

1.0 INTRODUCTION

This document has been prepared by the staff of the Pacific Fishery Management Council (Council) and the Salmon Technical Team (STT) to describe the Council's proposed ocean salmon management Alternatives for 2011 and characterize their expected impacts on ocean salmon fisheries and the stocks which support them. The Council solicits public comments on the proposed management Alternatives in preparation for adopting final management recommendations at its April meeting. Oral and written comments may be presented at public hearings at the times and locations displayed on the inside front cover of this report. Additional comment will be accepted during the April Council meeting at the San Mateo Marriott, 1770 South Amphlett Boulevard, San Mateo, CA 94402, 650-653-6000. Written comments received at the Council office by April 3, 2011 will be copied and distributed to all Council members (Council staff cannot assure distribution of comments received after April 3).

This report also constitutes the second part of an Environmental Assessment (EA) to comply with National Environmental Policy Act (NEPA) requirements for the 2011 ocean salmon regulations. An EA is used to determine whether an action being considered by a Federal agency has significant environmental impacts. This part of the EA includes a statement of the purpose and need, a description of the affected environment, a description of 2011 ocean salmon regulation Alternatives being considered, and an analysis of the effects of those Alternatives on the affected environment. The first part of the EA (Preseason Report I; STT 2011) included a description of the No-Action Alternative and an analysis of the effects of the No-Action Alternative on salmon stocks managed under the Pacific Coast Salmon Fishery Management Plan (FMP), which is one component of the affected environment. Together, these two parts of the EA will provide the necessary components to determine if a finding of no significant impact (FONSI) or Environmental Impact Statement (EIS) is warranted.

1.1 *Purpose and Need*

The purpose of this action, implementation of the 2011 ocean salmon fishery management measures, is to allow fisheries to harvest surplus production of healthy natural and hatchery salmon stocks within the constraints specified under the Salmon FMP, the Pacific Salmon Treaty (PST), and consultation standards established for 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. 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 economically viable and socially acceptable commercial, recreational, and tribal seasons.
8. Achieve long-term coordination with the member states of the Council, Indian tribes with federally recognized fishing rights, Canada, the North Pacific Fishery Management Council, Alaska, and other management entities which are responsible for salmon habitat or production. Manage consistent with the Pacific Salmon Treaty and other international treaty obligations.
9. In recommending seasons, to the extent practicable, promote the safety of human life at sea.

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

Implementation of 2011 management measures will allow fishermen to harvest surplus production of healthy natural and hatchery salmon stocks within the constraints specified under the Salmon FMP, consultation standards established for ESA-listed salmon stocks, and other applicable law.

2.0 SELECTION OF FINAL MANAGEMENT MEASURES

The Council's final ocean salmon season recommendations will be based on the range of Alternatives presented in this report and guidance received from deliberations at management fora such as the north of Cape Falcon planning process - sponsored by the States of Washington and Oregon and the treaty Indian tribes in that area, and from public hearings sponsored by the Council and the States of Washington, Oregon, and California. Final recommendations concerning season dates, catch quotas, and exploitation rates may vary from the range of Alternatives presented in this report depending upon determination of allocations, allowable harvest levels, public comment, or the final impact analyses completed by the STT. Elements of the Alternatives may be recombined to alter season patterns and quotas, or measures such as bag limits, days of fishing per week, special landing restrictions, and other specific regulatory details may also change. In addition, inseason modification of management measures may be used to ensure achievement of the Council's management objectives.

Specific details pertaining to season structure and special management measures for the treaty Indian troll fishery north of Cape Falcon are established in tribal regulations. Chinook and coho quota levels for the treaty Indian troll fishery may be adjusted if significant changes in incidental fishing mortality result from tribal regulations, preseason or inseason.

The impact analyses presented in this document reflect uncertainties and limitations of information available at the time of the March 2011 Council meeting. At this point in the planning cycle, the STT's impact assessments reflect four key assumptions relative to stocks impacted by Canadian and Alaskan fisheries: (1) abundance levels for Canadian Chinook and coho stocks identical to 2010 forecasts; (2) catch levels for southeast Alaskan, north-central British Columbia, and West Coast Vancouver Island (WCVI) fisheries equal to 2010 catch ceilings established under the aggregate abundance based management (AABM) provisions of the PST 2008 Agreement (WCVI outside sport catch assumed to

equal the average of the 2008-2010 level), with minimum size limits identical to those in place for 2010; (3) 2010 observed catch levels and size limits for Canadian fisheries operating under individual stock based management (ISBM) regimes pursuant to the 2008 PST Agreement; and (4) base packages for management of Southern U.S. inside fisheries. In mid-March, U.S. and Canadian fishery managers will exchange information regarding preseason expectations for fisheries and the status of Chinook and coho stocks. Following this exchange, the Pacific Salmon Commission's (PSC's) Chinook Model will be calibrated by the PSC Chinook Technical Committee to determine the allowable catch ceilings under the 2008 PST Agreement. Abundances and fishery expectations will be adjusted in the Council's fishery planning models prior to the April Council meeting, and inside fisheries will be shaped by state and tribal co-managers both prior to and during the April Council meeting.

The adjustments of stock abundances and fishery expectations, and the shaping of inside fisheries as described above, may result in estimated stock impacts in the final regulations adopted by the Council that differ from those presented in this report. The final regulations adopted by the Council in April are intended to be consistent with Council's Salmon FMP objectives, guidance provided by the National Marine Fisheries Service (NMFS), obligations under the PST, and other applicable law. This EA analyzes the range of effects within which the final management measures will fall.

Any Alternative considered for adoption that deviates from Salmon FMP objectives or other applicable laws will require implementation by emergency rule. If an emergency rule appears to be necessary, the Council must clearly identify and justify the need for such an action consistent with emergency criteria established by the Council and NMFS.

3.0 SALMON TECHNICAL TEAM CONCERNS

3.1 Need for Landing Requirements

The STT recommends that landing restrictions be employed to require landings within the area where the fish are caught. Unless such restrictions are adopted, fleet mobility increases the difficulty of inseason management by compromising catch accountability and interpretation of biological data such as genetic stock identification (GSI) samples or coded-wire-tag (CWT) recoveries.

4.0 SALMON FISHERY MANAGEMENT PLAN REQUIREMENTS

The Council's Salmon FMP includes objectives for setting annual management measures to regulate ocean salmon fisheries between the U.S./Canada border and the U.S./Mexico border. The objectives include biological, administrative, and allocation requirements. In recommending final management measures, the Council attempts to meet all objectives in a fair and balanced manner, while maintaining established priorities.

Biological objectives for stocks originating in the Council area or impacted by Council area ocean fisheries are listed in Table 3-1 of the Salmon FMP. The objectives generally consist of meeting spawning escapement numbers associated with maximum sustainable yield (MSY), or exploitation rate limits designed to support recovery of depressed stocks while encompassing a long term average harvest approximating MSY.

Administrative objectives are requirements for meeting other applicable law outside of the Salmon FMP. These requirements include ESA consultation standards, international treaties, and tribal trust responsibilities. The Salmon FMP defers to NMFS consultation standards for salmon stocks listed under the ESA in regards to biological conservation objectives. The Council considers the ESA requirements sufficient to meet the intent of FMP conservation objectives for the annual management measures as well as the MSA overfishing provisions requiring rebuilding of depressed stocks to MSY levels. Section 5.0

of this document provides greater detail on ESA listed stocks, while impacts of the Council adopted salmon management measures on ESA listed stocks are included in Table 5.

