not exceeded.

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. Oregon State-water fisheries are limited to Chinook salmon. Check state regulations for details.

TABLE 3. Management Options adopted by the Council for 2006 Treaty Indian ocean troll fisheries. (Page 1 of 2)

A. SEASON OPTION DESCRIPTIONS

OPTION I	OPTION II	OPTION III
Supplemental Management Information	**Supplemental Management Information**	**Supplemental Management Information**
1. Overall Treaty-Indian TAC: 50,000 Chinook and 45,000 coho. 2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries and stocks.	1. Overall Treaty-Indian TAC: 33,200 Chinook and 35,000 coho. 2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries and stocks.	1. Overall Treaty-Indian TAC: 25,000 Chinook and 25,000 coho. 2. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries and stocks.
• May 1 through the earlier of June 30 or 30,000 Chinook quota. All salmon except coho. If the Chinook quota for the May-June fishery is not fully utilized, the excess fish cannot be transferred into the later all-salmon season. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season. See size limit (B) and other restrictions (C).	• May 1 through the earlier of June 30 or 20,000 Chinook quota. All salmon except coho. If the Chinook quota for the May-June fishery is not fully utilized, the excess fish cannot be transferred into the later all-salmon season. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season. See size limit (B) and other restrictions (C).	• May 1 through the earlier of June 30 or 12,000 Chinook quota. All salmon except coho. If the Chinook quota for the May-June fishery is not fully utilized, the excess fish cannot be transferred into the later all-salmon season. If the Chinook quota is exceeded, the excess will be deducted from the later all-salmon season. See size limit (B) and other restrictions (C).
• July 1 through the earlier of September 15, or 20,000 preseason Chinook quota, or 45,000 coho quota. All salmon. See size limit (B) and other restrictions (C).	• July 1 through the earlier of September 15, or 13,200 preseason Chinook quota, or 35,000 coho quota. All salmon. See size limit (B) and other restrictions (C).	• July 1 through the earlier of September 15, or 13,000 preseason Chinook quota, or 25,000 coho quota. All salmon. See size limit (B) and other restrictions (C).

TABLE 3. Management Options **adopted by the Council** for 2006 **Treaty Indian ocean troll** fisheries. (Page 2 of 2)

B. MINIMUM SIZE (Inches)

Area (when open)	Chinook		Coho		Pink
	Total Length	Head-off	Total Length	Head-off	
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 (All)

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 - That portion of the FMA between 48°07'36" N. lat. (Sand Pt.) and 47°31'42" N. lat. (Queets River) and east of 125°44'00" W. long.

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 - That portion of the FMA between 47°40'06" N. lat. (Destruction Island) and 46°53'18"N. lat. (Point Chehalis) and east of 125°44'00" W. long.

C.2 Gear restrictions

a. Single point, single shank, barbless hooks are required in all fisheries.
b. No more than 8 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 Makah encounter rate study will occur between May 1 and September 15. Salmon taken in the study by treaty Indian vessels will be counted towards the overall treaty Indian troll quota.
c. The Quileute Tribe will continue a ceremonial and subsistence fishery during the time frame of September 15 through October 15 in the same manner as in 2004. Fish taken during this fishery are to be counted against treaty troll quotas established for the 2006 season (estimated harvest during the October ceremonial and subsistence fishery: 100 Chinook; 200 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.

8.0 APPENDIX B: RISK ANALYSES FOR KLAMATH RIVER FALL CHINOOK

The documents contained in this appendix represent the scientific analyses the Council and NMFS considered in recommending the Preferred Alternative relative to the risk to the KRFC population to produce MSY in the long term.

Table 1. Klamath River Fall Chinook Stock-Recruitment Data Set. [1/]

Brood Year	Spawners (S)	Recruits (R)	R/S
1979	30,637	200,698	6.6
1980	21,484	109,430	5.1
1981	33,857	50,968	1.5
1982	31,951	122,187	3.8
1983	30,784	368,159	12.0
1984	16,064	244,052	15.2
1985	25,676	188,722	7.4
1986	113,359	123,247	1.1
1987	101,717	72,981	0.7
1988	79,385	17,450	0.2
1989	43,869	16,213	0.4
1990	15,596	44,910	2.9
1991	11,649	48,513	4.2
1992	12,028	269,678	22.4
1993	21,858	90,210	4.1
1994	32,333	50,840	1.6
1995	161,794	39,203	0.2
1996	81,326	38,408	0.5
1997	46,144	168,089	3.6
1998	42,488	130,283	3.1
1999	18,457	196,197	10.6
2000	82,728	188,537	2.3
2001	77,834	Likely Below Average [2/]	-
2002	65,635	Possibly Below Average [3/]	-
2003	87,642	Possibly Poor [4/]	-
2004	24,079	No Recruits Yet	-
2005	27,305	No Recruits Yet	-

1/ Consolidation of Table A1 from : *Klamath River Fall Chinook Stock Recruitment Analysis.* Salmon Technical Team. Pacific Fishery Management Council, September 1, 2005. 1991-2005 spawner data from Table B-4, *Review of 2005 Ocean Salmon Fisheries* , Salmon Technical Team, February 2006.

2/ Only the 5-year-old age class is yet to be accounted from the 2001 brood year. 5-year-old fish are typically a minor portion of the adult recruits, it appears likely the total recruits produced from this brood will be below average (1979-2000 Avg. =126,317).

3/ The 4 and 5-year-old age class have yet to be accounted; the current postseason estimate of 3-year-old ocean abundance (209,493) is below average (1985-2005 Avg. =377,232).

4/ The return of 2-year-old jacks in 2005 was the second lowest on record; 2-year-old jacks are used to forecast 3-year-old abundance in the same brood year.

PFMC
3/30/2006

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

March 31, 2006

Mr. Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Dear Don,

NOAA Fisheries is concerned about the long-term status of Klamath River fall Chinook (KRFC), and the consequences that additional fishing in 2006 may have on the spawner escapement. At the same time, we are very aware and concerned about the severe consequences to the fishing community associated with fishery closures of the magnitude described under Option III. Given the past two years failure of KRFC to achieve its escapement floor and the prospect that the lower KRFC returns may continue into the near term, we believe it is imperative to consider the best available scientific information relative to the risks to the KRFC to produce maximum sustained yield on a continuing basis. From our perspective, the critical task is to address the biological question that requires that the long-term health of the stock not be decreased by the proposed fisheries consistent with the terms of the Magnuson-Stevens Act related to overfishing.

To address this question, we asked our Northwest and Southwest Fisheries Science Centers to review all relevant information in the available time. In particular, we asked the scientists at the Science Centers whether there were escapement levels below the 35,000 floor that would not jeopardize the capacity of KRFC to produce maximum sustainable yield on a continuing basis. The Science Centers' report is enclosed for your information. Based on this review, NOAA Fisheries finds that the risk to KRFC associated with the fishing regime proposed in Option II is too great to justify an emergency rule that satisfies the requirements of the Magnuson-Stevens Act. As a consequence, we suggest the Council focus its effort on shaping seasons around Option III that add little or no KRFC impacts.

Also, as you may now be aware, NOAA has determined that the best available information did not support a declaration of a commercial fishery failure in 2005. The commercial fishery failure could not be justified because the commercial fisher's sales of salmon either met or exceeded the average value of recent years because the price to fishermen was high and offset the effects of the more restrictive fishing seasons. Community impacts also were assessed in the disaster consideration and the 2005 economic activity generated by commercial salmon fishing in each of the ports affected by the restrictions was found to be near the average of recent years. However, because of

the circumstances related to KRFC in 2006, NOAA Fisheries will analyze the projected impacts of the 2006 ocean salmon management measures as soon as those measures are established. Governor Kulongoski of Oregon has informed us that he is sending a letter to the Secretary of Commerce requesting a commercial fishery failure declaration for 2006 due to a fishery resource disaster.

We remain committed to working with the Council to address the difficult management issues before us this year.

Sincerely,

D. Robert Lohn
Northwest Regional Administrator

Rodney R. McInnis
Southwest Regional Administrator

Enclosure

Comments on the Klamath River Fall-Run Chinook Salmon Fisheries Management Plan Escapement Floor

29 March 2006

Prepared by: Northwest Fisheries Science Center
Southwest Fisheries Science Center

Introduction

This report is in response to a request from the Northwest and Southwest Regions to comment on escapement levels developed by the Pacific Fishery Management Council (PFMC) to regulate ocean fisheries in response to run forecasts for the 2006 return year. These forecasts predict that the escapement goal of naturally-spawning fall-run Chinook salmon will fall below the established floor of 35,000 adults. This report reviews previous information used to establish the current escapement floor, discusses the potential biological effects of escapements below the floor, and evaluates uncertainty in the forecasted ocean abundance and spawning escapement estimates.

Klamath River Chinook Salmon – Historical Perspective

Early in the development of West Coast fisheries the Klamath River was identified as a major supplier of salmon, and (at the time) distinct in that it was one of only four coastal rivers that had both spring and fall runs of salmon (Collins 1892). In 1888, the in-river salmon catch was estimated at 734,000 pounds[1], 50,000 fish at 15 pounds each (Collins 1892, Snyder 1931). Snyder (1931) estimated that between 1915 and 1928 the peak in-river catch was 1.2 million pounds, (1915) with an average catch of 725,000 pounds. Additionally, near shore fisheries from Ft. Bragg to Eureka and the California border captured nearly 2.1 million pounds of salmon annually from 1916-1928 (Snyder 1931), although it is unclear what proportion of these fish would have originated from the Klamath River. Myers et al. (1998) provided a peak run estimate, based on cannery pack, of 130,000 fish in 1912. The contribution of hatchery origin fish to these run estimates (hatcheries have been present in the Basin for over 100 years) is thought to be minimal given the state of hatchery culture at the time. At best, during the late 1800s and early 1900s hatchery production may have replaced the adults removed from the river for broodstock purposes. In estimating the historical run size for the Klamath River Basin it is also important to consider that habitat degradation, primarily related to mining activities, had already impacted much of the basin during the years of the catch estimates provided above. Moyle (2002) estimated that the total fall run to Klamath River may have been as large as 500,000.

Population Structure and Biological Diversity

The Klamath River Basin includes two major rivers: the Klamath and Trinity. Anadromous access to much of the basin has been lost due to the construction of impassible dams, the Iron Gate Dam (1962, RKm 306) on the Klamath River and the Lewiston and Trinity Dams (1963, RKm 249) on the Trinity River. This habitat loss primarily affected spring-run populations in the Trinity, and Klamath Rivers, although some fall-run Chinook salmon habitat was also lost. More significantly for the fall-run populations, these dams have altered the flow dynamics and temperature profiles for

[1] The catch is listed only as salmon and likely include Chinook and coho salmon and steelhead. Where a break-down of these catches is available, it is clear that the majority of fish were Chinook salmon.

downstream mainstem areas. These changes may be correlated to increases in mortality among outmigrating juvenile salmon, in part from exposure to *Cerratomyxa shasta* (Bartholomew 2005).

Fall-run Chinook salmon spawning aggregations exist throughout the basin. While the current conservation objective and fishery management plan considers fall-run fish as belonging to a single stock, it is almost certain that the Klamath fall Chinook "stock" contains multiple distinct populations (effectively the Demographically Independent Populations defined in McElhany et al. 2000). The sustainability of the Klamath fall Chinook stock complex will depend on the preservation of locally-adapted populations that possess sufficient diversity to adjust to short-term and long-term environmental variability.

Snyder (1931) described significant differences in the spawning time for fall-run Chinook salmon in different tributaries to the Klamath River. These differences suggest diverse local conditions, and the potential for reproductive isolation. Barnhart (1995) used geographic, genetic, and life history information to identify fall-run metapopulations in the Klamath River Basin. According to Barnhart twelve "breeding populations" of fall-run Chinook salmon exist, clustered within four "metapopulation" units (Table 1).

