UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

DEC - 8 2011

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Pacific Coast Salmon Plan Amendment 16: Classifying stocks, revising status determination criteria, establishing annual catch limits and accountability measures, and *de minimis* fishing provisions (RIN 0648-BA55)

LOCATION: Exclusive Economic Zone (3-200 nautical miles) off the Coasts of Washington, Oregon, and California

SUMMARY: The proposed action is to Amend the Salmon Fishery Management Plan to provide a framework for specifying biological and management reference points and accountability measures (AMs) that will meet the requirements of the revised MSA and National Standard 1 Guidelines (NS1Gs) to account for uncertainty in the fishery management process, reduce the probability of overfishing, and include clear and objective status determination criteria (SDC), while integrating with existing management processes and capabilities to the degree possible. No significant impacts are anticipated.

RESPONSIBLE
OFFICIAL: William W. Stelle, Jr.
Northwest Regional Administrator
National Marine Fisheries Service, National Oceanic and Atmospheric Administration (NOAA)
7600 Sand Point Way NE
Seattle, WA 98115-6349

The environmental review process led us to conclude that this action will not have a significant impact on the environment. Therefore, an environmental impact statement was not prepared. A copy of the finding of no significant impact (FONSI) is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the Responsible Official named above.

Sincerely,

Patricia A. Montanio
NOAA NEPA Coordinator

Enclosure

FINAL
ENVIRONMENTAL ASSESSMENT
AND
INITIAL REGULATORY IMPACT REVIEW
FOR
PACIFIC COAST SALMON PLAN AMENDMENT 16: CLASSIFYING STOCKS, REVISING STATUS DETERMINATION CRITERIA, ESTABLISHING ANNUAL CATCH LIMITS AND ACCOUNTABILITY MEASURES, AND *DE MINIMIS* FISHING PROVISIONS

REGULATORY IDENTIFIER NUMBER 0648-BA55

PREPARED BY
THE AD HOC SALMON AMENDMENT COMMITTEE
FOR
THE PACIFIC FISHERY MANAGEMENT COUNCIL
AND
NATIONAL MARINE FISHERIES SERVICE

DECEMBER 2011

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List of Acronyms

ABC	acceptable biological catch
ACL	annual catch limit
AEQ	adult equivalent (exploitation rate [ER])
AM	accountability measure
ACT	annual catch target
BO	biological opinion
C	catch (based reference points)
CA ESA	California (salmon stocks listed under the) Endangered Species Act
CAN	Canadian (coho, Chinook, or pink salmon)
CA/S OR C	California/Southern Oregon Coast (Chinook)
CFR	Code of Federal Regulations
CR ESA	Columbia River (salmon stocks listed under the) Endangered Species Act
CR F	Columbia River fall (upper river bright Chinook)
CR S	Columbia River summer (Chinook)
CVF	Central Valley fall (Chinook complex)
CWT	coded-wire tag
CZMA	Coastal Zone Management Act
EA	Environmental Assessment
EC	Ecosystem Component
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ER	exploitation rate
ESA	Endangered Species Act
ESU	evolutionarily significant unit
F	fishing mortality rate (instantaneous)
FMP	Fisheries Management Plan
FNM	far-north migrating
FNMC	far-north migrating coastal (Chinook complex)
FONSI	Finding Of No Significant Impacts
FRFA	final regulatory flexibility analysis
GM	geometric mean
FPA	final preferred alternative
HAT	Hatchery (origin salmon stocks)
HC	Habitat Committee
IRFA	Initial Regulatory Flexibility Analysis
KOHM	Klamath Ocean Harvest Model
KRFC	Klamath River fall Chinook
MEW	Model Evaluation Workgroup
MFMT	maximum fishery mortality threshold
MMPA	Marine Mammal Protection Act
MPA	marine protected area
MSA	Magnuson-Stevens Act
MSP	maximum sustained production
MSRA	Magnuson-Stevens Reauthorization Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service

List of Acronyms (continued)

NOAA	National Oceanic and Atmospheric Administration
NS1Gs	National Standard 1 Guidelines
NWFSC	Northwest Fisheries Science Center
NWR	Northwest Region
OCN	Oregon Coast Natural
ODFW	Oregon Department of Fish and Wildlife
OFL	overfishing limit
OR C	Oregon Coast
OY	optimum yield
PFMC	Pacific Fishery Management Council (Council)
PS	Puget Sound
PSMFC	Pacific States Marine Fisheries Commission
PST	Pacific Salmon Treaty
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
S	spawning escapement
SAC	(Ad Hoc) Salmon Amendment Committee
SAFE	Stock Assessment Fishery Evaluation
SAS	Salmon Advisory Subpanel
SBA	Small Business Administration
SDC	status determination criteria
Secretary	U.S. Secretary of Commerce
SEIS	Supplemental Environmental Impact Statement
SHM	Sacramento Harvest Model
SI	Sacramento Index (of abundance)
SJFC	San Joaquin River fall Chinook
SONC	Southern Oregon-Northern California (Chinook Complex)
SONCC	Southern Oregon-Northern California Coastal (coho ESU)
SRFC	Sacramento River fall Chinook
SSC	Scientific and Statistical Committee
SSRM	stochastic stock recruitment model
STT	Salmon Technical Team
SWFSC	Southwest Fisheries Science Center
SWR	Southwest Region
VEWG	Vulnerability Evaluation Work Group
WA C	Washington Coast (coho)
WA/CR Sp/S	Washington/Oregon spring/summer (Chinook)
WA/OR S/F	Washington/Oregon summer/fall (Chinook)
WOC	Washington, Oregon, and California

EXECUTIVE SUMMARY

The purpose of the proposed action is to provide a framework for specifying biological and management reference points and AMs that will meet the requirements of the revised MSA and NS1Gs to account for uncertainty in the fishery management process, reduce the probability of overfishing, and include clear and objective status determination criteria (SDC), while integrating with existing management processes and capabilities to the degree possible.

This action is needed to bring the Salmon FMP into compliance with new requirements to end and prevent overfishing in the MSA, as amended in 2007, and to address the corresponding 2009 revised NS1Gs (CFR § 600.310). The MSA now requires specification of ABC, ACLs, and AMs. The NS1Gs establish a detailed framework that integrates the existing and new biological reference points and AMs. In addition, the proposed action needs to revise SDC and associated actions of the current status determination criteria (SDC) in the Salmon FMP to make them consistent with the NS1Gs and to address issues with ambiguity, timeliness, and implementation of annual management measures.