The Salmon FMP requires compliance with relevant terms of the PST. Section 6.0 of this document provides greater detail on PST provisions and stocks, while impacts of the Council adopted salmon management measures on those stocks are included in Table 5.

Treaty trust responsibilities of the Salmon FMP require the Council to abide by Court orders in the *U.S. v. Washington* (Puget Sound), *Hoh v. Baldrige* (Washington coast), and *U.S. v. Oregon* (Columbia River) cases, and the Solicitor General opinion (Klamath River) governing allocation and management of shared salmon resources. Much of the North of Falcon forum is dedicated to annual negotiations establishing allocation among the tribes, non-Indian fishing sectors, and ocean and inside interests. The results of these negotiations allow the Council to complete final management measure recommendations while meeting its biological, administrative, and allocation objectives. Among the annual agreements reached by the co-managers in the North of Falcon forum are conservation objectives for Puget Sound and Washington coastal stocks. These objectives can supersede the Salmon FMP conservation objectives for annual management measures and for Council action when a Conservation Alert is triggered; however, they cannot be used in place of the FMP objectives for determination of an Overfishing Concern; nor can they supersede ESA consultation standards. In recent years, the annual agreed to conservation objectives for Puget Sound coho have been based on the Comprehensive Coho Agreement. In November 2009, the Council adopted permanent FMP conservation objectives for Puget Sound coho consistent with the Comprehensive Coho Agreement

The Columbia River treaty tribes establish periodic management agreements with the state co-managers and Federal agencies. These agreements are approved pursuant to provisions of *U.S. v. Oregon* procedures. Recent agreements have included an entitlement for the treaty tribes of 50 percent of the coho return destined for areas upstream from Bonneville Dam. Council area fisheries are shaped in order to meet this requirement in some years.

The Yurok and Hoopa Valley tribes are entitled to up to 50 percent of the total KRFC harvest, which is calculated as a harvest of Klamath River fall Chinook (KRFC) equal to that taken in all non-Indian fisheries. The Council must account for all harvest impacts when assessing the achievement of KRFC conservation objectives.

In addition to the allocation objectives associated with sharing between treaty Indian and non-Indian sectors, the Salmon FMP includes formulas for sharing Chinook and coho quotas north of Cape Falcon between commercial and recreational sectors, and among recreational port areas, and for coho south of Cape Falcon between commercial and recreational sectors. Alternatives for the 2011 salmon management measures adopted by the Council meet the allocation requirements for fisheries north of Cape Falcon in the Salmon FMP.

5.0 SPECIES LISTED UNDER THE ENDANGERED SPECIES ACT

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

Species	ESU	Status	Federal Register Notice			
			Most Recent		Original Listing	
Chinook Salmon (<i>O. tshawytscha</i>)	Sacramento River Winter	Endangered	70 FR 37160	6/28/2005	54 FR 32085	8/1/1989
	Snake River Fall	Threatened	70 FR 37160	6/28/2005	57 FR 14653	4/22/1992
	Snake River Spring/Summer	Threatened	70 FR 37160	6/28/2005	57 FR 14653	4/22/1992
	Puget Sound	Threatened	70 FR 37160	6/28/2005	64 FR 14308	3/24/1999
	Lower Columbia River	Threatened	70 FR 37160	6/28/2005	64 FR 14308	3/24/1999
	Upper Willamette River	Threatened	70 FR 37160	6/28/2005	64 FR 14308	3/24/1999
	Upper Columbia River Spring	Endangered	70 FR 37160	6/28/2005	64 FR 14308	3/24/1999
	Central Valley Spring	Threatened	70 FR 37160	6/28/2005	64 FR 50394	9/16/1999
	California Coastal	Threatened	70 FR 37160	6/28/2005	64 FR 50394	9/16/1999
Chum Salmon (<i>O. keta</i>)	Hood Canal Summer-Run	Threatened	70 FR 37160	6/28/2005	64 FR 14508	3/25/1999
	Columbia River	Threatened	70 FR 37160	6/28/2005	64 FR 14508	3/25/1999
Coho Salmon (<i>O. kisutch</i>)	Central California Coastal	Endangered	70 FR 37160	6/28/2005	61 FR 56138	10/31/1996
	S. Oregon/ N. California Coastal	Threatened	70 FR 37160	6/28/2005	62 FR 24588	5/6/1997
	Oregon Coastal	Threatened	73 FR 7816	2/11/2008	63 FR 42587	8/10/1998
	Lower Columbia River	Threatened	70 FR 37160	6/28/2005		
Sockeye Salmon (<i>O. nerka</i>)	Snake River	Endangered	70 FR 37160	6/28/2005	56 FR 58619	11/20/1991
	Ozette Lake	Threatened	70 FR 37160	6/28/2005	64 FR 14528	3/25/1999

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

Date	Evolutionarily Significant Unit covered and effective period
8-Mar-96	Snake River spring/summer and fall Chinook and sockeye (until reinitiated)
28-Apr-99	Oregon Coastal natural coho, Southern Oregon/ Northern California coastal coho, Central California coastal coho (until reinitiated)
28-Apr-00	Central Valley spring Chinook (until reinitiated)
27-Apr-01	Hood Canal summer chum 4(d) limit (until reinitiated)
30-Apr-01	Upper Willamette Chinook, Upper Columbia spring Chinook, Lake Ozette sockeye, Columbia River chum, and 10 steelhead ESUs (until reinitiated)
30-Apr-10	Sacramento River winter Chinook (until reinitiated)
30-Apr-04	Puget Sound Chinook (until reinitiated)
13-Jun-05	California coastal Chinook (until reinitiated)
28-Apr-08	Lower Columbia River natural coho (until reinitiated)
30-Apr-10	Lower Columbia River Chinook (April 30, 2012)

Amendment 12 to the Salmon FMP added the generic category “species listed under the ESA” to the list of stocks in the salmon management unit and modified respective escapement goals to include “manage consistent with NMFS jeopardy standards or recovery plans to meet immediate conservation needs and long-term recovery of the species.” Amendment 14 specified those listed ESUs and clarified which stocks in the FMP management unit were representative of the ESUs.

In a letter received by the Council on March 3, 2011, NMFS provided guidance on protective measures for species listed under the ESA during the 2011 fishing season. The letter summarized the requirements of NMFS’ BOs on the effects of potential actions under the salmon FMP on listed salmon and provided the anticipated consultation standards of the BOs in preparation for the 2011 management season, as well as further guidance and recommendations for the 2011 management season.

The ESA consultation standards, exploitation rates, and other criteria in place for the 2011 management season are presented in Table 5. Some listed stocks are either rarely caught in Council fisheries (e.g., spring Chinook from the upper Columbia River) or already receive sufficient protection from other salmon FMP and ESA standards (e.g., Central Valley spring Chinook). NMFS has determined that management actions designed to limit catch from these ESUs, beyond what will be provided by harvest constraints for other stocks, are not necessary.