Table 1. Population structure for Klamath River Basin fall-run Chinook salmon, as proposed by Barnhart (1995)

River System	Metapopulation	Breeding Population
Klamath River	Upper Klamath River	Iron Gate Hatchery and Bogus Creek
		Upper Mainstem Klamath River
		Shasta River
	Middle Klamath River	Scott River
		Salmon River
		Upper Middle Klamath Tribs
		Lower Middle Klamath Tribs
Trinity River	Lower Klamath/Trinity River	Lower Klamath River Tribs
		Lower Mainstem Trinity, below South Fork
	Mainstem Trinity River	South Fork Trinity River
		Upper Mainstem Trinity River
		Mainstem Trinity River

The criteria utilized by Barnhart (1995) are similar those used by NOAA Fisheries Technical Recovery Teams to identify demographically independent populations. Given the size of the Klamath River Basin, identifying twelve "populations" for the fall-run life history comports with the findings of the coastal and Lower Columbia TRTs (Bjorkstedt et al. 2005, Myers et al. 2006). Barnhart (1995) based his findings, in part, on a preliminary genetic population survey by Gall et al. (1990). Subsequent analysis of an expanded California Chinook salmon genetic data set provided further support to the population structure presented by Barnhart (NMFS 1999). On a course scale, populations in the Klamath River Basin clustered together relative to other samples from coastal and Central Valley populations. Within the Klamath River Basin, populations from the Klamath and Trinity River were distinct from one another, and on a finer scale there

appears to be significant population structure within each of the major tributaries (Figure 1).

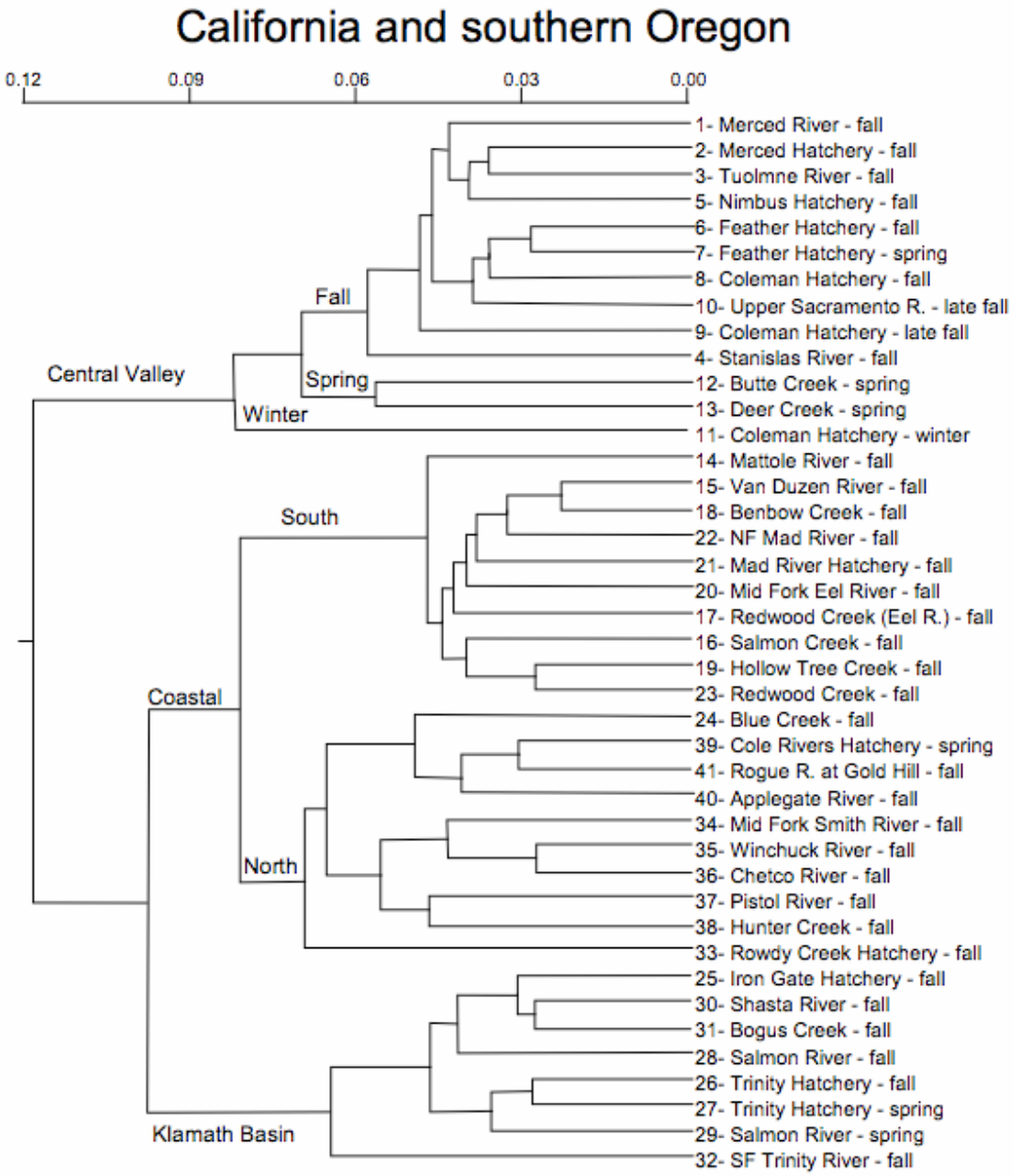

Figure 1. UPGMA dendrogram based on 34 allozyme loci from 41 composite samples of Chinook salmon from California and southern Oregon. (From NMFS 1999).

Banks et al. (2000) reported on genetic variation among 14 different spring and fall-run populations from the Klamath River Basin using DNA microsatellite analysis. This study confirmed that there are genetic differences between populations within the Klamath River Basin (Figure 2). Population structure appears to be more closely associated with geographic location rather than life history characteristics (i.e. run timing). Additionally, among population differences are evident for several life history characteristics (timing, spawn timing, age structure) in the Klamath River (Shaw et al. 1997, Andersson 2003, KRTAT 2006b). These life history differences are indicative of local adaptation and

suggest that basin-wide productivity and overall fitness are likely to be related to the conservation of these locally adapted populations.

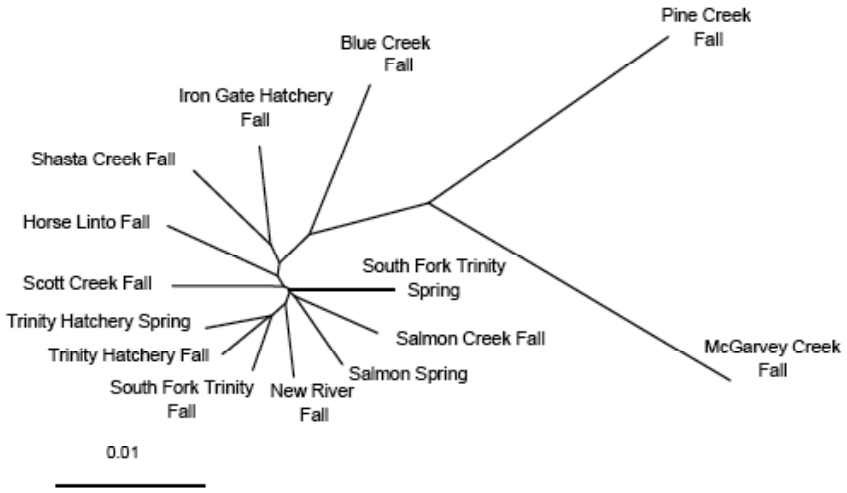

Figure 2. UPGMA phenogram for population samples from fall and spring Chinook of the Klamath and Trinity basins characterized at 7 microsatellite loci. (Reproduced from Banks et al. 2000).

If several populations of fall-run Chinook salmon exist in the Klamath River Basin then it is necessary to consider the demographic characteristics of each population in order to assess the potential effect of the proposed fishery management options. Based on information in Andersson (2003) and KRTAT (2006b) the typical spawning escapement of many of these populations is a thousand fish or less, with some in the low hundreds. Numerically small breeding populations are at higher risks from both demographic and diversity factors. When extended over several generations the effects of small population size on diversity may be compounded (through the cumulative effects of inbreeding). Additionally, small sized populations are more susceptible to introgression by hatchery-origin spawners. If naturally spawning hatchery fish exhibit lower reproductive fitness (see Berejikian and Ford 2004) then the affected population would exhibit a decrease in productivity. Returns to the hatcheries constitute a substantial portion (~40%) of the total run in the Klamath (Figure 3a). The proportion of hatchery-origin fish on the natural spawning grounds averaged 22% for the 1991 to 2004 return years (Figure 3b). The effect on productivity of this level of hatchery contribution cannot be estimated with currently available data; however, it is of some concern that the hatchery contribution is largest during years of low escapement, 48% in 2004, increasing the potential for the loss of local adaptation in populations. The recovery of coded wire tags (CWTs) from fish on natural spawning grounds suggests that the degree of hatchery influence varies considerably from population to population (KRTAT 2006b), with those natural

spawning areas geographically proximate to hatcheries having the relatively high rates of CWT recovery.

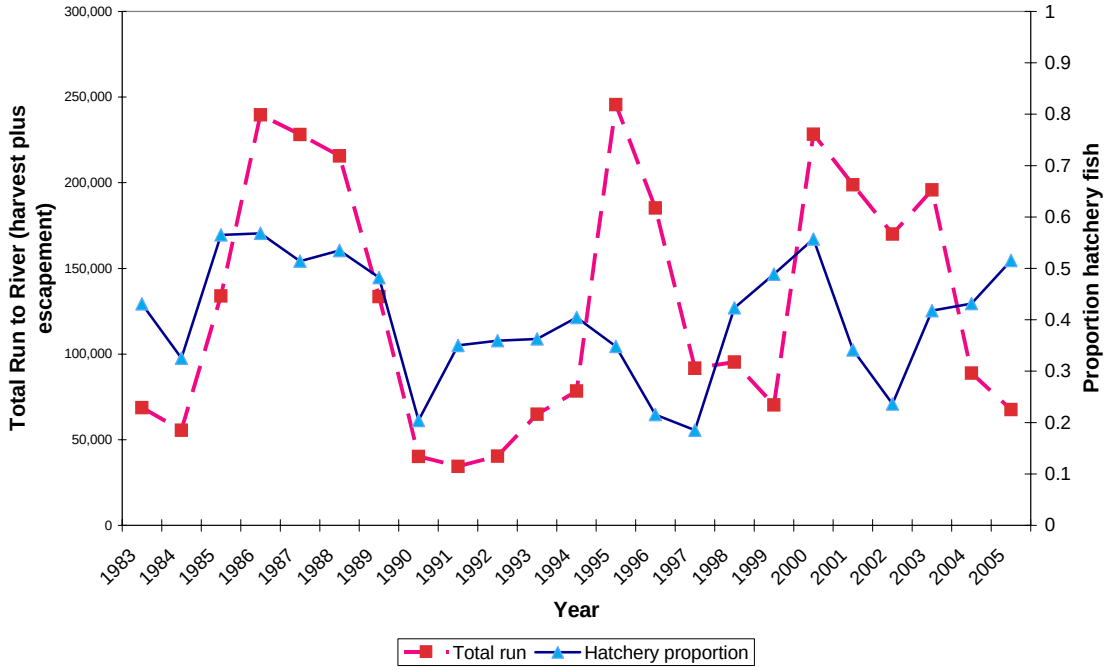

Figure 3a. Total fall-run Chinook salmon return to the river (dashed line) and the proportion of the run that returned to the hatcheries (solid line with triangles) (Data provided by M. Palmer-Zwahlen, CDFG).