Specifically the proposed action needs to:

- Classify salmon stocks in the FMP as “in the fishery” or as “ecosystem components”;
- Identify the salmon stocks for which the international exception to MSA 303(a)(15) (specification of ACLs and AMs) will apply;
- Revise the SDC for overfishing, overfished, approaching overfished, and rebuilt to be “measurable and objective” as required by the MSA, and establish maximum fishing mortality threshold (MFMT) and minimum stock size threshold (MSST) reference points used for status determinations;
- Establish a framework for the specification of the following reference points: overfishing limit (OFL), ABC (with a corresponding ABC control rule), ACL, and possibly annual catch target (ACT);
- Establish AMs to prevent the ACL from being exceeded, where possible, and establish AMs to address overages of the ACL;
- Explain how and why “flexibility” in the application of the NS1Gs will be applied in the Salmon FMP;
- Clarify any discrepancies with current “exceptions” as identified in the Salmon FMP with new terminology of the MSA; and
- Integrate, to the extent possible, existing management processes and capabilities.

Classification Issues

The first step in the classification process is to determine which stocks are still in need of conservation and management measures in Council-area fisheries; these stocks will be classified as “in the fishery” Examples of target stocks in Council-area fisheries are hatchery stocks and productive natural stocks with ocean distributions primarily within the Council area. Non-target salmon stocks include ESA-listed stocks or depressed natural stocks (e.g., Strait of Juan de Fuca coho).

Stocks currently in the FMP that are not recommended to be classified as “in the fishery” can either be omitted altogether, if determined not to be in need of conservation and management measures; or can be classified as Ecosystem Components (ECs). ECs do not require specification of reference points for SDC or ACLs.

Stock complexes are groups of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impacts of management actions on the stocks are similar. Stock complexes may be formed to facilitate management requirements such as setting ACL, or determining stock status.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

The Magnuson Stevens Act (MSA) provides that stocks subject to an international agreement may be excepted from ACL and AM requirements, but still must have all other MSA Section 303(a) requirements, including specification of SDC and MSY.

Under the final preferred alternative (FPA) 4, all stocks currently in the FMP would be retained in the fishery except for Canadian Chinook, coho, and pink stocks, and mid-Columbia River spring Chinook (Table ES-1). The Canadian stocks were removed because the Council did not have responsibility for setting management objectives over these stocks, only for ensuring they were met. The Mid-Columbia River spring Chinook would be removed because Council area fisheries have negligible impacts on the stock, and therefore they were not in need of conservation and management measures in fisheries under the Council authority; in addition, no suitable complex could be specified that would allow specification of ACLs, therefore conservation and management of this stock by the Council and NMFS is unnecessary. No EC stocks were identified. Two stocks would be added to the FMP, Oregon coastal hatchery coho and Willapa Bay natural coho. Smith River Chinook would also be identified as a separate stock form other ESA listed California Coastal Chinook stocks. Three Chinook stock complexes would be specified: Central Valley Fall (CVF), Southern Oregon Northern California (SONC), and far-north migrating coastal (FNMC). The complexes would facilitate specification of ACLs and AMs. The FNMC Chinook complex, Washington coastal and Puget Sound coho, and Puget sound pink salmon would be identified as international exceptions to the ACL and AM provisions of the MSA because these stocks are subject to management under the Pacific Salmon Treaty with Canada.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Table ES-1. Alternatives for stock classification, stock complexes, and application of the international exception for specifying annual catch limit and accountability measures.

Classification	Stock Category	Alternative 1: Status Quo	Alternative 2	Alternative 3	FPA 4
In the Fishery	Individual Stocks	45 Chinook stocks, 21 coho stocks, and 2 pink stocks	46 Chinook stocks, 21 coho stocks, and 2 pink stocks separating Smith River Chinook from Eel, Mattole, Mad Rivers (California Coastal ESU)	32 Chinook stocks, 21 coho stocks, and 2 pink stocks: separating Smith River Chinook from Eel, Mattole, Mad Rivers (California Coastal ESU)	43 Chinook stocks, 23 coho stocks, and 1 pink Smith River Chinook separate; Mid-Col Spring Chinook, and Canadian Chinook, coho and pink salmon removed
	Stock Complexes	7 Chinook and 4 coho complexes	3 Chinook complexes: • Central Valley Fall • Southern Oregon/Northern California • Far North Migrating Coastal	4 Chinook complexes: • Central Valley Fall • Southern Oregon/Northern California • Far North Migrating Coastal • Mid-Columbia Spring	3 Chinook complexes: • Central Valley Fall • Southern Oregon/Northern California • Far North Migrating Coastal
	ESA-listed	9 Chinook and 4 coho ESUs	9 Chinook and 4 coho ESUs	9 Chinook and 4 coho ESUs	9 Chinook and 4 coho ESUs
	Hatchery Stocks	6 Chinook and 6 coho stocks	6 Chinook and 6 coho stocks	6 Chinook and 6 coho stocks	6 Chinook and 7 coho stocks; added Oregon Coast Hatchery coho
	Exploitation Rate Exceptions	14 Chinook stocks (not ESA-listed or hatchery)	NA	NA	NA
	International Exceptions to ACLs and AMs	NA	15 Chinook and 11 coho stocks (not ESA-listed or hatchery) managed under the Pacific Salmon Treaty	11 Chinook and 9 coho stocks (not ESA-listed or hatchery) managed under the Pacific Salmon Treaty	13 Chinook and 9 coho stocks (not ESA-listed or hatchery) managed under the Pacific Salmon Treaty
Not In The Fishery	Ecosystem Component Stocks	NA	None	2 Chinook stocks (FNM) and 2 pink stocks (not ESA-listed or hatchery)	3 Chinook stocks (FNM) and 1 pink stock (not ESA-listed or hatchery)

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Status Determination Criteria

SDC will be applied to natural stocks for which specification of these reference points is appropriate and possible based on the best available science. SDC will continue to be applied to and specified only for individual stocks, not stock complexes. The status of other stocks in a complex will not change as a result of indicator stock status changes. Stocks managed under an international agreement can be excepted from specification of ABC and ACL reference points, but are still required to have MSY and SDC specified.