Of the listed Chinook and coho, Council-managed fisheries have a significant impact on Sacramento River winter Chinook, Central Valley spring Chinook, California coastal Chinook, Snake River wild (SRW) fall Chinook, lower Columbia River (LCR) fall Chinook, and all of the coho stocks. Additional listed salmonid ESUs found within the Council area, but not significantly impacted by Council managed fisheries, include:

Chinook	
Snake River spring/summer (threatened)	Puget Sound (threatened)
Upper Willamette (threatened)	Upper Columbia River spring (endangered)
Sockeye	
Snake River (endangered)	Ozette Lake Sockeye (threatened)
Chum	
Columbia River (threatened)	Hood Canal summer (threatened)
Steelhead	
Southern California (endangered)	Central Valley, California (threatened)
South-central California coast (threatened)	Central California coast (threatened)
Upper Columbia River (endangered)	Upper Willamette River (threatened)
Middle Columbia River (threatened)	Lower Columbia River (threatened)
Snake River Basin (threatened)	Northern California (threatened)
Puget Sound (threatened)	Northern California (threatened)

6.0 OBLIGATIONS UNDER THE PACIFIC SALMON TREATY

In 1985 the PST was signed, setting long-term goals for the benefit of the shared salmon resources of the United States and Canada. The PSC is the body formed by the governments of Canada and the United States to implement the Pacific Salmon Treaty.

6.1 Chinook Salmon Management

A new agreement under the PST was negotiated in 2008 and formally accepted by both the U.S. and Canada in December of 2008. This new agreement took effect on January 1, 2009, and includes 30 percent reductions in the catch ceilings for AABM fisheries off the West Coast Vancouver Island and a 15 percent reduction in the catch ceilings for AABM fisheries in Southeast Alaska Chinook relative to the catch ceilings in effect for these fisheries since 1999. Under the terms of the 2008 PST Agreement,

Council fisheries for Chinook salmon continue to be subject to the ISBM provisions of Annex 4, Chapter 3, adopted in 1999. These provisions require the adult equivalent (AEQ) exploitation rate by all U.S. fisheries south of the U.S./Canada border be reduced by 40 percent from the 1979-1982 base period for Chinook stocks failing to achieve escapement goals adopted by the PSC.

Many Chinook stocks of concern to the Council are affected by fisheries off Canada and Alaska. Maximum allowable catches by AABM fishery complexes off the WCVI, Northern British Columbia, and Southeast Alaska are determined through the annual calibration of the PSC Chinook Model. Canadian fisheries that are not included in AABM complexes are managed under ISBM constraints, which require a 36.5 percent reduction in AEQ exploitation rates relative to the 1979-1982 base period on Chinook stocks that are not expected to achieve agreed MSY spawning escapement goals. Expectations for Canadian and Alaskan fisheries harvest and stock abundance forecasts are incorporated into the Chinook Fishery Regulation Assessment Model (FRAM) to estimate total exploitation rate impacts from all marine fisheries (Table 5).

Key considerations for Canadian domestic fishery management for Chinook in 2011 include, (1) meeting domestic conservation obligations for WCVI, Strait of Georgia, and Fraser River spring stocks; (2) Chinook harvests by native fisheries; and (3) incidental impacts during commercial and native fisheries directed at pink, sockeye, and chum salmon. It is anticipated that the details of the fishery regulatory package off WCVI will be driven by levels of allowable impact on WCVI and Lower Strait of Georgia Chinook and Interior Fraser (Thompson River) coho.

6.2 Coho Salmon Management

In 2002, the PSC adopted a management plan for coho salmon originating in Washington and Southern British Columbia river systems. The plan is directed at the conservation of key management units, four from Southern British Columbia (Interior Fraser, Lower Fraser, Strait of Georgia Mainland, and Strait of Georgia Vancouver Island) and nine from Washington (Skagit, Stillaguamish, Snohomish, Hood Canal, Strait of Juan de Fuca, Quillayute, Hoh, Queets, and Grays Harbor). Exploitation rate limits for intercepting fisheries are established for individual management units through formulas specified in the 2002 PST Southern Coho Management Plan, and are based on total allowable fishery exploitation rates. Based on preseason abundance forecasts, total allowable exploitation rates for U.S. management units in 2011 are summarized in the table below.

The categorical status of U.S. coho management units is reported to comply with obligations pursuant to the 2002 PST Southern Coho Management Plan. Categorical status is employed by the PSC under the 2002 PST Southern Coho Management Plan to indicate general ranges of allowable total exploitation rates for U.S. and Canadian coho management units. Three categories are employed: low (total exploitation rate less than 20 percent), moderate (total exploitation rate 20 percent to 40 percent), and abundant (total exploitation rate greater than 40 percent). For the Puget Sound management units, the 2002 PST Southern Coho Management Plan uses the thresholds and stepped harvest rate goals from the Comprehensive Coho Agreement, developed by Washington and the Puget Sound tribes, and adopted by the Council as FMP conservation objectives in November 2009. Actual exploitation rate constraints for Canadian fisheries on U.S. coho management units are determined by formulas that specify sharing of allowable exploitation rates and a “composite rule.” The composite rule adjusts constraints for Canadian fishery exploitation rates based on the number of U.S. management units which fall in a given category. For example, if only one Washington coastal coho management unit is in low status, Canadian fisheries are constrained to a total exploitation rate on that unit of 12 percent; if two or more Washington coastal management units are in low status, the constraint becomes 10 percent. The most restrictive exploitation rate limit for Canadian fishery impacts on U.S. coho management units is 10 percent.

Some confusion may arise from the methods employed to report the categorical status for Washington coastal coho management units. For these units, a range is reported for the allowable exploitation rates based on the relationship between the pre-season abundance forecast and the upper and lower values of the spawning escapement ranges corresponding to MSY production. Maximum exploitation rates are computed using the lower end of the escapement range and minimum exploitation rates are computed using the upper end of the escapement range. For purposes of reporting the categorical status, an allowable exploitation rate is computed using the mid-point of the MSY escapement range. For 2011, Puget Sound and Washington coast coho constraints are as follows:

U.S. Management Unit	Total Exploitation Rate Constraint ^{a/}	Categorical Status ^{b/}
Skagit	60%	Abundant
Stillaguamish	50%	Abundant
Snohomish	60%	Abundant
Hood Canal	65%	Abundant
Strait of Juan de Fuca	40%	Moderate
Quillayute Fall ^{c/}	44%-78% (61%)	Abundant
Hoh ^{c/}	57%-83% (70%)	Abundant
Queets ^{c/}	0%-56% (24%)	Moderate
Grays Harbor	60%	Abundant

a/ Preliminary, total mortality exploitation rate ceilings. Constraints will ultimately be determined through preseason planning processes. For Puget Sound management units, the exploitation rate constraints reflect application of Comprehensive Coho Agreement rules. For the Quillayute, Hoh, and Queets management units, exploitation rate constraints represent the potential range associated with escapement goal ranges (the values in parentheses reflect the exploitation rate associated with the mid-point of the spawning escapement goal range).

b/ Category titles correspond to the general exploitation rate ranges depicted in paragraph 3(a) of the 2002 PST Southern Coho Management Plan or the exploitation rate status determinations exchanged during the negotiations that culminated in the 2002 Southern Coho Agreement. For Puget Sound management units, the categorical status categories reflect application of Comprehensive Coho Agreement rules. No formal status classification system has yet been developed for Washington coastal management units; the categorical status levels are based on exploitation rate values depicted in parentheses.

c/ For Washington Coastal coho management units, spawning escapement ranges correspond to estimates for MSY escapements. The exploitation rate ranges for these management units are based on preseason abundance forecasts and the upper and lower ends of the ranges. Maximum exploitation rates are computed using the lower end of the escapement range; minimum exploitation rates are computed using the upper end of the escapement range. The categorical status is determined based on the mid-point of the escapement range. Note that the exploitation rates used to report categorical status do not represent maximum allowable rates for the management units.