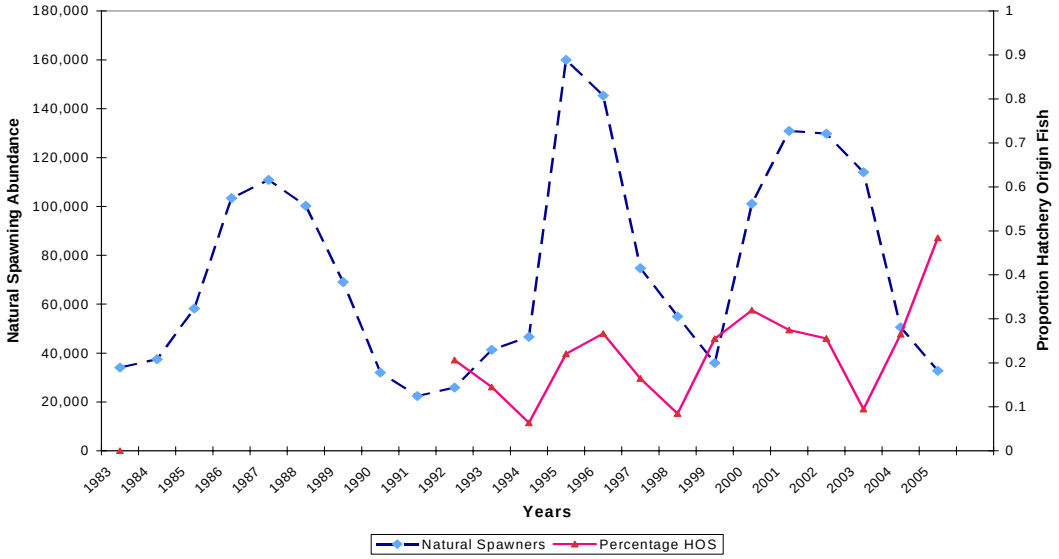

Figure 3b. Naturally spawning fall-run Chinook salmon (dashed line), and the proportion of natural spawners originating from a hatchery (HOS) (solid line with triangles). HOS estimates are based on the expansion of CWTs recovered from natural spawning grounds. (Data provided by M. Palmer-Zwahlen, CDFG).

In recent years, those natural spawning areas with a high proportion of hatchery origin spawners (i.e. Bogus Creek and mainstem Trinity River) also contribute substantially to overall escapement (Table 2). Hatchery-origin spawners will mask the decline of some populations and bias productivity estimates if not specifically accounted for.

Table 2. Hatchery and natural spawner escapement to the Klamath River Basin for the 2004 return year relative to the location of hatcheries. Distances are calculated as river kilometers from the mainstem spawning reach or tributary mouth to the hatchery in the Klamath and Trinity rivers. Data from KRTAT 2006b.

Survey Site	Hatchery Return	Natural Spawners	Distance to Hatchery (RKm)
Klamath River			
Iron Gate Hatchery	11,519		0
Bogus Creek		3,788	Adjacent
Klamath River (IGH to Shasta)		4,420	Adjacent - 21
Shasta River		962	21
Klamath River (Shasta R to Indian Creek)		822	21 - 145
Scott River		467	75
Salmon River		626	199
Klamath River (above Reservation)		557	145 - 233
Yurok Reservation		208	233 - 305
Trinity River			
Trinity River Hatchery	13,443		0
Trinity River (above Willow Ck Weir)		15,655	Adjacent - 138
Trinity River (below Willow Ck. Weir)		1,029	138 - 186
Trinity Tributaries (above Reservation)		333	47 - 147
Hoopa Reservation Tributaries		186	146 - 186
	24,962	29,053	

For example, returns of fall-run Chinook salmon to the Shasta River, a tributary which does not receive a large influx of hatchery-origin spawners, have declined substantially in the last 80 years (Figure 4). Similar declines in other historically important natural spawning areas, such as the Scott, and Salmon Rivers in the Klamath River Basin, may be obscured by an increasing hatchery contribution to basin-wide escapements.

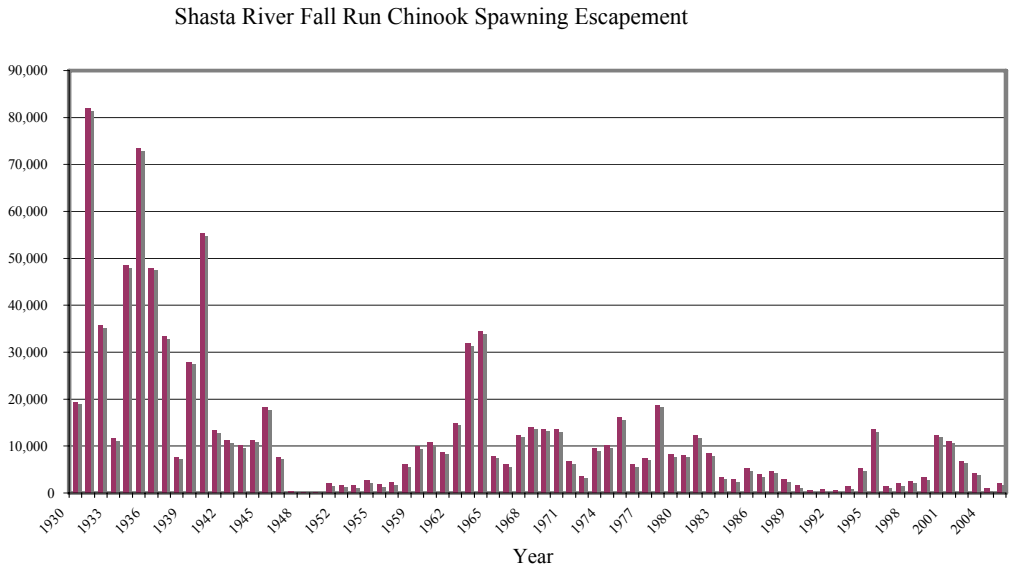

Figure 4. Chinook salmon fall run escapement to the Shasta River from 1931 – 2005. Data from STT 2006a.

Contribution of C. shasta to Chinook mortality in the Klamath River

The myxosporean parasite *Ceratomyxa* shasta was first described in 1948 (*Ceratomyxa* shasta Fact Sheet - 2002). The reported distribution of *C.*shasta in the Western part of the United States has reportedly expanded, however this may not be a true increase in distribution since the parasite does not colonize new habitat readily. Instead it is possible that new occurrences may be the result of more sensitive detection techniques. Currently these new techniques include a highly sensitive polymerase chain reaction (PCR) assay (Palenzuela, et al., 1999; Bartholomew, et al., 2004). Because of this, it is possible that *C.* shasta has been endemic in the Klamath system for a much longer time frame.

The intermediate host of *C.* shasta is the fresh water polychaete worm, Manayunkia speciosa (Bartholomew, et al., 1997). There is no documented proof that the parasite is transmitted horizontally (fish to fish) or vertically (fish to egg). The route of infection is through contact with the infectious stage, the actinospore, which is released from the polychaete into the water column. There is evidence of differential host susceptibility (Bartholomew, 1998), and differential life stage susceptibility. Out-migrating juvenile Chinook salmon experience higher mortality due to *C.* shasta than returning adults (W. Cox, CDFG, personal communication).

Based upon a review of available data on the impacts of *C.* shasta in the Klamath River, it is clear that infection potential is enhanced when water temperatures are high, water flow is low, conditions optimal for growth of *M.* speciosa. This results in a significant increase in the numbers of infectious *C.* shasta during this time. Within the Klamath, live box experiments with sentinel species (rainbow trout and Chinook salmon) show that while habitat is available throughout the river, surveys using the *C.* shasta PCR detection method support findings that there is a greater incidence below Iron Gate Dam (Oregon State University. 2004). This is based on multiple year survey records from 2001 through 2003 (Foote, et al., 2002, 2003, 2004). However, it is not yet known whether these results represent a true trend. In order to determine if variable temperature and flow patterns are directly correlated with pathogen prevalence, it will be necessary to conduct such surveys over several field seasons. These studies will be aided by the development of a new quantitative PCR detection method for the parasite (Hallet, et al., in press).

In terms of relevancy to the determination of Klamath River fall Chinook escapement goals, there is insufficient data to suggest that higher escapement would be counterproductive because of river conditions. While it is true that river conditions over the past several years have led to increased *C.* shasta incidence, the perception that most returning adults will succumb to *C.* shasta prior to spawning is unsupported by any available data. *C.* shasta can be a significant contributor to pre-spawning mortality but this is at least partially dependent on conditions that delay migration prior to spawning, and additional studies in this area are needed. However there are examples of pathogens causing significant pre-spawning mortality. The 2002 pre-spawning fish kill in the lower

36 mile stretch of the Klamath River (34,000 fish including 32,553 fall Chinook) was determined to be the ciliated protozoan parasite *Ichthyopthirius* mulitfilis (Ich) in combination with the bacterium *Flavobacterium* columnare (columnaris). Predisposing factors included the combination of high fish density and warm water conditions (California Department of Fish and Game 2004).

Fisheries Management Context

The Pacific Fishery Management Council's conservation objectives for natural salmon stocks are based on estimates for achieving Maximum Sustainable Yield (MSY) or a MSY proxy (PFMC 2003). The collection of these conservation objectives is the conservation portion of the Council's overall strategy for management of West Coast salmon stocks, the Salmon Fishery Management Plan (FMP).

The Salmon FMP (PFMC 2003) and Amendment 9 (PMFC 1988) define the Klamath River fall Chinook conservation objective as "33-34% of potential adult natural spawners, but no fewer than 35,000 naturally spawning adults in any one year." The Council may make a change to the escapement rate portion of the Klamath conservation objective if a comprehensive technical review by the STT provides conclusive evidence that justifies a modification. However, the 35,000 natural spawner floor portion of the conservation objective can only be changed by FMP amendment and this makes consideration of this portion of the conservation objective more rigid.

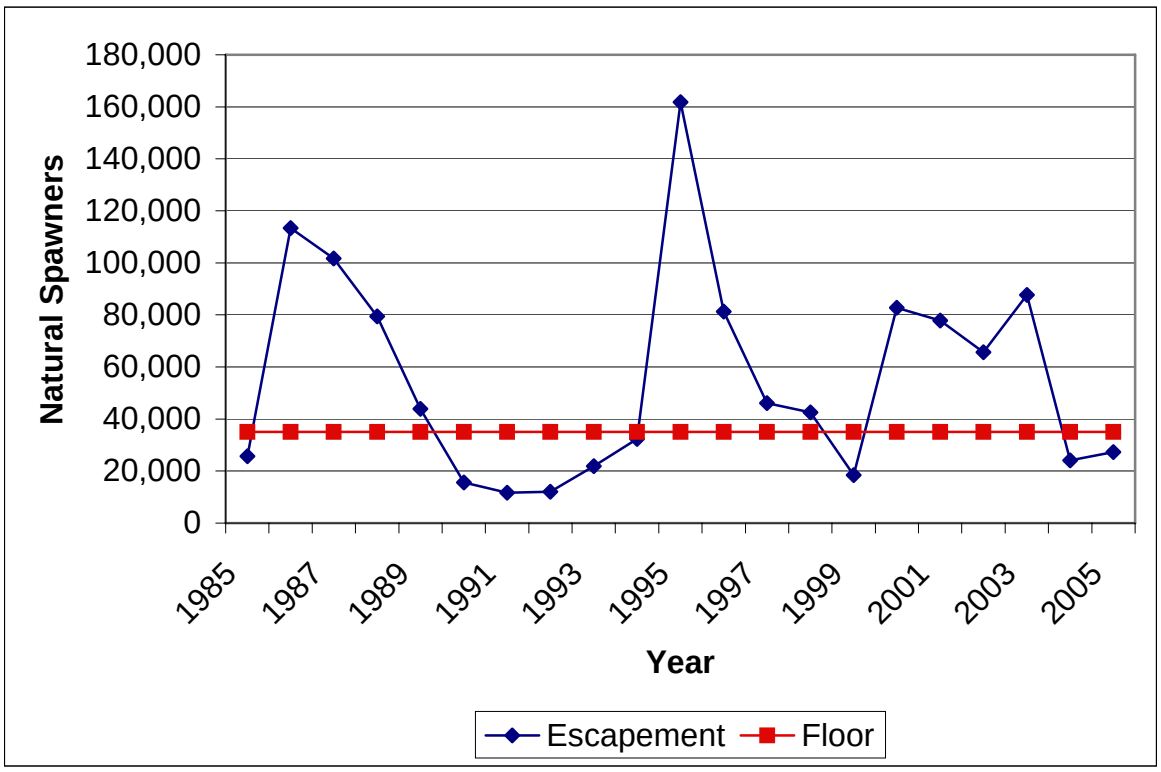

Figure 5. Klamath River fall Chinook natural spawner escapement and the 35,000 spawner floor. (from KRTAT 2006a).