The proposed SDC alternatives incorporate the reference points identified in the NS1Gs (e.g., F_{MSY}, MFMT, MSST). However, the proposed definitions of some of these references points differ slightly from those in the NS1Gs to accommodate the life history of Pacific salmon, where reproduction is semelparous and a stock's full reproductive potential can be spread out over a multi-year period. These modified approaches are proposed in accordance with the provision allowing for flexibility in the application of the NS1Gs.

Under FPA 5 SDC (a suite of SDC alternatives), a stock would be considered subject to overfishing when the postseason estimate of F exceeds the MFMT, where the MFMT is defined as F_{MSY}, the same as Alternative 2 (Table ES-2). The definitions of overfished, approaching overfished, and rebuilt require multi-year postseason estimates of spawning escapement to be assessed using a 3-year geometric mean to determine status. MSST would be variable among stocks, with most stocks based on MSST = $0.5*S_{MSY}$ (as in Alternative 3), except for SRFC, KRFC, Grays Harbor, Queets, Hoh, and Quillayute coho MSST = $0.75*S_{MSY}$ (as in Alternative 3b), and for Puget Sound coho MSST would equal the stock specific low/critical abundance breakpoint multiplied by one minus the low exploitation rate limit (Tables ES-3 and ES-4). Approaching overfished and rebuilt status under FPA 5would be based on three year geometric means for MSST and S_{MSY}, respectively (as in Alternative 3).

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Table ES-2: Overview of SDC alternatives for overfishing, overfished, approaching overfished, and rebuilt (S = Spawning Escapement; C = catch; t = year; GM = Geometric mean). F and S used are most recent postseason values available unless otherwise noted.

Status Category	Alternative 1: Status Quo Determination Based on Three Consecutive Years: MSST = S_{MSY}	Alternatives 2 & 2b Determination Based on a Single Year: MSST = 0.5*S_{MSY} or 0.75*S_{MSY} (2b)	Alternative 3, Determination Based on 3-Year Geometric Mean: MSST = 0.5*S_{MSY}	Alternative 3b & 3c Determination Based on 3-Year Geometric Mean: MSST = 0.75*S_{MSY} (3b) or 0.86*S_{MSY} (3c)	Alternative 4 and 4b Determination Based on 3-Year Arithmetic Mean: MSST = 0.5*S_{MSY} or 0.75*S_{MSY} (4b)	FPA 5, Determination Based on 3-Year Geometric Mean: MSST is variable among stocks
Overfishing	S(t,t-1,t-2)<MSST and C(t,t-1,t-2) > MSST-S(t,t-I,t-2) i.e. fishing contributed to Overfishing Concern	F > MFMT in one year, with MFMT = F_{MSY}.	Same as Alternative 2 i.e., single year basis	Same as Alternative 2 i.e., single year basis	Same as Alternative 2 i.e., single year basis	Same as Alternative 2 i.e., single year basis
Overfished	S(t,t-1,t-2)<MSST Current NMFS interpretation of Overfishing Concern as defined in FMP.	S < MSST in one year.	GM(S) < MSST over three year period.	Same as Alternative 3 with MSST = 0.75*S_{MSY} (3b) or MSST = 0.86*S_{MSY} (3c)	0(S) < MSST over three year period.	GM(S) < MSST over three year period. MSST = 0.75*S_{MSY} for KRFC, SRFC, WA C coho; Status Quo SDC for PS coho, and 0.5*S_{MSY} for other stocks.
Approaching overfished	S(t-1,t-2)<MSST and S(t) forecast < MSST	S < MSST in one year. S used is current preseason forecast.	GM(S) < MSST over three year period. S used are 2 most recently available postseason values and current preseason forecast.	Same as Alternative 3 with MSST = 0.75*S_{MSY} (3b) or MSST = 0.86*S_{MSY} (3c)	0(S)< MSST over three year period. S used are 2 most recently available postseason values and current preseason forecast.	GM(S) < MSST over three year period. S used are 2 most recently available postseason values and current preseason forecast.
Rebuilt	S > S_{MSY} in one year or as otherwise determined in rebuilding plan.	S ≥ S_{MSY} in one year.	GM(S) ≥ S_{MSY} over three year period.	Same as Alternative 3	0(S) ≥ S_{MSY} over three year period.	GM(S) ≥ S_{MSY} over three year period.

The status categories for overfished, approaching overfished, and rebuilt within each alternative should be considered together, given the need to have comparable metrics among these abundance-based SDC.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Table ES-3. Status determination criteria reference points, assumptions and issues for coho stocks.

Coho Stock	S_{MSY} Est	S_{MSY} Basis	MFMT (F_{MSY}) Est	MFMT (F_{MSY}) Basis	MSST Alt 1 Status Quo Cons Obj	MSST Alt 2, 3, & 4 $0.5*S_{MSY}$	MSST Alt 2b, 3b & 4b $0.75*S_{MSY}$	MSST Alt 3c $0.86*S_{MSY}$	MSST FPA 5 Varies among stocks
CCC – ESA Endangered	Unk	NA	Unk	NA	0.0 HR in CA: ESA BO	Unk	Unk	Unk	Unk
SONCC – ESA Threatened	Unk	NA	Unk	NA	0.13 Ocean ER: ESA BO	Unk	Unk	Unk	Unk
OCN – ESA Threatened	Unk	NA	Unk	NA	0.08-0.45 ER: ESA BO	Unk	Unk	Unk	Unk
LCN – ESA Threatened	Unk	NA	Unk	NA	Ocean & MS CR ER: ESA BO	Unk	Unk	Unk	Unk
Oregon Coastal - Hatchery	Unk	ODFW	UnDef	NA	NA	NA	NA	NA	NA
Columbia River Late - Hatchery	14,100	TAC	UnDef	NA		NA	NA	NA	NA
Columbia River Early - Hatchery	7,100	TAC	UnDef	NA	7,100	NA	NA	NA	NA
Willapa Bay - Hatchery	6,100	WDFW	UnDef	NA	6,100	NA	NA	NA	NA
Quinault - Hatchery	??	QIN?	UnDef	NA	??	NA	NA	NA	NA
Quillayute Summer - Hatchery	300	WDFW	UnDef	NA	300	NA	NA	NA	NA
S. Puget Sound - Hatchery	52,000	WDFW	UnDef	NA	52,000	NA	NA	NA	NA
Grays Harbor	24,426	S_{MSP} FMP $*F_{SMY}$ App C	0.65	PSC	35,400	12,213	18,320	21,007	18,320
Queets	5,800	FMP	0.65	PSC	5,800-14,500	2,750	4,350	4,730	4,350
Hoh	2,520	App E	0.65	PSC	2,000-5,000	1,260	1,890	1,935	1,890
Quillayute Fall	6,300	FMP	0.65	App E	6,300-15,800	2,937	4,725	5,051	4,725
Strait of JdF	11,000	FMP	0.60	FMP	7,000	5,489	8,234	9,442	7,000
Hood Canal	14,350	FMP	0.65	FMP	10,750	7,175	10,762	12,340	10,750
Skagit	25,000	FMP	0.60	FMP	14,875	12,500	18,750	21,500	14,875
Stillaguamish	10,000	FMP	0.50	FMP	6,100	5,000	7,500	8,600	6,100
Snohomish	50,000	FMP	0.60	FMP	31,000	25,000	37,500	43,000	31,000
Canadian Coastal	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA
Fraser River	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Table ES-4. Status determination criteria reference points, assumptions and issues for Chinook stocks. Sp/Su = Spring/Summer, Su/F = Summer/Fall.