Key considerations for Canadian fishery management for coho in 2011 are expected to include, (1) meeting domestic conservation obligations for Interior Fraser (including Thompson River) coho; (2) coho harvests by First Nations fisheries; (3) incidental impacts during commercial and First Nations fisheries directed at Chinook, sockeye, pink, and chum salmon; and (4) the desire to provide increased opportunity for sport fisheries through mark-selective retention regulations. The Canadian fishery regimes affecting coho will be driven by Canadian domestic allowable impacts on the Thompson River component of the Interior Fraser management unit (in previous years, Canadian fisheries were managed so as not to exceed a three percent maximum exploitation rate).

The projected status of Canadian coho management units in 2011 indicates continuing concerns for the condition of Interior Fraser coho. The Interior Fraser coho management unit is anticipated to remain in low status, resulting in a requirement to constrain the total mortality fishery exploitation rate for 2011 Southern U.S. fisheries to a maximum of 10.0 percent.

7.0 DESCRIPTION OF THE ALTERNATIVES

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

7.1 *Commercial*

Alternatives for the area north of Cape Falcon reflect similar relative abundance of Chinook and coho as in 2010, with low abundance of Oregon Production Index (OPI) hatchery coho and higher abundance of tulle fall Chinook. However, in 2011, allowable catch of Chinook will be decreased due to the lower abundance of tulle Chinook from Spring Creek Hatchery, and a reduced exploitation rate limit for LCR natural tulle Chinook. Coho catch quotas will be slightly reduced relative to 2010 due to reduced abundance of OPI hatchery coho.

Alternative I north of Cape Falcon assigns three-fourths of the troll Chinook quota to the May-June Chinook directed fishery to increase access when Chinook are more available to the fishery, which opens initially seven days per week with no landing and possession limit. In Alternative II, two-thirds of the troll Chinook quota is assigned to the May-June fishery, which opens initially five days per week with an area-wide landing and possession limit. In Alternative III one half of the troll Chinook quota is assigned to the May-June fishery, which opens initially five days per week with an area-wide landing and possession limit. The summer all-salmon fisheries for all Alternatives include Chinook and coho landing and possession limits for areas north and south of Leadbetter Point. Coho retention regulations are similar to recent years, except that Alternative III includes both mark-selective and non-mark-selective periods, before and after mid-August, respectively.

For areas south of Cape Falcon in 2011, there is the potential for greater commercial fishing opportunity relative to recent years. A relatively high SRFC abundance forecast will result in this stock not constraining fisheries as it has for the past three years. Constraints on fishing opportunity south of Falcon will be due to the California Coastal Chinook consultation standard that limits the KRFC age-4 ocean harvest rate to a maximum of 16 percent, and the exploitation rate limit on ESA listed tulle Chinook.

For the North and Central Oregon coast south of Cape Falcon, all Alternatives for Chinook fisheries open in April and generally run through August. Alternatives I and II reopen for the month of October with weekly landing and possession limits.

For the Oregon KMZ, all Alternatives have May open, and then have monthly quota fisheries with daily landing and possession limits for June, July, and August. Alternative I also allows transfer of unused quota to subsequent quota periods.

For the California KMZ, Alternative I has four quota fisheries: late June, early July, early August, and late September. Alternative II has two quota periods: early July and early August, with reduced quota sizes relative to Alternative I. Alternative III is closed.

Alternatives in the Fort Bragg area include quota fisheries concurrent with the KMZ fisheries in June and July for Alternative I and in July for Alternative II. Alternative I also allows transfer of unused quota from June to the July quota. All three Alternatives include open season in August and September.

In the San Francisco and Monterey areas, all Alternatives have the fishery opening in May and generally running through September, with June mostly or entirely closed. Alternative I also includes a period in July with fisheries alternating five days open and two days closed. Alternatives I and II require landing of fish south of Point Arena when the Fort Bragg quota fisheries are open. The fall area target zone fishery is included in Alternative I during early October.

7.2 *Recreational*

In the area between the U.S. Canada Border and Cape Falcon, Alternatives I and II include Chinook directed recreational fisheries in June. Both Alternatives have an area-wide mark-selective Chinook

quota; in Alternative I however, the subarea south of Leadbetter Point opens one week later than subareas to the north.

Alternatives I and II for subareas north of the Queets River are open seven days per week, Alternative II is open five days per week. For the Westport subarea, all Alternatives are open five days per week, and for the Columbia River subarea, all Alternatives are open seven days per week. Subareas north of Leadbetter Point also have Alternatives that allow additional pink salmon retention above the normal two fish per day bag limit. There is an area 4B add-on fishery in Alternative III to help provide the Neah Bay subarea additional opportunity under the limited coho quota.

For the North and Central Oregon coast south of Cape Falcon, all Alternatives for Chinook fisheries open March 15 and run through early September to late October. Alternative I has a mark-selective coho quota fishery running from late June to early September that also includes the Oregon KMZ area. Alternative II has both mark-selective and non-mark selective coho quota fisheries, and Alternative III only has a non-mark-selective coho quota fishery. Non-mark-selective coho quotas are being considered because of the relatively high OCN and low OPI hatchery coho forecasts, which tend to reduce expected mark rates and increase the number of release mortalities on natural stocks.

Chinook fishing in both the Oregon and California KMZ will open in early to late May and run through Labor Day.

South of the KMZ, all Alternatives open April 2. In the Fort Bragg and San Francisco areas, seasons run through mid-November for Alternative I, mid-October for Alternative II and mid-September for Alternative III. In the Monterey area, seasons run through early October, mid-September, and early September for Alternatives I, II, and III, respectively. The minimum size limit for Chinook in recreational fisheries coast-wide is 24 inches.

7.3 Treaty Indian

Alternatives are generally similar in structure as in recent years.

8.0 AFFECTED ENVIRONMENT AND ANALYSIS OF IMPACTS

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

- Target (FMP) species
- Social or economic environments
- Non-target species
- Essential Fish Habitat
- Public health or safety
- ESA listed (non-salmon) species or critical habitat
- Marine mammals
- Biodiversity or ecosystem function

8.1 Salmon Stocks in the Fishery

Target stocks include Chinook, coho, and pink salmon stocks identified in Appendix A, Table A-1 of Preseason Report I (Part 1 of this EA; PFMC 2011b), which includes several ESA listed Chinook and coho stocks. These ESA listed stocks are not targeted in Council area salmon fisheries, but will be included in the analysis of effects on target species because they are impacted coincidentally with targeted salmon stocks and frequently constrain access to targeted stocks. Environmental impacts to other ESA listed species (e.g., marine mammals) from the Alternatives will be analyzed in a later section of this EA.