The 35,000 fish Klamath floor has been reviewed and reconfirmed several times. Originally in 1978, the Council adopted a Klamath Chinook salmon spawner escapement goalof 97,5000 natural spawners based on observed returns to the basin in the early 1960s (CDFG 1965). Because the Klamath stock was depressed, the Council (PFMC 1985) implemented an interim rebuilding schedule beginning in 1983 which called for an average river run size of 68,900 adults during the 1983-1986 period, to be followed by 20% increases every four years. However, in 1983-1984, the river return failed to meet these goals and the Council responded by closing the Klamath Management Zone (KMZ) troll fishery in 1985 and directing work that lead to Amendment 9 of the Salmon FMP (PFMC 1988). Amendment 9 analyzed four alternative conservation objectives; three of which included a spawning floor of either 43,000 or 35,000 natural spawners. The rationale provided for the spawning floor requirements was "to prevent extremely low escapements in any one year" and "to protect against extended periods of depressed natural production and failure to meet hatchery escapement needs." In 1992, the inriver spawning escapement fell below the 35,000 spawner floor for the third consecutive year (Figure 5) and this prompted the closure of most of the California commercial fishery and portions of the recreational fishery. Further consideration of the appropriateness of the 35,000 spawner floor (Prager and Mohr 1999 and STT 2005b) concluded, "The results of this study suggest that the present spawner floor of 35,000 is prudent."

Klamath Assessment Description

Sampling Programs for Klamath River Fall-Run Chinook Samon

West coast ocean fishery sampling programs are comprehensive with respect to coverage (coastwide) and estimation (well-defined random sampling designs). The sampling rate is approximately 20% of all landings in all salmon-directed fisheries. Estimated harvest is stratified by fishery type (commercial, recreational), geographic area, month, and year. For Klamath River fall Chinook, which are impacted by ocean fisheries from Cape Falcon, OR, to Point Sur, CA, there are seven geographic areas ("major port areas") with fishery-area-month-specific regulations and associated sampling that used to manage the fisheries impacts on Klamath River fall Chinook: northern Oregon (NO), central Oregon (CO), Oregon KMZ (KO), California KMZ (KC), Fort Bragg (FB), San Francisco (SF), and Monterey (MO). CWT salmon recoveries in the sample, after expanding for the sampling fraction and hatchery mark-rate, are used to estimate stock-age-specific harvest, and in the case of Klamath River fall Chinook in particular, are used to reconstruct cohorts and thereby estimate various fishery and biological vital rates for the stock.

The annual Klamath River fall Chinook run is also comprehensively sampled with respect to coverage (river fisheries harvest, natural area spawning escapement, hatchery returns) and estimation (well-defined random sampling designs). Age-composition is estimated for all strata based on the analysis of sampled scales (over 10,400 scales were read in the 2005 run assessment, of which over 1,500 were from known-age CWT fish

allowing for scale reader bias-adjustment). CWTs are recovered in all strata and expanded for the sampling and mark-rate as in the ocean fishery sampling.

Population Assessment Based on Historical Data

The CWT recoveries along with the age-specific accounting of river returns for the hatchery and natural stock enable cohort reconstructions (a form of virtual population analysis) to be performed on all hatchery release groups and on the natural stock. For each hatchery release group, the cohort reconstruction leads to estimates of ocean harvest rates (fishery-area-month-age-year-specific), maturation rates (age-year-specific), and ocean preseason abundance (age-year-specific). For the natural stock, with the assumption that ocean fishery contact (encounter) rates are equivalent for hatchery and natural fish (conditional on being alive at the time), the natural stock age-specific returns enables cohort reconstruction of this stock component as well, and estimates of maturation rates (age-year-specific) and ocean preseason abundance (age-year-specific). There are now over twenty years for which all of these quantities have been estimated. Together, the estimated fishery and biological vital rates and quantities form the basis of ocean fishery forecast models (e.g. the Klamath Ocean Harvest Model (KOHM)), stock-recruitment analyses, estimation of release-to-age-two survival rates of hatchery fish (indicator of early-life marine survival), etc.

Models for Forecasting Fishery Impacts and Spawner Escapement

Ocean preseason age-specific abundance is forecast using "sibling regressions" of "age(a) preseason ocean abundance" (from cohort reconstructions) versus "age(a-1) river return" (same cohort).

The KOHM is used annually by the PFMC to forecast the impacts of ocean and river fisheries on the Klamath River fall Chinook stock, and the expected number of natural area spawners as a result of these fisheries. All model components are estimated using over twenty years of estimates provided by the cohort reconstructions. The KOHM assesses the impacts of ocean salmon-directed fisheries between Cape Falcon, OR, and Point Sur, CA (Klamath River fall Chinook recoveries to the north and south of this region are rare). Fishery management of this area primarily takes the form of time-area openings and closures rather than through the use of quotas. This form of management requires an impact forecast model that is spatially and temporally explicit consistent with the management sub-areas and time-periods for which regulations are developed. The KOHM contact rate submodel forecasts are fishery-area-month-age-specific over the seven contiguous management areas between Cape Falcon, OR and Point Sur, CA. These contact rates are defined as the fraction of the month-specific cohort ocean-wide abundance contacted (legal size and sub-legal size) by a fishery. The KOHM contact rates depend on the expected level of fishing effort under the regulations proposed (a separate KOHM submodel forecasts effort as a function of, e.g., days-open), which is fishery-area-month-specific.

The KOHM contains an ocean length-at-age submodel to estimate the fraction of contacted fish that exceed the minimum size limit (and are thus harvested versus released), which is month-age-specific. The KOHM thus forecasts fishery-area-month-

age-specific impact rates (fraction of the month-specific cohort abundance killed by a fishery) as (contact rate) * [p + (1-p)v + d.o], where p is the fraction of fish that are legal size, v is the release mortality rate, and d.o is the ocean "drop off" rate (additional deaths expected from fishing due to predation of fish from the gear, etc).

The KOHM river submodel components include a fishery harvest submodel. River tribal and recreational fisheries are managed by quotas, and the model assumes that these fisheries take their full harvest allocation (i.e. quota expected to be met). The age-specific harvest expected under these quotas is forecast as a function of the fishery-specific gear selectivity. Fishery-specific impacts are then forecast as (harvest) * (1+d.r), where d.r is the fishery-specific river "drop off" rate. The age-specific number of adults which will spawn in natural areas (vs. hatcheries), are forecast using sibling regressions of "age(a) proportion natural areas" versus "age(a-1) proportion natural areas the year prior" (same cohort).

The KOHM thus consists of projecting the age-specific (ages 3, 4, 5) preseason ocean forecast abundance through the various ocean fisheries by month. Fishery-area-month-age-specific ocean impact rates are applied to the age-month-specific ocean abundance. Following that an age-month-specific natural mortality rate is applied, and this alternating cycle of fishery impact rates followed by natural mortality rates is applied from September 1 (of the previous year) to the end of August (current year). At the end of August, the age-specific river return is forecast as the age-specific number of surviving fish times the age-specific expected maturation rates. River fisheries age-specific expected harvest impacts are deducted from the age-specific river return abundances, and of the remaining fish are apportioned into the hatcheries and natural areas according to the age-specific expectations for the proportion of fish in natural areas. The sum of the age-3, age-4, and age-5 natural area number of spawners is the forecast number of adult natural area spawners; a quantity which must exceed 35,000 under the current PFMC FMP conservation objective for this stock.

Forecast and Modeling Uncertainty

The KOHM assesses the impacts of ocean salmon fisheries in a spatially- and temporally-specific framework. Due to this structure, there are great many model inputs with accompanying variation associated with the inputs. Much of the variation associated with the individual input variables is described in various reports (KRTAT 2006a, 2006b) and we will only describe the most significant ones below.

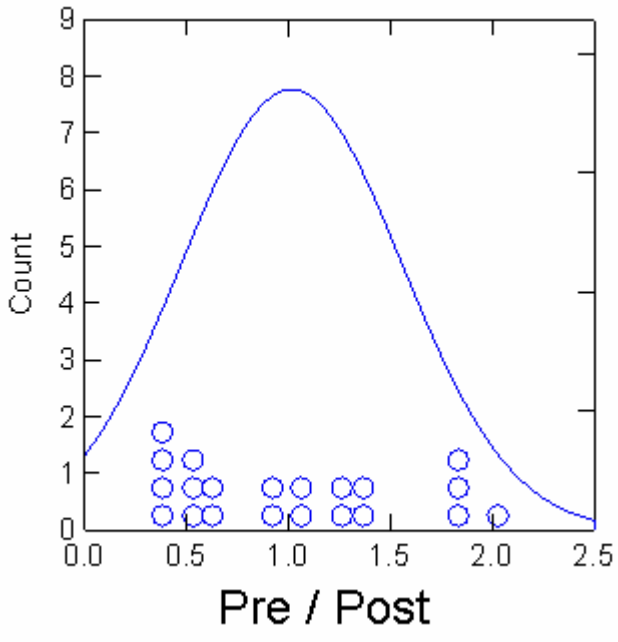

Figure 6 -- Distribution of pre/post season total adult abundance estimates. Data from Table 2, KRTAT 2006a.

Preseason and postseason Klamath fall Chinook ocean abundance estimates can be considerably different from each other (Figure 6). Preseason and postseason estimates can differ from 2 to 100%, and in recent years postseason estimates have been consistently higher than the preseason forecasts (Figure 7). Since the preseason forecasts are the starting point of the KOHM analysis, a matrix of the differences between preseason and postseason abundance estimates would the appropriate starting point for a Monte Carlo analysis of uncertainity in providing management advice. Differences between preseason forecasts and postseason estimates of ocean abundance seem to be autocorrelated (Figure 7), perhaps due to fluctuations in ocean conditions, even though over the entire time-series the forecast appears to be unbiased. Also, there is a consistently large divergence between preseason and postseason estimates prior to 1989. Methods were different during this period, so it is difficult to determine the underlying cause.

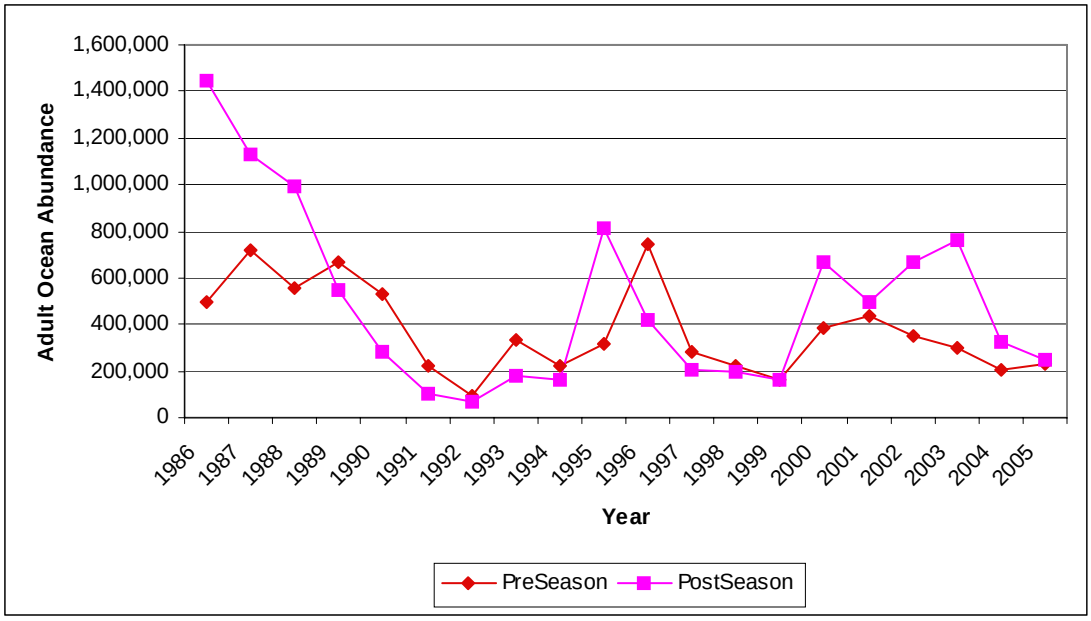

Figure 7. Comparison of preseason and postseason ocean abundance estimates of Klamath fall Chinook salmon. (from KRTAT 2006a)

A similar comparison of preseason and postseason ocean harvest estimates is instructive about model performance of this principal model output (Figure 8). In two of the last three years, ocean harvest has been substantially underestimated by the KOHM. One reason for this underestimate is the dramatically higher fisheries contact rates for Klamath River fish, particularly in some months off San Francisco and Central Oregon (shown for commercial fisheries in Figure A-1 from STT 2006c). This is particularly so in San Francisco area, where the largest Chinook fishery off Washington, Oregon, and California occurs. In the last three years, contact rates (the large dots in the Figure A1) have been extremely high, often double or triple their average value. It is the Klamath Chinook salmon caught in this fishery, as well as the Oregon fishery, that has driven up harvest rates for Klamath Chinook salmon and reduced escapement to below the 35,000 spawner floor. Why these contact rates have increased in the last three years is unknown, but the underestimation of harvest has contributed substantially to the failure to reach escapement in the past two years.