Chinook Stock	S_{MSY} Est	S_{MSY} Basis	MFMT (F_{MSY}) Est	MFMT (F_{MSY}) Basis	MSST Alt 1 Status Quo Cons Obj	Alt 2, 3, & 4 $0.5*S_{MSY}$	Alt 2b, 3b & 4b $0.75*S_{MSY}$	Alt 3c $0.86*S_{MSY}$	FPA 5 Varies Among Stocks
Sacramento River Winter – ESA Endangered	Unk	NA	Unk	NA	CA Time/Area /Size restriction: ESA BO	Unk	Unk	Unk	Unk
Sacramento River Spring – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Northern California Coast (Eel, Mattole, Mad Rivers) -ESA Threatened	Unk	NA	Unk	NA	≤ 0.16 Ocean Age-4 KRFC ER: ESA BO	Unk	Unk	Unk	Unk
Upper Willamette Spring – ESA Threatened	Unk	NA	Unk	NA	≤ 0.15 FW ER: ESA BO	Unk	Unk	Unk	Unk
Lower Columbia River (LCR) Natural – ESA Threatened	Unk	NA	Unk	NA	≤ 0.37 ER: ESA BO	Unk	Unk	Unk	Unk
North Fork Lewis Fall – Part of LCR ESU	5,700 5,791	FMP CTC	0.76	CTC	5,700: ESA BO	Unk	Unk	Unk	Unk
Snake River Fall – ESA Threatened	Unk	NA	Unk	NA	≤ 0.70 Base Period ER: ESA BO	Unk	Unk	Unk	Unk
Snake River Sp/Su – ESA Threatened	Unk	NA	Unk	NA	≤ 0.055 to 0.17 FW ER: ESA BO	Unk	Unk	Unk	Unk
Upper Columbia River Spring – ESA Endangered	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Eastern Strait of Juan de Fuca Su/F – ESA Threatened	Unk	NA	Unk	NA	Comp. Chinook ER: ESA 4(d) Rule	Unk	Unk	Unk	Unk
Skokomish Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Nooksack Sp/early Fall – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Skagit - Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Skagit Sp – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Stillaguamish Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Snohomish Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Cedar River Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
White River Spring – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Green River Su/F –	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Chinook Stock	S_{MSY} Est	S_{MSY} Basis	MFMT (F_{MSY}) Est	MFMT (F_{MSY}) Basis	MSST Alt 1 Status Quo Cons Obj	Alt 2, 3, & 4 $0.5*S_{MSY}$	Alt 2b, 3b & 4b $0.75*S_{MSY}$	Alt 3c $0.86*S_{MSY}$	FPA 5 Varies Among Stocks
ESA Threatened									
Nisqually River Su/F – ESA Threatened	Unk	NA	Unk	NA	1,100: ESA 4(d) Rule	Unk	Unk	Unk	Unk
Lower Columbia River Fall - Hatchery	15,400	TAC	UnDef	NA	15,400	NA	NA	NA	NA
Lower Columbia River Spring - Hatchery	2,700	TAC	UnDef	NA	2,700	NA	NA	NA	NA
Mid-Columbia River Bright Fall - Hatchery	Unk	TAC	UnDef	NA	Hatchery Egg Take	NA	NA	NA	NA
Spring Creek Fall-Hatchery	7,000	TAC	UnDef	NA	7,000	NA	NA	NA	NA
Willapa Bay Fall-Hatchery	8,200	WDFW	UnDef	NA	8,200	NA	NA	NA	NA
Quinault Fall–Hatchery	Unk	QIN	UnDef	NA	Egg Take	NA	NA	NA	NA
Sacramento Fall	122,000	Lower	0.78	App C	122,000	61,000	91,500	104,920	91,500
Klamath River Fall	40,700	STT	0.71	STT	35,000 floor: FMP	20,350	30,525	35,000	30,525
Smith River Fall	UnDef	NA	0.78	App C	UnDef	UnDef	UnDef	UnDef	UnDef
Southern Oregon	150,000 to 200,000	FMP	0.78	App C	>60 spawners/ mi: FMP	UnDef	UnDef	UnDef	UnDef
Central and Northern Oregon		FMP	0.78	App C		UnDef	UnDef	UnDef	UnDef
Klickitat, Warms Springs, John Day and Yakima River - Spring	Unk	FMP	Unk	NA	ER Exception	Unk	Unk	Unk	NA
Upper River Bright - Fall	39,625	CTC	0.86	CTC		19,182	29,719	34,078	19,182
Upper River - Summer	12,143	CTC	0.75	CTC		6,072	9,107	10,443	6,072
Willapa Bay - Fall	3,393	WDFW	0.78	App C		1,696	2,545	2,918	1,696
Grays Harbor Fall	11,388	S_{MSP} FMP $*F_{SMY}$ App C	0.78	App C		5,694	8,541	9,794	5,694
Grays Harbor Spring	1,092		0.78	App C		546	819	939	546
Queets - Fall	2,500	FMP	0.87	App C		1,250	1,875	2,150	1,250
Queets – Sp/Sur	700	FMP	0.78	App C		350	525	602	350
Hoh - Fall	1,200	FMP	0.90	App C		600	900	1,032	600
Hoh Sp/Su	900	FMP	0.78	App C		450	675	774	450
Quillayute - Fall	3,000	FMP	0.87	App C		1,500	2,250	2,580	1,500
Quillayute - Sp/Su	1,200	FMP	0.78	App C		600	900	1,032	600
Hoko -Su/F	850	FMP	0.78	App C		425	637	731	425
Canadian Coastal	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA
Fraser River	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Annual Catch Limits