A description of the historical baseline for this component of the affected environment is presented in the Review of 2010 Ocean Salmon Fisheries (PFMC 2011a). A more general description of salmon life history and population characteristics is presented in PFMC 2006. The current status (2011 ocean abundance forecasts) of the environmental components expected to be affected by the 2011 ocean salmon fisheries regulation Alternatives (FMP salmon stocks) are described in PFMC 2011b. The criteria used to evaluate whether there are significant effects from the Alternatives on target stocks are achievement of conservation objectives and ESA consultation standards for salmon FMP stocks. The Salmon FMP conservation objectives are based on the best available science and are intended to prevent overfishing while achieving optimum yield from West Coast salmon fisheries as required by the MSA, as are ESA consultation standards. Therefore conservation standards and consultation standards are appropriate indicators for determining the significance of fishery management actions referred to in NOA6.02.

8.1.1 Chinook Salmon

8.1.1.1 North of Cape Falcon

Abundance projections relevant to Chinook harvest management north of Cape Falcon are:

- *Columbia River hatchery tules.* Combined production of Lower River Hatchery (LRH) and Spring Creek Hatchery (SCH) stocks is predicted to be 249,900 which is slightly lower than the 2010 preseason expectation of 259,600. The 2011 LRH forecast abundance is 133,500 up significantly from 90,600 in 2010. The 2011 SCH forecast abundance is 116,400, which is down from last year's record high forecast of 169,000 but similar to the actual return to the river of 130,800 in 2010.

The key Chinook salmon management objectives shaping the Alternatives are:

- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant stocks for the area north of Cape Falcon include Columbia Lower River wild fall Chinook, LCR natural tule Chinook, SRW fall Chinook, and Puget Sound natural Chinook.

Fishery quotas under the Alternatives are presented in Table 4. Stock-specific management criteria and their forecast values under the Alternatives are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality under the Alternatives are summarized in Table 6. Table 7 provides a breakdown of impacts by fishery and area for LCR tule Chinook.

- *LCR natural tule fall Chinook.* The Alternative 1 exploitation rate of 39.3 percent exceeds the 37.0 percent NMFS consultation standard maximum for all fisheries. The exploitation rates in Alternatives II and III are less than the maximum, assuming river fisheries are structured similar to last year. LCR tules are the constraining Chinook stock for fisheries north of Cape Falcon in 2011.
- *SRW fall Chinook.* SRW Chinook will not constrain ocean fisheries north of Cape Falcon in 2011.
- *Puget Sound Chinook.* Council-area fisheries have a minor impact on ESA-listed Puget Sound Chinook and *negligible* impacts on most other Chinook stocks subject to the 2008 PST Agreement. At this point there appears to be sufficient flexibility within Council and inside area fisheries as a whole to achieve compliance with NMFS consultation standards for the Puget Sound Chinook ESU.

All of the Alternatives for Chinook fisheries north of Cape Falcon satisfy NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for other relevant Chinook stocks listed in Table 5.

8.1.1.2 South of Cape Falcon

Status of Chinook stocks relevant to 2011 Chinook harvest management south of Cape Falcon are:

- *SRFC*. The SI forecast is 729,900 SRFC adults, which is slightly lower than the average Sacramento Index (SI) for years 1983-2010.
- *KRFC*. The age-3 forecast is 304,600 KRFC, which is very close to average for the years 1985-2010. The age-4 forecast is 61,600 fish, which is below average. The age-5 forecast is 5,000 fish. Last year's preseason forecast was 223,400 age-3, 106,300 age-4, and 1,800 age-5 fish.
- *Sacramento River Winter Chinook*. No forecast is made for this stock, but returns continue to decline.

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

- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant stocks for the area south of Cape Falcon include Sacramento River winter Chinook, California Coastal Chinook, SRW fall Chinook, and LCR natural tule Chinook.
- SRFC hatchery and natural-area spawner escapement goal of 122,000 to 180,000 adults (FMP conservation objective). NMFS also provided guidance that management Alternatives for 2011 should, at a minimum, target a spawner escapement around the upper end of the FMP conservation objective.
- KRFC natural area spawning escapement of at least 35,000 adults and spawner reduction rate not to exceed 66.7 percent (FMP conservation objective), 50:50 tribal-non-tribal sharing of adult harvest (Department of Interior Solicitor Opinion).

Fishery quotas under the Alternatives are presented in Table 4. Stock-specific management criteria and their forecast values under the Alternatives are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality under the Alternatives are summarized in Table 6. Table 7 provides a breakdown of impacts by fishery and area for LCR tule Chinook. Appendix A presents tables of SRFC and KRFC impacts, by fishery/time/area under the three Alternatives. Descriptions pertaining to the achievement of key objectives for Chinook salmon management south of Cape Falcon are found below.

- *California Coastal Chinook*. The ESA consultation standard that limits the forecast KRFC age-4 ocean harvest rate to a maximum of 16.0 percent is met by each of the three Alternatives.
- *Sacramento River Winter Chinook*. The ESA consultation standard was met in all Alternatives with appropriate season dates and minimum size limits in fisheries south of Point Arena.
- *KRFC*. The natural-area escapement of at least 35,000 adults, as well as the maximum spawner reduction rate conservation objective of 66.7 percent, is met by each of the three Alternatives.

- *SRFC*. The conservation objective of targeting the upper end of the 122,000 to 180,000 natural and hatchery adult spawner range is met by each of the three Alternatives.
- *LCR natural tule fall Chinook*. The Alternative 1 exploitation rate of 39.3 percent exceeds 37.0 percent NMFS consultation standard maximum for all fisheries. The exploitation rates in Alternatives II and III are less than the maximum, assuming river fisheries are structured similar to last year.
- *SRW fall Chinook*. SRW Chinook will not constrain ocean fisheries south of Cape Falcon in 2011.

All of the Alternatives for Chinook fisheries south of Cape Falcon satisfy NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for other relevant Chinook stocks listed in Table 5.

8.1.2 Coho Salmon

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

- *OPI Hatchery coho*. The 2011 forecast for hatchery coho from the Columbia River and the coast south of Cape Falcon of 375,100 is slightly lower than the 2010 forecast of 408,000. The Columbia River early coho forecast is 216,000 compared to the 2010 forecast of 245,300 and the Columbia River late coho forecast is 146,500 and nearly identical to the 2010 forecast of 144,200.
- *OCN coho*. The 2011 OCN forecast of 249,900 is 70 percent higher than the 2010 forecast of 148,000.
- *LCN coho*. The 2011 LCN forecast is 22,700 compared to the 2010 forecast of 15,100.
- *Puget Sound coho*. All Puget Sound natural stocks are in the abundant category for 2011 except for Strait of Juan de Fuca, which is in the moderate category.
- *Interior Fraser (Thompson River) coho*. This Canadian stock continues to be depressed, and will continue to constrain 2011 ocean coho fisheries north of Cape Falcon.

Key coho salmon management objectives shaping the Alternatives are:

- NMFS consultation standards and annual guidance for ESA listed stocks as provided in Section 5.0 above. Relevant stocks include Central California Coast coho (south of the Oregon/California border), Southern Oregon/Northern California Coastal (SONCC) coho, OCN coho, and LCN coho. Based on this guidance, the maximum allowable exploitation rates for 2011 are: a combined marine/freshwater exploitation rate not to exceed 15.0 percent for OCN coho, a combined exploitation rate in marine-area and mainstem Columbia River fisheries not to exceed 15.0 percent for LCN coho, and a marine exploitation rate not to exceed 13.0 percent for Rogue/Klamath hatchery coho, used as a surrogate for the SONCC coho ESU. Furthermore, coho retention is prohibited in all California ocean fisheries.
- Salmon FMP conservation objectives and obligations under the 2002 PST Southern Coho Management Plan for stocks originating along the Washington coast, Puget Sound, and British Columbia as provided in Section 6.2 above. Because of the overall favorable forecasts for coho stocks in 2011, Interior Fraser coho is the only key management stock for the area north of Cape

Falcon. Because of their abundance status, Interior Fraser coho are subject to an exploitation rate ceiling of 10 percent in southern U.S. fisheries under the 2002 PST Southern Coho Management Plan.