The uncertainty in harvest predictions would suggest that a more biologically-conservative estimate may be warranted. For example, assuming that the past performance of the preseason total adult abundance estimator is a good predictor of the future, the middle 50% (i.e., likely) confidence interval for the 2006 total abundance estimate is 80,175 – 195,730 (110,000/1.372 – 110,000/0.562, from Table 3, 110,000 adult prediction from KRTAT 2006a).

Assuming the estimated escapement varies similarly, actual likely escapement estimates would range from 10,100 – 24,600 under PFMC Option 1, 13,700 – 33,500 under PFMC Option 2, and 18,500 – 45,200 under Option 3, based on the KOHM point estimates under these options of 13,800, 18,800, and 25,400, respectively (STT 2006c). In fact, due to additional uncertainty in the model converting ocean abundance to escapement, the range of likely escapement values is probably even larger.

Table 3 – Estimated quantiles for pre/post season total adult abundance estimates. Data from Table 2 KRTAT 2006a.

Quantile	PRE/POST
1 %	0.340
5 %	0.368
10 %	0.402
20 %	0.525
25 %	0.562
30 %	0.586
40 %	0.628
50 %	0.950
60 %	1.121
70 %	1.354
75 %	1.372
80 %	1.503
90 %	1.824
95 %	1.937
99 %	2.030

In conclusion, the KOHM inputs are probably the best estimated of any ocean salmon fishery impact model used off of Washington, Oregon, and California, due the long-term, comprehensive data collection for the Klamath stock. However, all of these inputs contain some, sometimes considerable, uncertainty. The cumulative effect of this uncertainty in the input parameters results in considerable uncertainty about forecasted abundance and escapement

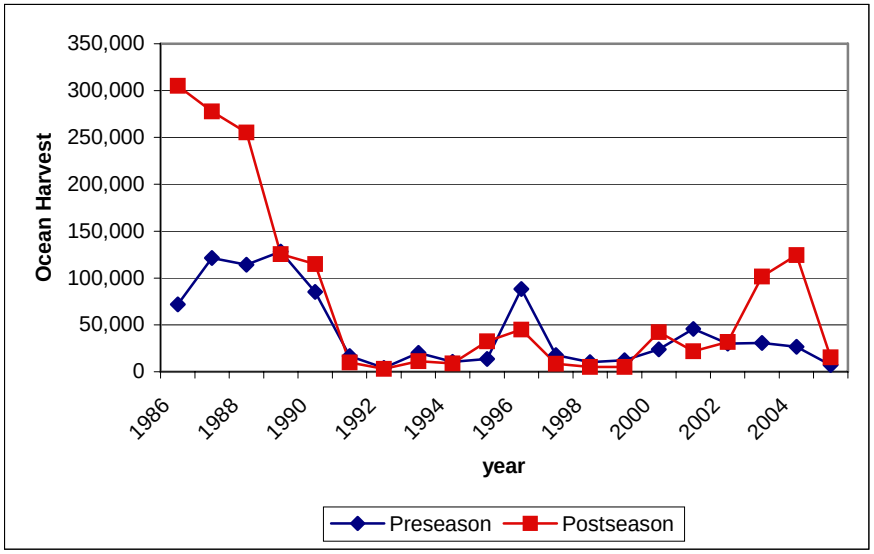

Figure 8. Preseason and postseason ocean harvest estimates of Klamath River fall-run Chinook salmon (from KRTAT 2006a)

Spawner-Recruit Analysis

Several spawner recruit analyses have been conducted on Klamath River fall Chinook salmon with remarkably similar results even as the amount of model complexity increases. The Klamath River Technical Team (KRTT) conducted the first Klamath spawner recruit analysis (KRTT 1986). They constructed a fishery stock dynamics model, which coupled a Ricker stock-recruitment function (Ricker, 1975) to a cohort life-cycle model that included ocean and river fishery mortality. The model was used to simulate stock dynamics and resulting fishery harvests over a 40-year period at various combinations of ocean and river harvest rates. The results of the KRTT modeling work depend on a number of parameters, but are most sensitive to the stock productivity (Ricker α) parameter. The KRTT assumed that $\alpha = 7$ for recruitment at age 3, based on a review of the literature and on the available data for the Klamath basin. The results indicated that a brood escapement rate of about 35% would maximize the long-term average annual harvest of the stock. KRTT recommend the adoption of an annual minimum escapement floor based on the finding that a floor was needed "to protect the production potential of the resource in the event of several consecutive years of adverse environmental conditions." They analyzed the results of modeling three consecutive years of poor recruitment (20% of expected recruitments) followed by 7 years of expected recruitments. The average catch over the 10-year period was 17% greater with the spawner floor in place, and the KRTT concluded that "recovery was quicker, more complete, and led to higher yields with the spawner floor of 35,000 fish." In addition, the KRTT also felt that the 35,000 spawner floor was justified based on their expert opinion by noting that "a minimum spawning escapement of 35,000 natural spawners would be higher than any natural escapement since 1978, [escapement] levels that have been widely regarded as too low for the basin."

The second modeling study of the relationship between MSY and a spawning floor was conducted by the Klamath River Technical Advisory Team (Prager and Mohr 1999). The modeling approach used here was similar to that used by the KRTT (1986) but included several improvements: 1) the Ricker spawn-recruit model was based on a direct fit of Klamath River basin data, as was the stochastic component of recruitment; 2) the model was started with "Pre-Season" estimates of stock abundance rather than the dynamic pool model; and 3) fishery harvest and mortalities were determined using a harvest model (Prager and Mohr 2001). The model was run subject to the 33% escapement rate conservation objective, and spawner escapement floor values ranging from 15,000 to 50,000 adults in increments of 5,000 were examined. The model results were: 1) the fitted Ricker parameters were remarkably similar to those used in the KRTT (1986) model; 2) average catch was strongly reduced by increased variance in stock abundance forecasts, and 3) average catch increased slightly as the spawner floor was raised from 15,000 to 35,000, but decreased with higher floor values. The KRTAT study (Prager and Mohr 1999) concluded that "The results of this study suggest that the present spawner floor of 35,000 is prudent."

The final modeling study of Klamath River fall Chinook stock recruitment (STT 2005a) was largely an attempt to look at environmental and habitat impacts on the stock recruit relationship. The analyses looked at three alternative models: 1) the standard Ricker model that uses parent spawner abundance as a predictor of subsequent brood recruitment; 2) a model that used both parent spawner abundance and a computed

measure of post-freshwater-rearing survival; and 3) a meta-analyses of Ricker stock recruitment relationships for Chinook salmon populations using accessible watershed area as a predictor of subsequent recruitment. Model 1 used essentially the same configuration and data as the KRTAT report (Prager and Mohr 1999)and resulted in very similar results, suggesting an MSY spawner level of 32,700 fish. The data did not fit the model terribly well as only 3.7% of the total variation in recruits was explained as a function of spawners.

Model 2 is similar to Model 1, but also included a measure of post-freshwater-rearing survival. The post-freshwater-rearing survival estimate was computed for hatchery fish to cover the period from the onset of juvenile outmigration in May-June, through the end of August of that same year. No comparable data were available for natural fish. Analyses of the spawners versus post-freshwater-rearing survival suggested that high recruits per spawner at low spawner abundance were partially accounted for by high post-freshwater-rearing survival in those particular years. The converse was also true: low recruits per spawner at high spawner abundance was partially accounted for by low post-freshwater-rearing survival in those particular years (Figure 9). Based on our understanding of *C. shasta* epidemiology, fish infected in freshwater during emigration do not succumb to the disease until after saltwater entry. Survival estimates for specific broodyears may reflect, in part, the effects of in-river exposure to *C. shasta*. The Model 2 results suggested a productivity coefficient 30% lower than that estimated under Model 1 under average survival conditions, and assuming these average survival conditions results in an estimated MSY spawner level of 40,700. Model 2 fit the observed data significantly better than Model 1 and explained a much higher fraction (50%) of the variation in recruits. This strongly suggests the (well established) notion that environmental variation plays a critical role in determining salmon survival and hence the number of recruits per spawner.

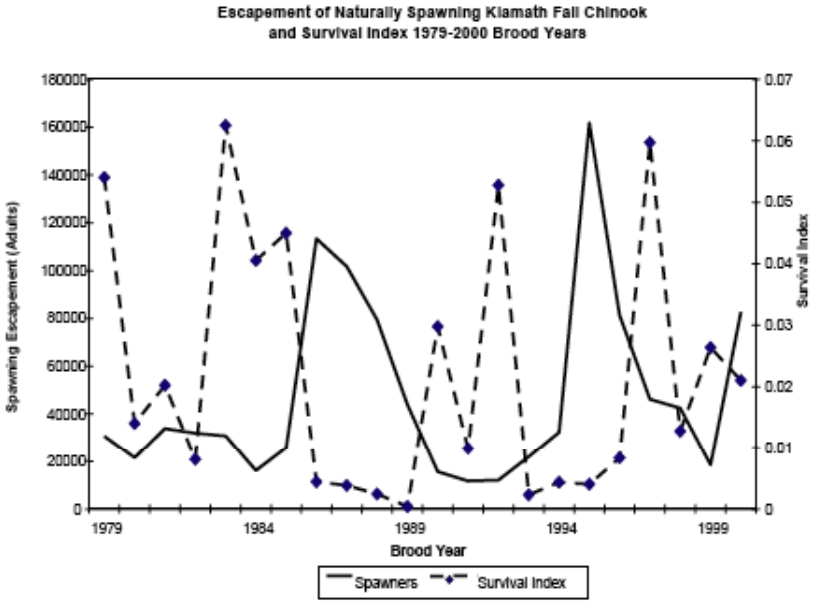

Figure 9. Natural spawning escapements and early life-stage survival index for Klamath River fall-run Chinook salmon the 1979 to 2000 brood years. Figure reproduced from STT (2005a).

The STT's Model 3 was a meta-analysis-based method under development by the Canadian Department of Fisheries and Oceans that estimates spawning escapement associated with MSY, maximum production, and unfished equilibrium based on accessible watershed area. Its development and application to the Klamath Basin are relatively complex and are not dealt with here, but the results of the Model 3 analysis suggests a MSY spawner level of 70,900, nearly double the other models' estimates.

Because of evidence of serial correlation in the preseason and postseason ocean abundance estimates and the greatly improved fit of Model 2 compared to Model 1, we also investigated incorporating ocean conditions into the spawner-recruit analysis. A rich literature has developed over the past decade showing how changes in the ocean environment due to climate change affect the productivity of various fish stocks (Beamish and Bouillon 1993; Mantua et al. 1997; McFarlane et al. 2000). In the case of Pacific salmon, climate-induced changes in survival rates have been identified for nearly all species over a large portion of their range (e.g., Peterman et al. 1998; Welch et al. 2000; Pyper et al. 2001, 2002; e.g., Lawson et al. 2004) . Recently, incorporating the effects of ocean conditions on Pacific salmon has proven useful in a forecasting context (e.g., Logerwell et al. 2003; Scheuerell and Williams 2005). In light of this, we examined whether including data on ocean-climate conditions in the stock assessment for Klamath River fall-run Chinook salmon would improve model fits to the data.