Alternatives for specification of OFL, ABC, and ACL reference points will be made on an individual stock basis for all stocks as required based on the best available science. These reference points will not be specified for any stocks that are identified in the FMP as EC species or stocks that are internationally managed. Hatchery stocks and ESA-listed stocks identified in the FMP will be managed to meet hatchery goals and ESA consultation standards, which serve the function of ACLs, consistent with the NS1Gs flexibility provision to consider alternative approaches for specifying ACLs and AMs.

Under the stock classification FPA 4, the relevant stocks for specifying OFL/ABC/ACL reference points would be Sacramento River fall Chinook (SRFC) and Klamath River fall Chinook (KRFC) as indicator stocks for the CVF and SONC Chinook complexes, respectively. It is possible that South Oregon Coast Chinook, or some stock components thereof, may also support specification of these reference points after implementation of this FMP amendment. These stocks could then serve either as additional indicator stocks for the SONC complex, form an independent complex, or be managed as individual stocks. Other stocks classified as in the fishery are either included in the CVF or SONC Chinook complexes, or are not required to have ACLs specified because of the international management exception

The FPA 3 specifies OFL and ABC as escapement levels for each stock. These OFL and ABC escapement levels are determined using exploitation rates (i.e., F_{MSY} and F_{ABC}) and abundance estimates for each stock (Table ES-5). F_{MSY} and F_{ABC} are defined in terms of total exploitation rate across all salmon fisheries (Federal and nonfederal jurisdictions). Impacts in non-salmon fisheries are included in the natural mortality assumptions used to estimate population parameters for salmon stocks; therefore, all fishing mortality sources are accounted for when reference points are specified. Current conservation objectives for all FMP-managed stocks, expressed as either spawning escapement or exploitation rate limits, can be expressed as exploitation rate control rules, with allowable exploitation rates dependent on stock abundance.

<u>OFL</u>: OFL would be derived from the stock-specific estimate of F_{MSY}, or an F_{MSY} proxy, and abundance. Under the alternatives described in the EA, OFL would be expressed in terms of either catch (C) or spawning escapement (S). As mentioned above, FPA 3 defines the OFL in terms of escapement. Stock-specific estimates of F_{MSY} based on spawner-recruit data will be used if available. Otherwise, proxy values based on species-specific meta-analyses would be used. The derivation of the F_{MSY} proxy value for Chinook (0.78) is shown in Appendix C.

<u>ABC and the ABC Control Rule</u>: ABC will be derived from an ABC control rule. The first step in determining the annual ABC is to specify $F_{ABC.}$ The second step requires applying F_{ABC} to the abundance (preseason projected or postseason actual) to derive the annual ABC value expressed in terms of C or S, depending on the alternative. FPA 3 defines the ABC in terms of escapement.

F_{ABC} is a constant exploitation rate which is reduced from F_{MSY} by a buffer that accounts for scientific uncertainty. Two tiers of buffers have been established based on the level of scientific uncertainty associated with stocks having different levels of data-richness. Taking such a tiered approach to specification of the ABC is consistent with the NS1Gs[1] and appropriately accounts for the differences in scientific uncertainty among the stocks (Appendix D).

- <u>Tier-1</u>: For stocks that have sufficient data to conduct a stock-specific spawner-recruit analysis, and for which F_{MSY} has been directly estimated, the buffer level is 5 percent ($F_{ABC} = F_{MSY} \times 0.95$).

[1] 50 CFR 600.310 (f)(4)

- Tier-2: For stocks that have not undergone a spawner-recruit analysis, and F_{MSY} has been determined by proxy, the buffer level is 10 percent ($F_{ABC} = F_{MSY} \times 0.90$).

The ACL can be based on C or S, depending on the alternative. FPA 3would use ACL based on S with $S_{ACL} = S_{ABC}$.

With regard to SRFC, the control rules for all the alternatives assume S_{MSY} = 122,000. For SRFC, the most notable difference between status quo and the control rule incorporating the ABC is the specification of the maximum exploitation rate at F_{ABC} (Figure ES-1). Under the status quo alternative (without the ABC control rule), the target exploitation rate for SRFC continues to increase with increasing abundance, approaching F = 1 as abundance increases. For KRFC, the status quo maximum allowable exploitation rate is 0.67, and application of the ABC control rule results in a minor change in maximum allowable F from 0.67 to 0.68. Under FPA 3 the control rule for KRFC would target an escapement of 40,700 natural area adult spawners (Figure ES-1). This would result in a decrease in the allowable exploitation rate over a portion of the range, because of the target spawner escapement level of S_{MSY} = 40,700 instead of the status quo conservation objective (escapement floor) of 35,000.

Table ES-5. Overview of alternatives for OFL, ABC, ACL, ACT, and the associated framework.

Alternatives	**OFL**	**ABC**	**ACL**	**ACT**[a/]	**Framework**
1) Status Quo	Not identified	Not identified	Not identified	Not identified	--NA— Current conservation objectives specified not to exceed (S_{MSY})
2) Catch (C) Based	C_{OFL}	C_{ABC}	C_{ACL}	C_{ACT} [a/]	$C_{OFL} > C_{ABC} = C_{ACL} > C_{ACT}$ $C_{OFL}(t) = N(t) \times F_{MSY}$ $C_{ABC}(t) = N(t) \times F_{ABC}$ F_{ABC} = 95% or 90% F_{MSY}[b/]
3) FPA Spawning Escapement (S) Based	S_{OFL}	S_{ABC}	S_{ACL}	S_{ACT} [a/]	$S_{OFL} < S_{ABC} = S_{ACL} < S_{ACT}$ $S_{OFL}(t) = N(t) \times (1-F_{MSY})$ $S_{ABC}(t) = N(t) \times (1-F_{ABC})$ F_{ABC} = 95% or 90% F_{MSY}[b/]

a/ ACT could be used, as needed, but is undefined at this time.
b/ The buffer to account for scientific uncertainty is either 95 percent or 90 percent of F_{MSY}, depending on whether the F_{MSY} value represents a stock-specific estimate (Tier-1) or proxy value (Tier-2), respectively.