- Minimum escapement of 50 percent of Upper Columbia coho above Bonneville Dam (U.S. v. Oregon annual management agreement).
- Providing sufficient escapement of Columbia River early and late coho to meet hatchery egg take goals and inriver harvest objectives.

Fishery quotas under the Alternatives are presented in Table 4. Stock-specific management criteria and their forecast values under the Alternatives are provided in Table 5. Projected fishery landings, bycatch, and bycatch mortality under the Alternatives are summarized in Table 6. Table 7 provides a breakdown of impacts by fishery and area for LCN, OCN, and RK coho. Table 8 provides expected coho mark rates for west coast fisheries by month.

- *LCN coho.* All Alternatives satisfy the maximum 15.0 percent exploitation rate for combined marine and mainstem Columbia River fisheries, with marine exploitation rates ranging from 12.8 percent to 8.8 percent. However, marine exploitation rates greater than 10 percent are unlikely to provide sufficient impacts to meet the needs of mainstem Columbia River fisheries, and will likely require further shaping before final management measures are adopted.
- *Interior Fraser coho.* Southern U.S. exploitation rates in Alternatives I and II exceed the 10.0 percent maximum required by the PST Southern Coho Management Plan. Alternative III is at the 10.0 percent maximum.
- All of the Alternatives for all fisheries satisfy NMFS ESA consultation standards and guidance, FMP conservation objectives, and all other objectives for other relevant coho stocks listed in Table 5.

8.1.3 Pink Salmon

Pink salmon are sufficiently abundant to merit management consideration only in odd numbered years. Abundance projections relevant to pink salmon harvest management in 2011 Council area fisheries are:

- *Puget Sound pink.* The 2011 forecast is 5.98 million, the highest forecast since at least 2001.
- *Fraser River pink.* The 2011 forecast is 17.5 million, similar to the 2009 forecast and near the recent year average.

The key pink salmon management objectives shaping the Alternatives are:

- Salmon FMP conservation objective of 900,000 natural spawners for Puget Sound pink salmon.
- PST Fraser River Panel objective of 6 million spawning escapement target (SET) for Fraser River pink salmon in 2011.

Council area fisheries have negligible impacts on pink salmon stocks, although recreational regulations generally provide additional opportunity to retain pink salmon in odd years. Inside fisheries are managed primarily through the Fraser River Panel of the PSC in order to achieve conservation objectives established by Fisheries and Oceans Canada. All Alternatives provide sufficient ocean escapement of pink salmon to meet conservation objectives for Puget Sound and Fraser River pink salmon and to support substantial inside fishing opportunity.

8.1.4 Summary of Environmental Impacts on Target Stocks

Stock forecasts for some Canadian stocks and the actual PST limits on AABM fisheries are not known at this time, and preliminary values have been used in the analyses presented in this report. These forecasts and limits will be available prior to the April Council meeting. Negotiations in the North of Falcon process will not be completed until the April Council meeting. These negotiations affect allocation of stock impacts primarily among inside fisheries (State, Tribal, recreational, various commercial sectors, etc.) but also between inside and ocean fisheries.

Environmental impacts on salmon stocks are assessed based on compliance with conservation objectives and ESA consultation standards. As noted in the description of the Alternatives (Tables 1, 2, and 3), if analyses using the updated values and the results of these negotiations do not result in compliance with FMP conservation objectives or ESA consultation standards, some Alternatives will not be viable and impacts in Council-area fisheries will need to be reduced to comply with all applicable objectives and standards. If updated values and negotiations result in compliance with applicable objectives and standards, Council area fishery impacts would not increase; therefore, the analysis of effects would include the upper bound of a reasonable range of effects under the Alternatives considered for 2011 Council area salmon fisheries.

8.1.4.1 Targeted Salmon Stocks

Based on current assumptions regarding Canadian, Alaskan, and inside fishery impacts, all target salmon stocks (non-ESA listed) meet their FMP conservation objective under Alternatives I and II except Interior Fraser (Thompson River) coho (Table 5). Impacts in Council area fisheries alone are well below maximum allowed exploitation rate, and further shaping of inside fisheries will be required to comply with the PST Southern Coho Management Plan.

Based on current assumptions regarding Canadian, Alaskan, and inside fishery impacts, all target salmon stocks (non-ESA listed) meet their FMP conservation objective under Alternative III (Table 5).

8.1.4.2 ESA Listed Salmon Stocks

Based on current assumptions regarding Canadian, Alaskan, and inside fishery impacts, all ESA listed salmon stocks meet their ESA consultation standard under Alternative I except LCR natural tule Chinook and LCN coho (Table 5). Impacts in ocean fisheries alone are less than significant and below maximum allowed exploitation rate for both stocks and further shaping of inside fisheries may result in compliance with the ESA consultation standard; however, additional restrictions to Council area fisheries may be necessary to meet both consultation standards and inside fishery needs.

ESA consultation standards are met for all stocks under Alternative II; however, additional restrictions to Council area fisheries may be necessary to meet both consultation standards for LCN coho and inside fishery needs (Table 5). Impacts on LCN coho necessary to prosecute Columbia River mainstem fisheries has not yet been estimated, although available impacts under Alternative II are within the range of impacts allocated in 2009 and 2010 and are less than significant.

ESA consultation standards are met for all stocks under Alternative III and impacts on LCN coho available to shape Columbia River mainstem fisheries are greater the range of impacts allocated in 2009 and 2010 (Table 5).

Council-area fisheries have a less than significant impact on ESA-listed Puget Sound Chinook and on most Chinook stocks subject to the 1999 PST Agreement. At this point there appears to be sufficient flexibility within Council and inside area fisheries as a whole to achieve protection for the Puget Sound Chinook ESU.

8.2 Socioeconomics

While analysis of impacts to target stocks is organized around salmon stocks that spawn in particular rivers, the social dimension, including regulation Alternatives, 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./Mexico border. There are also numerous subdivisions within these areas used to further balance stock conservation and harvest allocation needs. The boundaries of these areas and the main salmon ports appear on the inside back cover of this report. The following description of the fisheries and fishing communities is organized around these areas and is derived from the Review of 2010 Ocean Salmon Fisheries (PFMC 2011), which provides an historical description of the salmon fishery-affected environment, including stock status and socioeconomic impacts, and represents the current status of the socioeconomic component of the affected environment. For the purpose of characterizing the economic impact of Council area salmon fisheries, exvessel value and coastal community level personal income impacts were used.