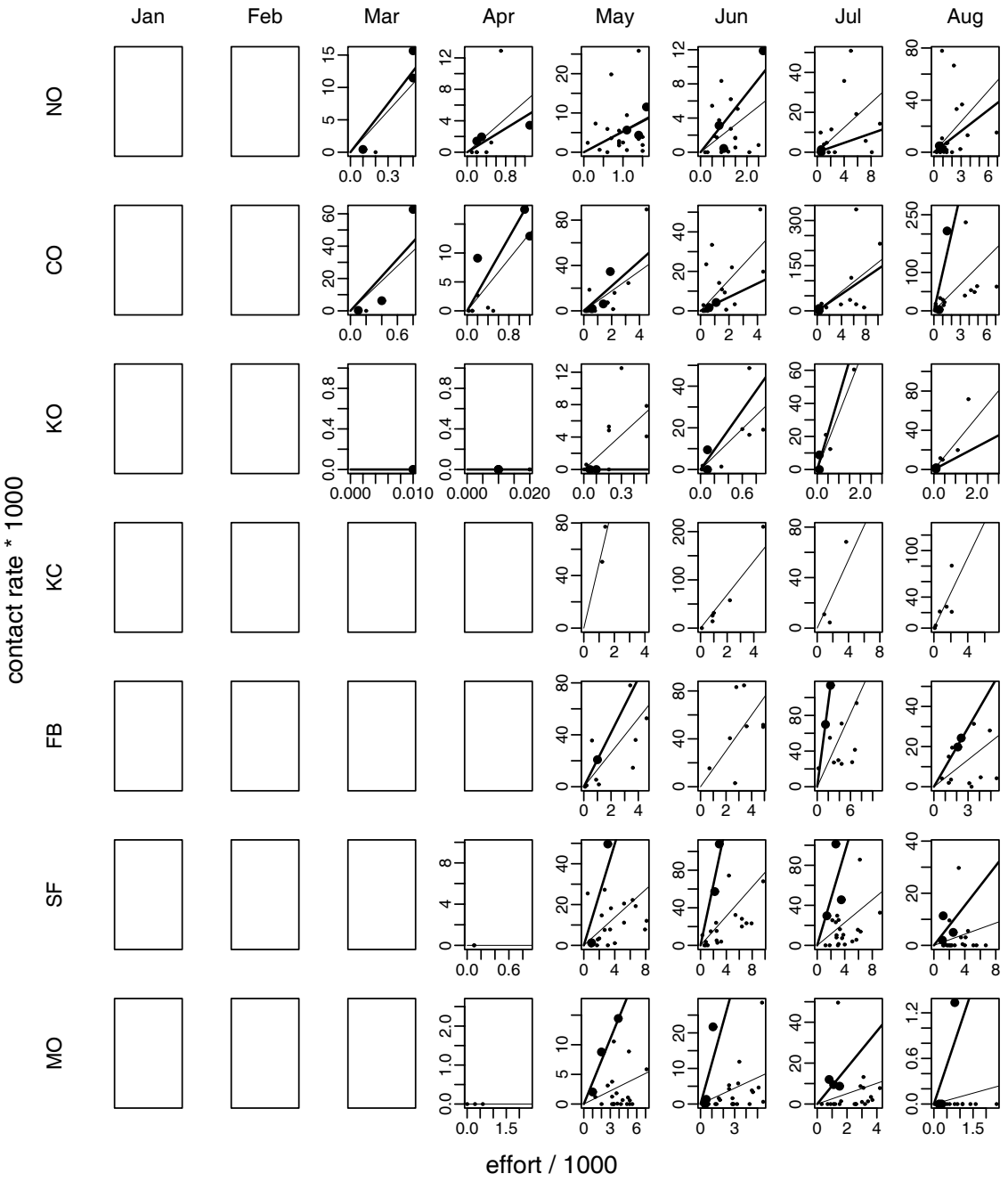

Figure A–1. Klamath River fall Chinook commercial age–4 contact rate versus effort for KOHM management areas by month, Jan–Aug. Large dots are 2003–2005 postseason values; small dots are 1983–2002 postseason values; thick lines are predictors based on the 2003–2005 data; thin lines are KOHM default predictors based on all data (1983–2005). See Appendix A text for further details.

From Appendix A-1, STT 2006c.

An exhaustive search over all possible ocean-climate indices was not possible due to time constraints. Nor was there adequate time to examine additional model structures other than the Ricker spawner-recruit model. As an example, however, we included the winter Pacific Decadal Oscillation (PDO) index as a predictive term. Our model took the form

$$R_{BY} = \alpha' S_{BY} \exp[-\beta S_{BY} + \phi PDO_{BY+1 \to BY+2} + \varepsilon] \text{ and } \varepsilon \sim \mathrm{N}(0, \sigma_{\varepsilon}^2), \qquad \text{(M2)}$$

where the winter PDO index was measured during the first winter at sea and equals the average of November and December of the brood year + 1 and January through March of the brood year +2 (i.e. five months in total). The first year at sea, particularly the winter, is generally thought to be the most important in determining year class strength (Pearcy 1992; Gargett 1997; Beamish et al. 1999; Beamish and Mahnken 2001). We obtained the PDO indices from http://jisao.washington.edu/pdo/PDO.latest.

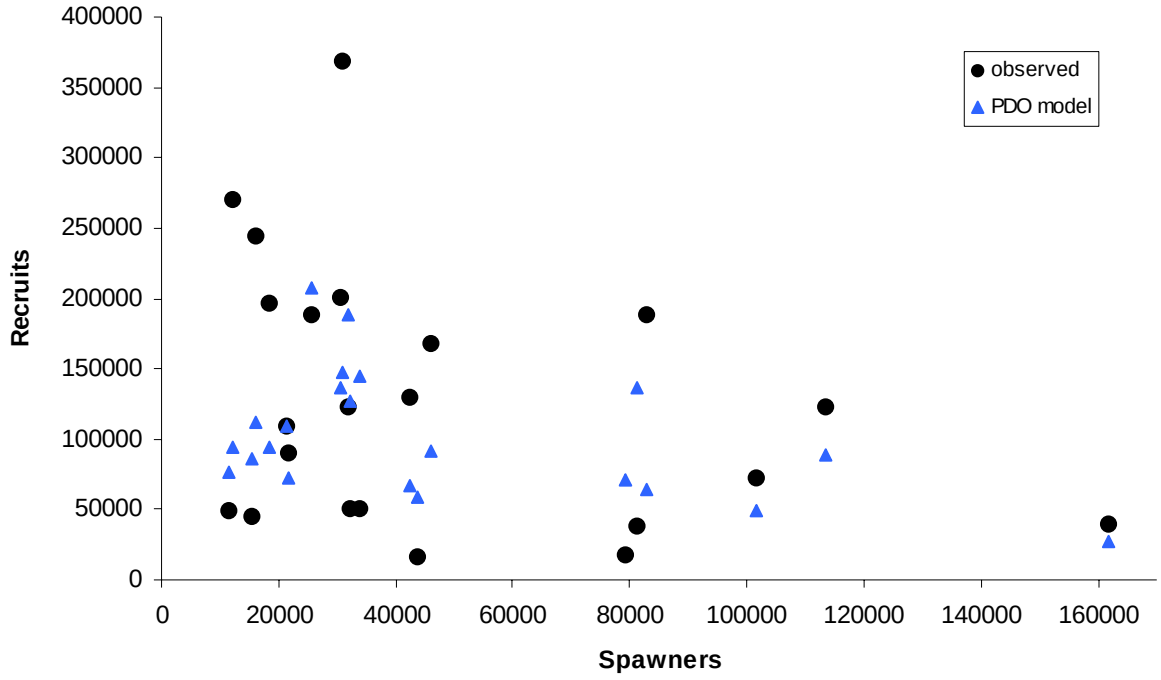

Figure 10. Spawner-recruit data for Klamath River fall Chinook salmon (dots) and the estimated Ricker stock-recruit relationship that includes a term for winter PDO (triangles).

Model parameters were estimated from the linear form of the equation using maximum likelihood analyses. The estimated model with climate effects fit the data much better (r^2 = 0.12, where r^2 is the squared correlation between the observed and predicted R values) than the simple Ricker function (r^2 = 0.037), but still rather poorly overall (Figure 10), and not nearly as well as the STT (2005a) Model 2 (r^2 = 0.50). We found modest evidence in support of the climate model over the simpler spawner-only model (likelihood ratio test, χ^2 = 2.0, df = 1, P = 0.050), suggesting that climate impacts could be important to fall Chinook from the Klamath River as well.

Risk of Recruitment Failure

A variety of risk factors concerning the productive capacity and viability of KRFC have been identified and discussed in this report. Because of the complexity and inter-relatedness of these factors, and the lack of necessary data, it would be difficult (if not impossible) to construct a quantitative model that would accurately determine "escapement levels below the 35,000 floor that would not jeopardize the capacity of KRFC to produce the maximum sustained yield on a continuing basis." However, it is possible to construct a quantitative model to assess the more immediate risk to KRFC natural production (recruitment) as a result of a low spawning escapement in 2006. The risk that will be evaluated is the probability that the recruitment resulting from the natural spawner escapement levels currently being considered for 2006 will be the lowest on record.

The most appropriate stock-recruitment model for KRFC that currently exists for evaluating this probability is STT Model 2 (STT 2005a, equation 2.1), in which recruitment R depends on the early-life survival rate s in addition to parental spawning abundance S:

$$R = \alpha S e^{-\beta S + \theta(s-\bar{s}) + \varepsilon}, \ \varepsilon \sim N(0, \sigma_\varepsilon^2).$$

This model implies that $\log(R \mid S, s)$ is a normally distributed random variable

$$\log(R \mid S, s) \sim N\left(\log(\alpha S) - \beta S + \theta(s-\bar{s}), \sigma_\varepsilon^2\right),$$

and thus for any particular benchmark level of recruitment R^*, the probability that $R \le R^*$ is

$$P(R \le R^* \mid S, s) = \Phi\left(\frac{\log(R^*) - \left[\log(\alpha S) - \beta S + \theta(s-\bar{s})\right]}{\sigma_\varepsilon}\right),$$

where $\Phi(\cdot)$ is the cumulative probability distribution function of a $N(0,1)$ variable. The relative risk, ρ, of any particular level S compared to the floor level, S = 35000, is

$$\rho(R^*, S, s) = P\left(R \le R^* \mid S, s\right) \Big/ P\left(R \le 35000 \mid S, s\right).$$

The lowest KRFC recruitment currently on record was taken as the benchmark for this risk analysis: R^* = 16200 (STT 2005a, brood year 1989). Considered spawner escapements included the floor value (35000) and those associated with the current PFMC options (STT 2006c): 25400 (Option 3), 18800 (Option 2), and 13800 (Option 1). Two values for the early-life survival rate[2] based on the 22 year time series of estimates reported by the STT (2005a, Table B1) were evaluated: (a) the average rate observed

[2] The survival rate time period in question is May–September, 2007.

($s = \bar{s}$ = -4.4225, log-scale), and (b) the poorest rate observed[3] (s = -7.7600, log-scale). The Model 2 parameter estimates used in the analysis were those reported by the STT (2005a, Table 2): $\hat{\alpha}$ = 5.9218, $\hat{\beta}$ = 1.7567e-05, $\hat{\theta}$ = 0.54327, $\hat{\sigma}_{\varepsilon}^2$ = 0.38821. The risk analysis results are provided in Table 4.

The results are contingent on STT Model 2 being an adequate characterization of the KRFC stock-recruitment relationship, and do not account for the fact that the stock-recruitment model parameters are estimates rather than known values. The analysis also assumes that the *S* values considered are in fact options that can be realized precisely (not subject to forecast error). As a consequence of this uncertainty, the actual range of probabilities of a recruitment failure is likely larger than indicated by the results in Table 4. The results suggest that if the 2007 early-life survival conditions are average (or good), the risk of the 2006 escapement yielding a recruitment lower than any on record is very small, but that the risk is substantial if these survival conditions are poor. Under poor conditions, the risk associated with the Option 1 and Option 2 spawner levels is 80% and 50% greater, respectively, than that for the floor level escapement. While the time-period for the early-life survival rate explicitly incorporated into Model 2 is May–September (downstream migration and early ocean residence) of the year following spawning, if survival conditions are poorer than average during the juvenile freshwater rearing phase (e.g., due to poor water quality, and/or a high *C. shasta* infection rate), this too would effectively reduce the Model 2 productivity coefficient and thereby increase the level of recruitment risk beyond that reported in Table 4.