In years with low abundance, the S_{ACL} could be specified at a level lower than the conservation objective escapement target. In that situation, the conservation objective escapement target would remain the management target for the fishery. In years with high abundance, the S_{ACL} would be specified at a level that could be greater than the conservation objective escapement target. In that situation, the fishery would be designed to achieve an amount of returning spawners no less than the S_{ACL} (i.e., greater than S specified in the conservation objective).

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

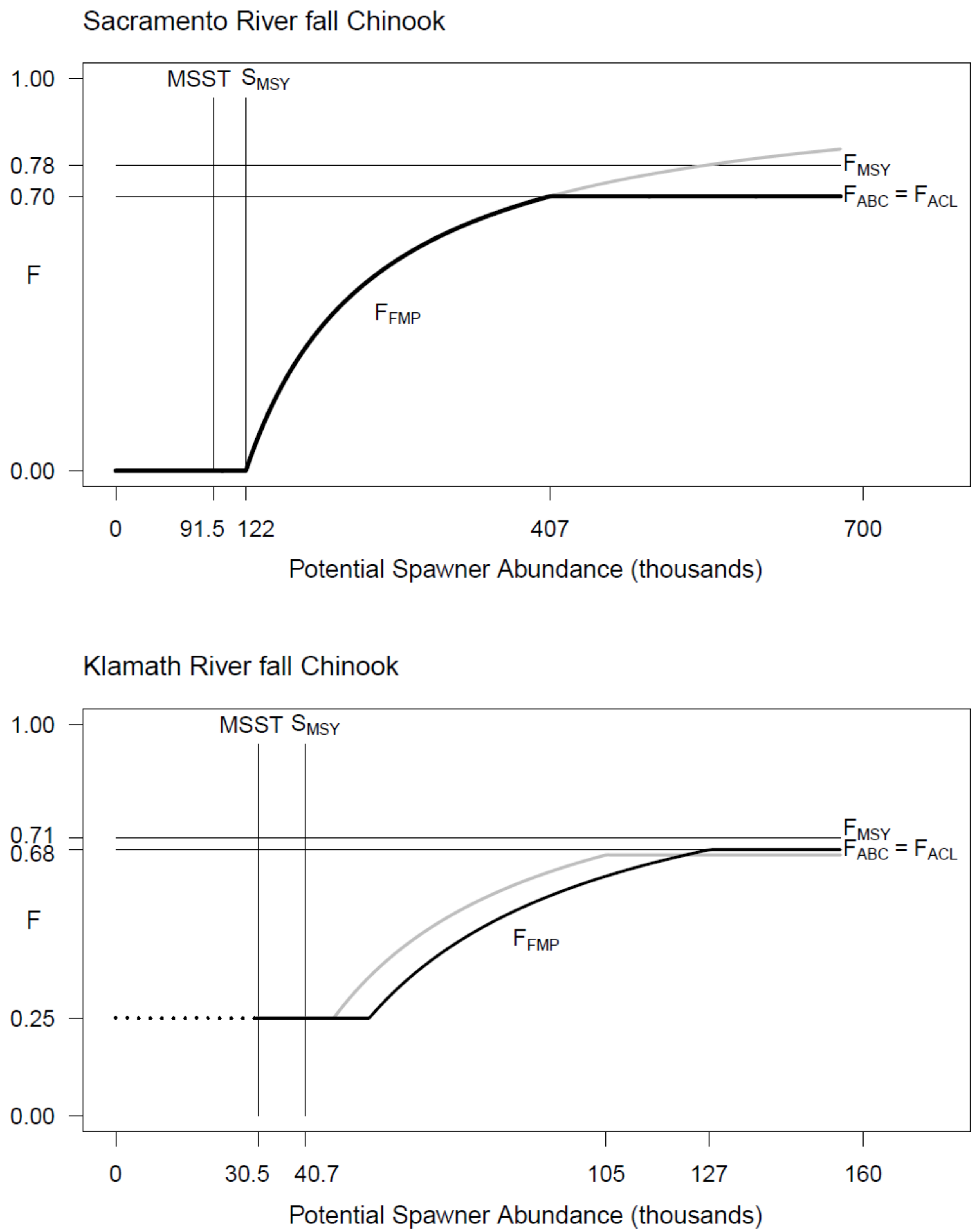

Figure ES-1. Status quo (thick gray line) and Alternative 2 and Final Preferred Alternative (FPA) 3 (thick black line) F-based control rules for SRFC and KRFC. Reference points MSST, S_{MSY}, F_{MSY}, F_{ABC}, and F_{ACL}, are denoted by thin black lines.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Accountability Measures

In addition to ACLs, AMs are required management controls to both prevent ACLs from being exceeded, and to correct or mitigate overages of ACLs if they occur. AMs are intended to minimize the frequency and magnitude of overages of the ACL, and to correct any problems that caused the overage.

A number of current FMP actions meet the intent of AMs. While some of them would not be directly working in combination with an ACL, they are in place to prevent overfishing. However, under FPA 3, the "conservation alert" and "overfishing concern" were replaced with actions associated with SDC FPA 5.

FPA3 In-season (and preseason) AMs

- In-season authority to manage quota fisheries (FMP § 10.1)
- Mixed-stock quota monitoring (FMP § 7.1)
- Quota partitioning (FMP § 5.3 and10.2)
- Quota trading (FMP § 5,3 and 10.2)
- Changes to gear/bag/size/trip limits (FMP § 6 and 10.2)
- Boundary modifications (FMP § 6 and 10.2)
- Landing restrictions (FMP § 6), and
- In-season monitoring and reporting requirements. (FMP § 7)

FPA 3 Post-season AMs

- Postseason monitoring and reporting through the annual SAFE document (FMP § 8)
- Salmon Methodology Review Process (COP-15; PFMC 2008).