The short-term economic effects of the proposed alternatives for non-Indian fisheries are shown in Tables 9 and 10. Table 9 shows troll impacts expressed in terms of estimates of potential exvessel value. Table 10 shows recreational impacts in terms of trips generated and community personal income impacts associated with the recreational fishery under each Alternative. The exvessel values provided for the troll fishery Alternatives in Table 9 and income impact values provided for the recreational fishery Alternatives in Table 10 are not directly comparable. Long-term social and economic effects are dependent on the impacts of this year's harvest on future production. In general the Council manages to meet escapement objectives for salmon that are expected to achieve optimum yields and rebuild depressed stocks.

Fishing effort estimates for the recreational fishery south of Cape Falcon are based on the effort estimates developed by the STT for modeling of biological impacts. STT estimates for this area use multi-year averages to predict effort for the coming year. If the multi-year average effort for a particular time period and area is higher than effort for the previous year in that stratum then the estimate may forecast an increase in effort for the coming year even though the fishery management measures may be more constrained than the previous year, or *vice-versa*. North of Cape Falcon, recreational fishery average catch per unit effort (CPUE) is applied to quotas to estimate total effort. For the summer mark-selective coho fishery, average 2009 CPUE was applied to the available coho quotas. For the June Chinook fisheries in Alternatives I and II, CPUE for the 2002 fishery was used, adjusted for the estimated increased effort required to reach a bag limit under mark-selective restrictions. Both estimates were then further adjusted for the difference in the number of trips observed in 2010 versus 2009. The expected harvests used to model effects on the commercial fishery are taken from Table 6. Additionally, last year's prices were assumed to be the best indicator of prices expected in the coming season. Commercial exvessel Chinook prices were at relatively high levels in 2010, as they have been for the past few years. To the degree that these prices were driven by the limited local supply in prior years, and harvests increase this year, then prices in 2011 may actually be lower than projected, which means that salmon exvessel revenue and commercial fisheries income impacts may be overstated. For southern areas where the commercial fishery was very limited or closed in 2010, per-fish weights and per-pound prices were projected using observed ratios between these areas and more northern areas from previous years.

Figures 1 and 2 show estimated community income impacts for the commercial troll and recreational Alternatives, respectively, compared to historic impacts in real (inflation adjusted) dollars. In general, income impact estimates provide information on the amount of income associated with a particular activity. While reductions in income impacts may not necessarily reflect net losses to a community, they are likely to correlate with losses to those businesses and individuals with income dependence on the activity. However, 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 Alternatives than is indicated by the short-term effects on the ocean fisheries described above. Alternatives 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 success rates for recreational fishers). Harvest forgone by ocean fisheries that is also 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-recruit relationship.

8.2.1 Alternative I

Under Alternative I, aggregated coastwide community-level commercial personal income impacts would exceed levels of last year (2010) and the recent inflation-adjusted average (2006-2010). Aggregated coastwide recreational income impacts would also be much higher. However there are notable regional differences along the coast. Compared with 2010, the area north of Cape Falcon would experience a 14 percent reduction in commercial fisheries income impacts, but this would be 70 percent higher than the 2006-2010 inflation-adjusted average, and would be partially offset by increased impacts from recreational fisheries. All areas south of Cape Falcon would see both commercial and recreational fisheries income impacts that are substantially higher than in the recent past.

There are projected to be no significant impacts under this Alternative as combined commercial and recreational community income impacts are either positive relative to recent year averages or within the historical range.

8.2.2 Alternative II

Under Alternative II, aggregated coastwide community-level commercial personal income impacts would exceed levels of last year (2010) and the recent average (2006-2010). Aggregated coastwide recreational income impacts would also be much higher. However there are notable regional differences along the coast. Compared with 2010, the area north of Cape Falcon would experience a 33 percent reduction in commercial fisheries income impacts, but this would be 33 percent higher than the 2006-2010 average. Recreational fisheries income impacts are slightly lower than last year but slightly higher than the recent average (2006-2010). All areas south of Cape Falcon would see both commercial and recreational fisheries income impacts that are substantially higher than in the recent past.

There are projected to be no significant impacts under this Alternative as combined commercial and recreational community income impacts are either positive relative to recent year averages or within the historical range.

8.2.3 Alternative III

Under Alternative III, aggregated coastwide community-level commercial personal income impacts would exceed levels of last year (2010) and the recent average (2006-2010). Aggregated coastwide recreational income impacts are also higher. However there are notable regional differences along the coast. Compared with 2010, areas north of Cape Falcon would experience a 51 percent reduction in commercial fisheries income impacts, but would still be slightly higher than the 2006-2010 average. Income impacts from recreational fisheries north of Cape Falcon would be below 2010 levels and also below the 2006-2010 average. South of Cape Falcon, all areas would see increased commercial fisheries

income impacts, and all areas except Cape Falcon to Humbug Mountain would see increased recreational fisheries income impacts. Cape Falcon to Humbug Mountain would experience a reduction of nearly one-half compared with 2010 income impacts, and a reduction of more than 60 percent compared with the recent years' average (2006-2010).

There are projected to be no significant impacts under this Alternative as combined commercial and recreational community income impacts are either positive relative to recent year averages or within the historical range.

8.2.4 Summary of Impacts on the Socioeconomic Environment

In aggregate coastwide, the Alternatives for the commercial fishery are expected to generate more revenue and income than in 2010, and more than the 2006-2010 average. However this result masks regional differences along the coast. While revenues and income impacts from commercial fisheries south of Cape Falcon are substantially higher than in the recent past for all areas under all three Alternatives, north of Cape Falcon revenues and income impacts are lower than in 2010 under all three Alternatives, and under Alternative III they are lower than the 2006-2010 average. Recreational income impacts are projected to be considerably higher in aggregate coastwide than in 2010 and the 2006-2010 average. However ports North of Cape Falcon may see reductions under Alternatives II and III; and under Alternative III the Cape Falcon to Humbug Mountain region shows a relatively large decrease compared to the recent past.

8.3 Non-target Species

Impacts to groundfish stocks from salmon troll fisheries continue to be managed as part of the open access groundfish fishery sector, and are at similar levels compared to recent years. The 2011 ocean salmon regulation Alternatives are not expected to differ substantially from earlier analyses with respect to groundfish impacts (NMFS 2003; Appendix B); therefore, effects from the Alternatives to groundfish stocks are not significant.

Impacts to Pacific halibut from salmon troll fisheries continue to be managed under limits established through the International Pacific Halibut Commission (IPHC) process and under the Area 2A (Council area) catch sharing plan. The 2011 ocean salmon regulation Alternatives include Pacific halibut landing restrictions within the range enacted in the past, and are not expected to differ substantially from earlier analyses with respect to Pacific halibut impacts (NMFS 2003; Appendix B); therefore, effects from the Alternatives to Pacific Halibut are not significant.

Ocean salmon fisheries have not changed substantially in terms of season length, areas, depth, bag limits, etc. Nor is there any new information to suggest that the incidental nature of encounters of non-target species in ocean salmon fisheries has changed. Therefore, the impacts from the 2011 salmon regulation Alternatives to non-target species such as groundfish, Pacific halibut, highly migratory species, and coastal pelagic species are not expected to be significant, and there is no discernable difference between the effects of the Alternatives on these resources.