Table 4. Recruitment failure risk analysis results. See text for description of terms.

Early-life survival s	Spawning escapement S	Risk $\hat{P}(R \le 16200)$	Relative risk $\hat{\rho}$
Average: -4.4225	Floor: 35000	0.1%	1.0
	Option 3: 25400	0.2%	2.2
	Option 2: 18800	0.5%	5.4
	Option 1: 13800	1.4%	14.3
Poor: -7.7600	Floor: 35000	42.3%	1.0
	Option 3: 25400	52.0%	1.2
	Option 2: 18800	63.6%	1.5
	Option 1: 13800	75.9%	1.8

Model Assumptions and Diversity Concerns

Prager and Mohr (1999) and STT (2005a) emphasize that the use of spawner-recruit analyses to estimate S_{MSY} necessarily involves many simplifying assumptions that may not incorporate all of the biologically important information that should be considered when evaluating the long-term viability of a population. Two important issues that are

[3] We note that the poorest observed *s* in fact coincided with the lowest observed recruitment (brood year 1989).

not fully captured in the spawner-recruit analyses are stock structure and the influence of hatchery produced fish on the estimates of stock productivity. These two issues are discussed further below.

The modeling analyses assumed that all of the populations of Klamath River fall Chinook could be modeled as a single stock with identical dynamics. Based on genetic, life history, ecological, and geographic characteristics there appear to be a number of distinct fall-run populations in the Klamath River Basin. Management of fall-run Chinook salmon in the Basin as a single unit may subject smaller populations to risk of extirpation. Furthermore, management of the fall run should also consider effects to the ESU, which includes spring-run fish, specifically the Salmon River spring run which persists at a relatively low abundance level. These concerns were also emphasized by Prager and Mohr (1999, pg. 29):

> *Lumping together all stocks in the Klamath-Trinity basin was done for lack of extensive data on substock structure on any scale. The relative strength of subpopulations can be assumed to vary through time, and thus there is an element of risk specific to using stock-wide management goals. Under such goals, it may be possible to seriously deplete, or even extirpate, certain local subpopulations and thereby reduce the long-term productive potential of the overall stock. This possibility would seem to call for caution in implementing a positive minimum spawner-reduction rate (a de minimis fishery), if one is indeed implemented*.

While sufficient information may be available to identify component populations in the Klamath River Basin, an expanded monitoring effort would be required to develop population-specific demographic models to evaluate harvest effects on the individual populations.

The spawner-recruit models also necessarily make some simplifying assumptions about hatchery fish. Although the models track natural (spawning gravel) escapement separately from escapement back to the hatcheries, the natural escapement itself consists of a varying fraction of hatchery-origin fish that may not have the same productivity as natural origin salmon. There is very limited information on the origin of naturally spawning fall-run fish in the Klamath River Basin. Escapement levels only consider natural spawners, regardless of origin. Changes in the proportion of hatchery-origin fish on the spawning ground may have a substantial effect on the relative productivity of specific broodyears, given the relatively extensive history of artificial propagation in the basin and the large number of known hatchery-origin fish returning to the river. Hatchery-origin fish can bias productivity estimates upward by inflating the apparent number of recruits produced. Conversely if hatchery fish have relatively lower fitness than wild fish, the proportion of hatchery fish on the spawning grounds may be an important, and unanalyzed, factor explaining variation in recruitment.

Summary and Conclusions

Uncertainty in adult abundance forecast. An important issue to consider in evaluating the consequences of alternative fishing strategies impacting the Klamath stock is the uncertainty around the estimated adult abundance. On average the pre-season forecasts are good predictors of ocean abundance, but there is considerable variation around these estimates, and it is not unusual for the post-season abundance estimate to be 50% higher or lower than the pre-season estimate. There is also uncertainty in the harvest model. For example, in the last two years, the post-season harvest rate estimate has been approximately three times higher than the preseason forecast. This underestimate has contributed to the recent failures to meet escapement. A similar degree of error in the 2006 preseason harvest rate forecast coupled with abundance on the low end of the likely forecast range could result in a very low escapement.

Spawner-recruit analyses. Several studies, most recently Prager and Mohr (1999) and STT (2005a) have estimated S_{MSY} (spawning escapement generating maximum sustainable yield) for the Klamath fall Chinook stock using stock-recruit models. Depending on the specific model used, point estimates for S_{MSY} range from 32,700 – 70,900 (STT 2005a). The lower 90% confidence interval for the lowest point estimate was 25,800 (STT 2005a). The model favored by the STT as being the most realistic produced an S_{MSY} of 40,700.

There have been large recruitments in the past from spawning escapements below 35,000 (e.g., brood years 1979, 1983, 1984, 1985, 1992, and 1999). There have also been poor recruitments (e.g., brood years 1981, 1990, 1991, and 1994). The STT (2005a) found that annual variability in early life-stage survival explained a large part of this variability in recruitment. The additional modeling done for this current report emphasizes this conclusion. In particular, using the spawner-recruit model favored by the STT (Model 2), we estimated that the probability of a recruitment lower than any previously observed was 52%, 64%, and 76% for escapements of 25,800, 18,800, and 13,800, respectively, assuming poor early marine survival conditions. If average survival conditions are assumed, the estimated probability becomes 0.2%, 0.5%, and 1.4% for the same three assumed spawning escapements.

Expectations for future conditions. The Klamath Chinook stock is not unusual in its sensitivity to river and ocean conditions. Considerable research over the past decade has shown how climate-induced variation in ocean and freshwater ecosystems can influence the population dynamics of salmon stocks across the west coast of North America (e.g., Beamish and Bouillon 1993, Mantua et al. 1997, Peterman et al. 1998, Scheuerell & Williams 2005). These shifts in productivity and subsequent catch rates are often abrupt and occur at non-regular intervals (Mantua et al. 1997). While there has been some recent success in forecasting climate-driven changes in marine survival rates of salmon (e.g., Logerwell et al. 2003, Scheuerell and Williams 2005. Lawson et al. 2004), our ability to forecast future changes is relatively poor, with typical lead times of less than one year. This suggests a real need for precaution when assessing the status of salmon stocks and projecting future trends in their abundance under various harvest management plans.

Some of the current problems with the status of KRFC are attributed to a series of low flow/low water conditions in the basin. Poor conditions in the river have likely contributed substantially to the low abundance and spawning escapement this year. Conditions in 2005 appear to be better and conditions in 2006 may be better still. However, the spawning escapement of Klamath fall Chinook is made up primarily ofage-3 and age-4 fish. This year's forecast for age-3 abundance is the lowest on record (STT 2006b). The age-2 fish in this year's run will be from the 2004 brood year, before river conditions began to improve. This does not bode well for the 2007 and 2008 return years. Any additional ocean fishing mortality will not only reduce this year's spawning run, but will also reduce the spawning runs for the next couple of years.

Diversity and stock structure. There are consequences to the diversity (and therefore viability) of the Klamath stock at low escapements that are not captured in the spawner-recruit analyses that have been used to estimate S_{MSY}. In particular, although the Klamath fall Chinook have been modeled and treated as a single population, multiple lines of evidence strongly suggest that there are multiple distinct demographic stocks of Chinook salmon that spawn in different parts of the Klamath. It is highly unlikely that these stocks all have the same population dynamics and managing at the aggregate level will result in high harvest rates on the less productive stocks. Most of the potentially independent spawning populations in the Klamath currently have spawning escapements well below 1000, and those populations that have larger spawning escapements are adjacent to hatcheries and likely receive large numbers of hatchery strays.

Long-term changes in stock productivity. The Klamath stock complex is almost certainly less productive now than it was under "pristine" conditions, and perhaps even than it was 20 years ago. It is possible that the stock complex's productivity will continue decline if climate change and/or local environmental degradation leads to lower water quality. For example, Bartholow (2005) analyzed available temperature and flow data and concluded that mean water temperatures in the Klamath have been rising since the 1960's. The California Department of Fish and Game (2004) concluded that elevated water temperature was a factor in the high level of pre-spawning mortality experienced by Klamath fall Chinook salmon in 2002. The productivity of the stock has been highly variable, but may be on a downward trend. From one perspective, it is tempting to argue that as watershed capacity declines, escapement goals should decline as well. From another perspective, not meeting the escapement floor for a stock that is already impacted by a deteriorating environment will only lead to a more rapid loss of the stock's ability to produce maximum sustained yield on a continuing basis.

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SALMON TECHNICAL TEAM (STT) UPDATE ON ESTIMATED IMPACTS IMPACTS OF MARCH 2006 OPTIONS

Comments on the Effects of Escapements below the Floor on the Long Term Yield of Klamath Fall Chinook

The STT concludes that the failure to meet the spawning escapement floor for Klamath fall Chinook for the third consecutive year poses a significant risk of reducing the long-term yield from this stock.

The risks presented by fishing below the floor for Klamath fall Chinook are difficult to quantify, but are nonetheless apparent. While it is possible to construct quantitative probability models based on the distribution of variability around the spawner-recruit relationship, those calculations depend on the assumptions built into the spawner-recruit model, the distribution of deviations from that model, and there having been no fundamental changes in that relationship between the time period when the data were collected and the present.

In the past, spawning escapements below the floor have occurred. Some of these have resulted in the recruitment of strong year-classes, and some of these have resulted in recruitment of weak year classes. The differences between these outcomes have been the result of environmental conditions encountered by the adult spawners, the eggs, and juvenile salmon. Years that produced strong recruitments benefited from favorable conditions in the river for spawning and outmigration, and marine conditions favorable for survival and growth.

In addition to the natural escapement being forecast to be below the escapement floor, this year's age-3 ocean abundance forecast is the lowest on record. This is believed to be largely the result of extremely poor river conditions brought on by a combination of drought and water management decisions in the Klamath basin beginning in 2002 and persisting for several years. Additional ocean fishing mortality will not only further reduce the escapement this year, but will also reduce the abundance of age-4 and age-5 adults next year.

In 2005, river conditions were apparently a little better, and 2006 has the prospect of being better still. The 2004 brood migrated to sea in 2005 and would have benefited from the improved river conditions. However, in 2005 ocean conditions were poor, with warm water, a delayed spring transition, and apparent low productivity. There were numerous reports of seabird die-offs and breeding colony failures. Available information suggests that the 2006 ocean conditions appear to be at least as unfavorable as they were in 2005, and may have deteriorated. We cannot forecast what conditions will be like for the 2006 spawning run, and their progeny. However, given the recent history of this stock and unfavorable indicators of ocean productivity, it would not be prudent to expect a strong year-class to recruit from low escapement this year.

The long-term impacts of current depressed abundance of Klamath River fall Chinook are exacerbated by the distribution of natural spawning escapement. Although for fishery management purposes naturally spawning Klamath fall Chinook are treated as a single stock,

Klamath fall Chinook are actually comprised of many discrete populations in the mainstems and tributaries of the Klamath and Trinity rivers. Genetic evidence indicates that these populations are genetically distinct, and thus are demographically independent.

In 2005, escapement to the Klamath basin was 56,200 adult spawners. Of this number, 49% or 27,800 adults returned to the two hatcheries in the basin. Of the remaining 28,400 adults that spawned in natural areas, 83% or 23,500 spawned in Bogus Creek, the mainstem Klamath River above the Shasta River, and the mainstem Trinity River above the Willow Creek weir. These are all areas adjacent to the hatcheries and receive substantial numbers of hatchery strays. Natural spawning areas that are relatively free of hatchery influence accounted for only an estimated 4,900 spawners (17% of the natural spawning escapement or 9% of the total escapement). Of these distinct natural spawning areas, only the Shasta River had an escapement of more than 1,000 adult spawners. As total natural spawning escapement is further reduced below the 35,000 floor, the risk increases of extirpation of some of these independent populations. If any of these distinct local populations are lost, the productive capacity of the basin would be reduced until locally adapted populations could be re-established.

Methods Considered by the STT to Model Effects of Landing Limits on the Harvest of Klamath River Fall Chinook.