Annual Catch Target (ACT): An ACT may be adopted in any fishing year in which there is increased management uncertainty in the fishery causing increased uncertainty in maintaining compliance with the ACL. The ACT would be specified at a level sufficiently below the ACL to buffer for the management uncertainty it is implemented to address, incorporating uncertainty in the ability to constrain catch for ACL compliance, and uncertainty in quantifying the true catch amounts (i.e., estimation errors)[2].

Re-evaluation of the ACLs and AMs System: The ACL described in FPA 3 relies on a postseason evaluation for assessing compliance with ACLs. If the evaluation determines that spawning escapement was not in compliance with the ACL more than once in four consecutive years, the Council will direct the STT to conduct an assessment of the cause. The assessment will include consideration of the tiered buffers used to account for scientific uncertainty, and may include recommendations for changing the buffers to a level that would increase the compliance rate to an appropriate level (e.g., 75 percent compliance rate).

Pending the outcome of the STT re-evaluation of the system of ACLs and AMs, an ACT may be implemented as an interim measure if it was determined that the cause was related to management uncertainty in the fishery and to reduce the likelihood of future non-compliance with the ACL until any new or updated measures are approved. When it is determined that the fishery has been out of compliance with the ACL more than once in four consecutive years, an ACT may be adopted, which could be based on applying an buffer additional to the ABC control rule (in addition to the tiered scientific uncertainty buffers in the ABC control rule). The additional buffer would remain in place until either additional measures are adopted to ensure an appropriate compliance with ACLs, or it has been demonstrated that the buffer is not necessary to achieve an appropriate compliance level.

[2] As explained in 50 CFR 600.310(f)(6)(i)

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

De minimis Fishing Provisions

De minimis fishing provisions give more flexibility to the process of setting annual regulations when the conservation objectives for limiting stocks are projected not to be met, and provide opportunity to access more abundant salmon stocks that are typically available in the Council management area when the status of one stock may otherwise preclude all ocean salmon fishing in a large region, as is the case under the conservation alert actions in the current FMP. This would reduce the risk of fishery restrictions that impose severe economic consequences to local communities and states. While this action seeks to provide management flexibility in times of scarcity, there is an overriding mandate to preserve the long-term productive capacity of all stocks to ensure meaningful contributions to ocean and river fisheries in the future, and to ensure that the total fishing mortality rate does not exceed F_{MSY}.

Status quo *de minimis* fishing provisions are variable among stocks, and not defined for SRFC. For KRFC, the *de minimis* fishing provision added to the FMP by Amendment 15 allows an ocean impact rate of no more than 10 percent on age–4 Klamath River fall Chinook, if the projected natural spawning escapement with a 10 percent age–4 ocean impact rate is between 35,000 and 22,000. If the projected natural escapement is less than 22,000, the Council must further reduce the allowable age– 4 ocean impact rate to reflect the status of the stock. The final rule implementing Amendment 15 states that as escapement falls below approximately 30,000, the impact rate will need to decline automatically.

The general form of *de minimis* alternatives use as F-based control rule, where as stock size declines, the allowable exploitation rate declines from F_{ABC} in order to achieve S_{MSY}, until F = 0.25. A constant exploitation rate of 0.25 is allowed until the point where F must be further reduced in order to achieve a spawner escapement equal to some specified level, defined relative to MSST.

Alternative 2 specifies a *de minimis* exploitation rate of F0.25, when spawner abundance level is less than $1.33*S_{MSY}$ and is reduced to F=0 at the midpoint between S_{MSY} and MSST [(S_{MSY} + MSST)/2] Figure ES-2, top panel).

Alternative 3 specifies a *de minimis* exploitation rate of F≤0.25, similar to Alternative 2 except that F is reduced to F=0 at a spawner abundance level of MSST (Figure ES-2, second panel).

Alternatives 2b and 3b are similar to Alternatives 2 and 3 except that for KRFC only, the control rule would target the 35,000 natural area spawner floor rather than S_{MSY} (40,700), as is currently done under the status quo alternative.

Alternative 4 specifies a *de minimis* exploitation rate of F≤0.25, similar to Alternative 2 except that F is reduced to F=0 at a spawner abundance level of one half of MSST (MSST/2) (Figure ES-2, third panel).

Alternative 5 specifies that as stock size declines, the allowable exploitation rate declines from F_{ABC} until F = 0.25. A constant exploitation rate of 0.25 is allowed until the midpoint between S_{MSY} and MSST, below which F must be further reduced; however, there is no set stock size where F must equal zero (Figure ES-2, forth panel). Reduction below F=0.25 would not be structured, but would be in response to year-specific circumstances such as abundance of other stocks, recent spawning escapement performance, in order to achieve a spawner abundance equal to the MSST. Alternative 5 would not trigger the *de minimis* fishing rate until projected spawners fell to 35,000 natural area spawner floor for KRFC rather than S_{MSY} (40,700), as under Alternatives 2, 3, and 4.

FPA 6 is a structured, two step alternative that allows some harvest at all abundance levels (Figure ES-2, bottom panel). As stock size declines, the allowable exploitation rate declines from F_{ABC} in order to achieve S_{MSY} until F=0.25. A constant maximum exploitation rate of 0.25 is allowed until the potential

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

spawner abundance reaches the midpoint between S_{MSY} and MSST where F will be reduced in proportion to abundance to no more than 10 percent at MSST. At potential spawner abundance levels less than or equal to half of MSST the allowable exploitation rate will be further reduced to levels approaching zero as abundance approaches zero.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