8.4 Marine Mammals

The commercial salmon troll fisheries off the coasts of Washington, Oregon, and California are classified as Category III fisheries, indicating a remote or no likelihood causing of incidental mortality or serious injury to marine mammals (75 FR 68468). Recreational salmon fisheries use similar gear and techniques as the commercial fisheries and are assumed to have similar encounter rates and impacts. The non-ESA listed marine mammal species that are known to interact with ocean salmon fisheries are California sea lion and harbor seals. Populations of both these species are at stable and historically high levels. There is no new information to suggest that the nature of interactions between California sea lions or harbor seals

in ocean salmon fisheries has changed. Therefore, the impacts from the 2011 salmon regulation Alternatives to non-ESA listed marine mammals are not expected to be significant, and there is no discernable difference between the effects of the Alternatives on these resources.

8.5 *ESA Listed Species*

Steller sea lion interaction with the Pacific Coast salmon fisheries is rare and NMFS has determined mortality and serious injury incidental to commercial salmon troll fishing operations have a negligible effect on this species (NMFS 2003; Appendix B). Available information indicates that Pacific Coast salmon fisheries are not likely to jeopardize the existence of the Guadalupe fur seal. No sea turtles have been reported taken by the ocean salmon fisheries off Washington, Oregon, or California, and NMFS has determined that commercial fishing by Pacific Coast salmon fisheries would pose a negligible threat to Pacific turtle species. There is no discernable difference between the effects of the Alternatives on these resources

The NMFS BO on Southern Resident killer whale DPS (NMFS 2008; Appendix B)) concluded that ocean salmon fisheries were not likely to jeopardize the continued existence of the Southern Resident killer whales or adversely modify their critical habitat. NMFS has initiated a five year review of the Southern Resident killer whale ESA listing. There is new information that indicates salmon abundance in Puget Sound may correlate with killer whale population growth rate, and while this information is under review, it is possible that future consultation standards for Puget Sound and possibly Council area fisheries will change as a result of this new information. However, the 2011 ocean salmon regulations are covered by the NMFS 2008 BO, and on that basis it is expected that the 2011 regulations would not have significant impacts to Southern Resident killer whales. There is no discernable difference between the effects of the alternatives on these resources

Other ESA listed salmonid species present in Council area waters include sockeye and chum salmon, and steelhead trout. These species are rarely encountered in ocean salmon fisheries, and Alternatives for 2011 Council area ocean salmon fisheries are in compliance with applicable BOs as listed in Chapter 5 of this document. Because anticipated impacts are negligible, there are no significant impacts expected on listed sockeye or chum salmon or steelhead trout from the Alternatives analyzed in this EA, and there is no discernable difference between the effects of the Alternatives on these resources.

8.6 *Seabirds*

The types of vessels used in ocean salmon fisheries and the conduct of the vessels are not conducive to collisions or the introduction of rats other non-indigenous species to seabird breeding colonies. Other types of accidental bird encounters are a rare event for commercial and recreational ocean salmon fisheries (NMFS 2003; Appendix B). Therefore, there are no significant impacts expected on seabirds from the Alternatives analyzed in this EA, and there is no discernable difference between the effects of the Alternatives on these resources.

8.7 *Biodiversity and Ecosystem Function*

The removal of adult salmon by the ocean fisheries is not considered to significantly affect the lower trophic levels or the overall marine ecosystem because salmon are not the only or primary predator in the marine environment (NMFS 2003; Appendix B). Therefore, no significant impacts are expected on biodiversity or ecosystem function from the Alternatives analyzed in this EA, and there is no discernable difference between the effects of the Alternatives on these resources.

8.8 *Ocean and Coastal Habitats*

Council Area salmon fisheries do not employ bottom contact gear, and there is no evidence of direct gear effects on fish habitat from Council-managed salmon fisheries on EFH for salmon or other managed

species (PFMC 2006; Appendix B). Critical habitat for ESA listed salmon does not include Council area ocean water. Because Council area salmon fisheries are conducted at sea and without bottom contact gear, there is no interaction with unique geographic characteristics or other cultural, scientific, or historical resources such as those that might be listed on the National Register of Historical Places.

8.9 *Public Health and Safety*

Fisheries management can affect safety if, for example, season openings make it more likely that fishermen will have to go out in bad weather because fishing opportunities are limited. The Salmon FMP, however, has provisions to adjust management measures if unsafe weather affected fishery access. The Alternatives for 2011 ocean salmon regulations have season structures similar to those employed in previous salmon seasons and are not expected to result in any significant increase in the risk to human health or safety at sea (PFMC 2006; Appendix B). There are also no discernable differences between the effects of the Alternatives on the risk to human health or safety at sea.

9.0 CONCLUSION

Based on this environmental assessment for the 2011 ocean salmon regulation Alternatives and the requisite outcome of the Council's preseason planning and decision process, no significant environmental impacts will result from final regulations selected from within the range presented in these Alternatives.

10.0 LIST OF AGENCIES AND PERSONS CONSULTED

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

- October 23, 2010: **Salmon Technical Team/Scientific and Statistical Committee Salmon Subcommittee joint meeting**, Portland, Oregon.
- January 18-21, 2011: **Salmon Technical Team (Review preparation)**, Portland, Oregon.
- February 2-3: California Fish and Game Commission meeting, Sacramento, California.
- February 4-5: Washington Fish and Wildlife Commission meeting, Olympia, Washington.
- February 22-25: **Salmon Technical Team (Preseason Report I preparation)**, Portland, Oregon.
- March 1: California Department of Fish and Game Public Meeting, Santa Rosa, California.
Washington Department of Fish and Wildlife public meeting, Olympia, Washington.
- March 2: Oregon Salmon Industry Group meeting, Newport, Oregon.
- March 3: California Fish and Game Commission meeting, Los Angeles, California.
- March 4-5: Washington Fish and Wildlife Commission meeting, Spokane, Washington.
- March 4-9: **Pacific Fishery Management Council meeting**, Vancouver, Washington.
- March 14: California Fish and Game Commission teleconference meeting.
- March 15: North of Falcon and *U.S. v. Oregon Forums*, Olympia, Washington.
- March 16-17: Oregon Fish and Wildlife Commission meeting, Newport, Oregon.
- March 28-29: **Public hearings on management options** in Westport, Washington; Coos Bay, Oregon; and Eureka, California.
- April 5: North of Falcon and *U.S. v. Oregon Forums*, Lynwood, Washington.
- April 6-7: California Fish and Game Commission meeting, Folsom, California.
- April 8-14: **Pacific Fishery Management Council meeting**, San Mateo, California.
- April 15: Washington Fish and Wildlife Commission teleconference meeting.
- April 21: California Fish and Game Commission teleconference meeting.
- April 22: 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

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

11.0 REFERENCES

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- NMFS. 2008. Endangered Species Act-section 7 formal consultation biological opinion: Effects of the 2008 Pacific Coast salmon plan fisheries on the southern resident killer whale distinct population segment (*Orcinus orca*) and their critical habitat. National Marine Fisheries Service Northwest Region, Seattle.
- Pacific Fishery Management Council (PFMC). 2006. Environmental assessment for the proposed 2006 management measures for the ocean salmon fishery managed under the Pacific Coast salmon plan. Pacific Fishery Management Council, Portland, Oregon.
- PFMC. 2011a. Review of 2010 ocean salmon fisheries. Pacific Fishery Management Council, Portland, Oregon.
- PFMC. 2011b. Preseason Report I: Stock abundance analysis and environmental assessment part 1 for 2011 ocean salmon fishery management measures. Pacific Fishery Management Council, Portland, Oregon.