At the Council's March meeting, the STT was asked to evaluate the effectiveness of weekly landing limits as a management measure to reduce impacts in fisheries south of Cape Falcon on Klamath fall Chinook. In Options I and II, adopted for public comment at the March meeting, fisheries south of Cape Falcon contain a mix of landing limits that include: 50, 75, and 100 fish per boat per week (or open period).

In response to the Council's request, the STT considered several methods of modeling weekly landing limits, including:

I. Empirical estimates

The KOHM could be used to forecast Klamath impacts as a direct function of weekly landing limits, if methods could be found to quantify the effect of such limits on Klamath contact rates per effort and on the amount of effort expected per day open. This method would require a means to generate new base-period values for contact-rates and a means to project effort under a weekly landing limit. The California troll fishery has not operated under weekly landing limits so historical data are not available.

Some landing data are available for areas and periods when daily landing limits were in effect. However, these data were not collected under controlled conditions, may be confounded with other factors, and would be of very limited value for use in projecting either catch or effort under weekly landing limit restrictions. The only fishery south of Cape Falcon since 2000 with landing limits was in Fort Bragg in July, 2003. That month Fort Bragg had a 150 fish trip limit from the 3rd-14th and unrestricted fishing from the 18th - 31st. Both of these fisheries were sampled at a rate of about 20% of the pounds landed. During the first half of the month with a trip limit, 34,500 fish were landed and 86 Klamath CWT's were recovered. During the unrestricted fishery, 36,000 fish were landed and 77 Klamath CWT's were recovered. The trip limits appear to have had no effect on total landings or on Klamath impacts. The lack of observed effects may have occurred because the trip limits were relatively high and there were no restrictions on the number of landings that individual vessels could make during the open period.

We concluded that the data required to implement this method simply do not exist.

II. Historical fish-ticket data.

Oregon provided an analysis of fish ticket data from 2003, 2004, and 2005 in a report titled "Effects of Weekly Landing Limits on the Oregon Troll Fishery" by Eric Schindler dated March 20, 2006 . Using the landing dates and pounds of Chinook landed by individual vessels, Schindler estimated the number of Chinook landed each week by each boat that made landings. He then calculated the percentage of vessel-weeks that would have been affected by weekly landing limits in each year, and the reduction in numbers of fish landed in each year. Weekly landing limits evaluated included 50, 75, 100, 150, 200, and 250.

Calculating reductions in this manner assumes that weekly landing limits do not affect the number or behavior of the boats that participate in the fishery. It also depends on the catch rates observed during 2003-2005 which are influenced by Chinook abundance and distribution. Schindler also asserted that if landing limits were imposed, some boats would elect not to participate in the fishery and the savings would be somewhat greater than he calculated in the base period.

California DFG conducted a similar analysis of fish ticket data and considered the effects of landing limits of 50 and 100 fish per week. The effect of weekly landing limits was analyzed using sample and landings data for fisheries in California during 2003, 2004, and 2005. Catch per vessel day by boat week and port was estimated from fishing effort, total landing weight, average weight per fish, and average days fished per delivery. The estimated catch by each vessel during any week in the absence of landing restrictions was then computed. For a given vessel, if the observed catch during a week exceeded the weekly landing limit, then the difference could be interpreted as inferred savings. This procedure was completed for each KOHM area, month, and year (2003-2005) using weekly landing limits of 50 and 100 fish per vessel. Under a 50 fish per week restriction, inferred savings in fish and effort was 59% and 26%, respectively. For the 100 fish per week restriction, inferred savings in fish and effort was 37% and 14%, respectively.

The DFG analysis directly estimated reductions in effort while the the ODFW analysis estimated the percentage of trips that would have been affected by trip limits. The percentage of trips affected by trip limits cannot be directly used in the KOHM, but presumably inferred reductions in effort could be estimated for Oregon as well.

Concerns with the application of this method include:

1) Inability to predict effort response to landing limit restrictions – Neither method addresses the need to forecast effort response. To avoid effort transfer between ports, landing limits would have to be applied uniformly to all ports.
2) Changes in fleet structure – The historical data from which the relationship between days open and days fished was collected in the absence of weekly landing limits. Such limits would not affect all boats uniformly, so the fleet structure would be expected to change, but how is unknown.
3) Latent effort – Landing limits could affect the market price of fish. There is a large number of boats that fish very little or not at all. If the price of fish were to increase in response to limitation of supply due to landing limits, there could be a substantial increase in the number of boats participating in the fishery or the number of days fished by these boats relative to the 2003 through 2005 open seasons.
4) Monitoring and Enforcement - Weekly catch limits will tend to encourage unreported landings and increase the difficulty of monitoring and enforcement. With limited catch, and more time in port, there would be less incentive for fishermen to deliver their catches to buyers, and greater incentive for direct retail sales. This could make it harder to collect reliable CWT recovery data essential for Council management.

III. Maximum likely catch.

Fisheries north of Cape Falcon have used landing limits to reduce the rate of catch in fisheries operated under quotas or catch ceilings, where fisheries may need to be closed on short notice by inseason action. In these cases, WDFW has estimated the maximum likely catch by multiplying the number of vessels recently participating in the fishery by the daily catch limit to estimate daily catch. The STT considered using similar methodology to estimate the maximum likely catch under different weekly catch limits. This method estimates the maximum number of fish that would be expected to be landed under a given landing limit by assuming that there would be no change from last year in the number of boats participating in the fishery and that all boats would achieve their limit. This number would be compared the expected catch without landing limits and, if the maximum catch with a landing limit is less than the expected catch without a landing limit, the reduction in expected landings would be used to prorate the effort forecast in the KOHM.

This method is straightforward and could be easily implemented. Preliminary calculations indicate, however, that it would predict little, if any, reduction as a result of catch limits. In addition, it would still be subject to the same concerns outlined in method II above..

Recommendations

Our concern with the methods considered above is that untested assumptions must be made about participation in fisheries under landing limits and how relationships between effort and catch may change. An alternative approach is outlined below.

Catch guidelines or caps on total catch in a fishery can be used to control Klamath impacts. Although the precision of the estimate of the total catch level associated with any given level of Klamath impacts is reduced in areas where the ratio of Klamath stock catch to total catch is small, the total allowable catch in a cell can be directly modeled in the KOHM. Within a catch ceiling, landing limit and possession limits can be used in an attempt to reduce daily harvest. This balances the unknown risks associated with the implementation of catch limits noted above with the generally accepted idea that weekly landing and possession limits should in fact extend the time necessary to achieve a given catch level. If the Council imposes possession and landing limits on a catch ceiling fishery and they attain the ceiling sooner than expected, it would be necessary to take inseason action to close the fishery. The fishery would generate new data on contact rate per effort and effort per day open under catch and possession limits which could eventually lead to the development of data to base model impacts from the use of landing limits.

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON THE SUPPLEMENTAL NATIONAL MARINE FISHERIES SERVICE REPORT

Dr. John Stein summarized for the Scientific and Statistical Committee (SSC) the document "Comments on the Klamath River Fall-Run Chinook Salmon Fisheries Management Plan Escapement Floor." It was prepared primarily by biologists from the Northwest and Southwest Fisheries Science Centers who are not directly involved with the Council process and, as such, represents an outsiders' look at the Klamath fishery management situation. The impression of the SSC was that the document was prepared quickly and, as a result, was uneven in its coverage, leaving opportunities for further analysis and integration. However, the document provides considerable background material and discusses diversity, disease, hatcheries, forecast and model uncertainty, offers a risk assessment, and discusses expectations for 2007 and 2008.

A major focus of the SSC discussion, in response to guidance from the Council, was on the risk assessment. First, this report is one of the few presentations we have seen of uncertainty relative to proposed salmon harvest regimes. We commend the report authors for taking this first step and hope to see similar statistics for a broader range of salmon stocks and fisheries in the future. The SSC replicated the stock-recruit analysis (Salmon Technical Team Model 2) and risk analysis, and found them to be technically correct. However, the analysis presented in the report was incomplete, and deserves a fuller treatment. The intention of the risk analysis, based on the stock-recruit model, was to put boundaries on possible outcomes of the three fishery options under consideration for 2006. To do this the authors chose as a benchmark the lowest historical recruitment, under conditions of the mean and the lowest observed early-life survival rates. Because the lowest observed survival rate value (for the 1989 brood-year) was 6-fold lower than the next lowest, the SSC considers use of this parameter value as being unnecessarily pessimistic. This may be balanced by the use of the lowest historical recruitment, which is a low standard for assessing risk to the populations.

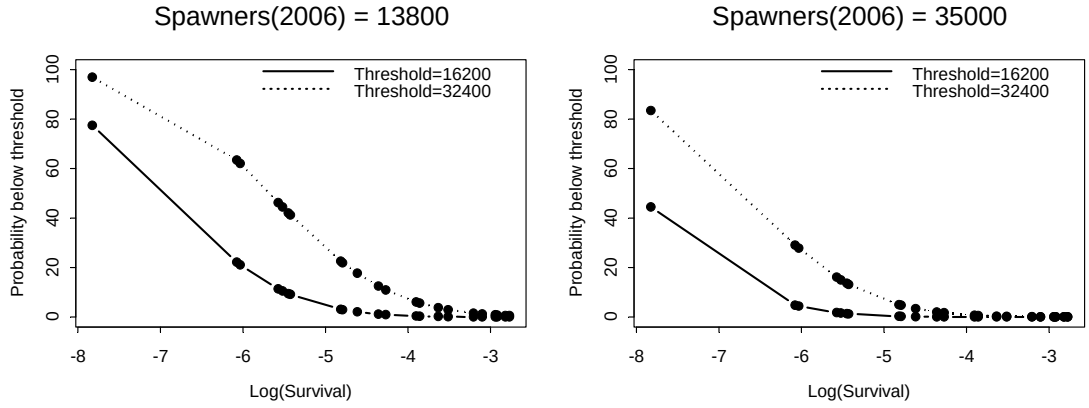

Figure 1. The relationship between risk (the probability of being below two recruitment thresholds, 16,200 and double that amount, or 32,400) is shown as a function of the survival rate for two spawner escapement levels, the escapement floor (right panel) and the Option 1 projected escapement (13,800, left panel). The large dots show observed levels of early-life survival.

The SSC explored the effects on risk of the chosen recruitment threshold and the number of parental spawners, where risk is expressed as the probability of being below the threshold over the range of observed survival rates (Figure 1). The left-most point on the solid line in the left panel corresponds to the most pessimistic early-life survival rate in the report. Risk in this scenario drops rapidly with increasing survival rate. Doubling the recruitment threshold (the dotted line) results in a considerable increase in risk, which stays high over a wider range of survival rates. The right-hand panel shows that the risks are lower if the parental spawning escapement remains at the current floor, compared with the escapement projected for Option 1.

Diagnostic plots of the residuals from the stock-recruit model suggest possible violation of the assumption that the logarithm of recruits-per-spawner follows a normal distribution. The implications of this to the risk analysis results are unclear beyond the additional uncertainty involved.

The population structure and biological diversity issue was of interest to the SSC. It appears, from the presentation in the report, that Klamath River Fall Chinook are made up of several distinct populations and that several of these populations had spawner escapements in 2004 that raise conservation concerns. The document points out the issue of inbreeding depression (reduced survival due to lack of genetic diversity) and demographic risk (chance events that, at low population size, can cause a population to disappear). There was also concern that the presence of large numbers of hatchery fish in the basin could be masking declines of wild spawners. The report does not attempt to assign risk levels to wild populations based on genetic or demographic effects of low escapements. The problems appear to be real, but it was not clear to the SSC how the aggregate 35,000 fish escapement floor is connected to the status of the separate populations. Smaller populations would be at greater risk if lower escapements were allowed.

The Summary and Conclusions of the report includes a discussion of expectations for the future. The current problem in the Klamath River is attributed, partly, to recent low flows and high water temperatures. These conditions persisted through 2004, affecting survival for fish that will return in 2006 – 2008. Additional pressure has been placed on the stock by recent ocean exploitation rates that were higher than expected due to unusual distributions of fish that resulted in anomalously high contact rates. Even with improved flows in the Klamath, the first return year with the potential for substantially higher escapement is 2009.

The situation in the Klamath River is dire. The risk to the fish is that several consecutive years of very low escapements may reduce the stock diversity, productivity, and resilience, potentially leading to greater problems in the future.

PFMC
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