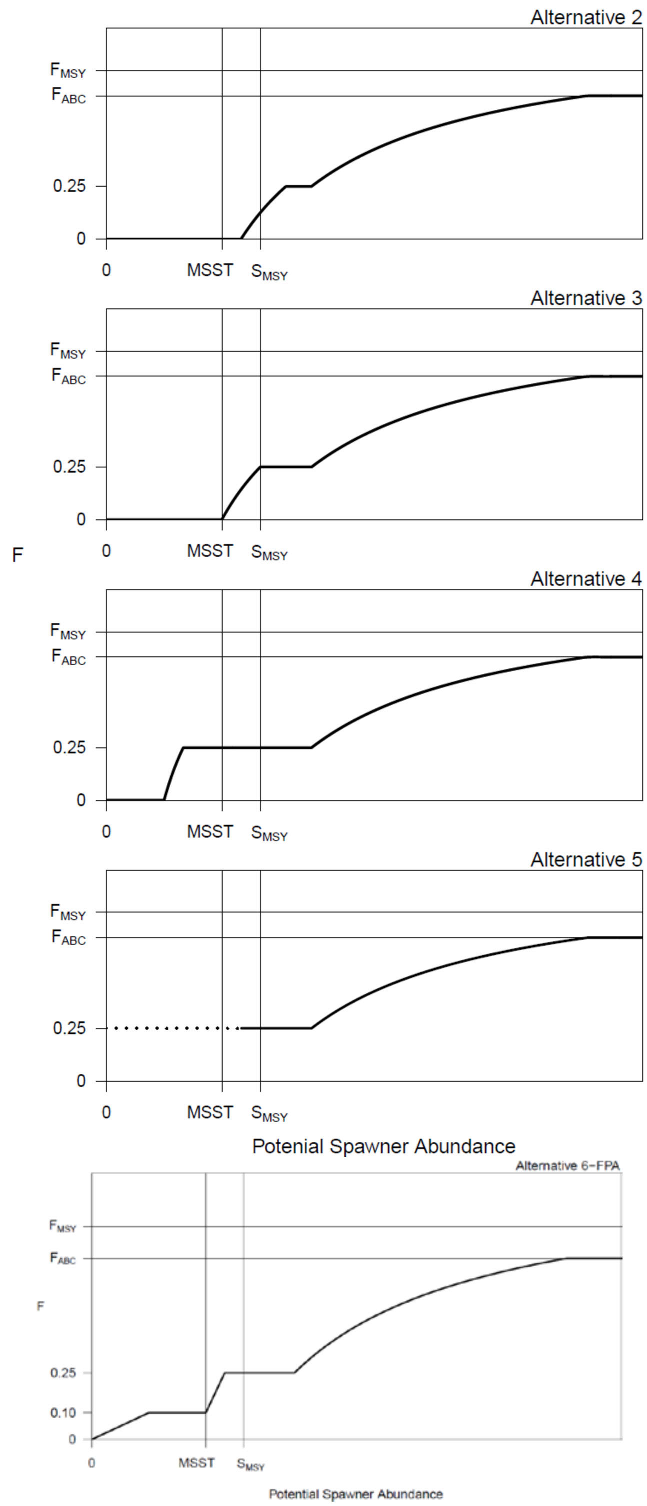

Figure ES-2. *De minimis* fishing Alternatives. Alternative 1 (status quo) is not shown because it is variable among stocks.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Biological and Economic Effects

Economic effects were assessed primarily by considering the effects of the Alternatives on short- and long-term catch and effort in the ocean fisheries; therefore, effects to the biological environment that affected available harvest could be used to anticipate economic effects. Generally, short-term positive economic effects were correlated with short- or long-term negative biological effects, and long-term positive economic effects with long-term positive biological effects. Some of the economic analyses were qualitative and only characterized effects relative to the Status Quo and the other Alternatives, and some, such as possible consumer response to status determinations, were only speculative – based on recent events – and without any quantitative information. However, some quantitative information was available to assess economic effects of alternatives for *de minimis* fishing provisions.

Economic effects were expected from SDC, ACL, AM, and *de minimis* fishing Alternatives. The economic effects from all the alternatives, like the biological effects, were determined to be not significant

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Table ES-6. Summary of environmental effects of Alternatives.

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
Stock Classificatio	2.1	Tables 2-1, 2-2, 2-3 , 2-4, 2-5, and 2-6	Four *(1, 2, 3, and FPA 4)*	Stocks in the fishery or Ecosystem Components; Stock Complexes and indicator stocks; Stocks subject to the international exception to application of ACLs Alt. 1: COHO, CHINOOK, and PINK: status quo; all stocks in the fishery; no EC stocks, new stock complexes or international exceptions Alt. 2: COHO: no EC stocks; SONCC coho includes southern OCN component stocks; 12 international exceptions CHINOOK: Smith River as separate stock; mid-Columbia spring removed from fishery; no EC stocks; 3 new stock complexes (CVF, SONC, FNMC); 15 international exceptions PINK: remove Fraser Canadian stocks from the fishery; 1 international exception Alt. 3: COHO: no EC stocks; remove Canadian stocks from fishery; 10 international exceptions CHINOOK: Smith River as separate stock; Columbia fall and mid-Columbia spring as EC stocks; 2 Canadian stocks removed from the fishery; 4 new stock complexes (CVF, SONC, FNMC, Mid-Columbia spring); 12 international exceptions PINK: both are EC stocks; no international exceptions FPA 4: COHO: no EC stocks; SONCC coho includes southern OCN component s; two new stocks added – Willapa natural and Oregon coast hatchery, two Canadian stocks removed; 10 international exceptions CHINOOK: Smith River as separate stock; 2 Canadian stocks and mid-Columbia spring removed from fishery; no EC stocks; 3 new stock complexes (CVF, SONC, FNMC); 13 international exceptions PINK: remove Fraser Canadian stocks from the fishery; 1 international exception	Alt. 1: effects not significant; however, the lack of newly formed stock complexes is inconsistent with MSA and NS1Gs Alt. 2: Effects not significant Alt. 3: Effects not significant FPA 4: Effects not significant	Stock classification alternatives do not have significant changes or impacts on the affected biological environment and therefore no significant economic impacts.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
Status Determination Criteria (SDC)	2.2	2-7	Nine Suites (*1,2/2b, 3 3b/3c, 4/4b, and FPA 5*)	Different alternatives for the reference points, specified for each stock annually: <u>Overfishing</u> (postseason) Alt 1: Status Quo; no consistent criteria, based on assessment of overfishing concern. FPA 2: Based on the fishing mortality rate exceeding the maximum fishing mortality threshold, OR the annual catch exceeding the overfishing limit. <u>Approaching Overfished</u> (preseason) based on the MSST Alt. 1: status quo; based on 3 consecutive years of MSST= S_{MSY} Alt. 2/2b: based on single year of MSST = 0.5* S_{MSY} or 0.75*S_{MSY} (2b) FPA 3, Alts. 3b/3c: based on 3-year geometric mean of MSST =0.5*S_{MSY}, or 0.75*S_{MSY} (3b) or 0.86*S_{MSY} (for KRFC) (3c) Alt. 4/4b: based on 3-year arithmetic mean of MSST=0.5* S_{MSY} or 0.75*S_{MSY} (4b) Overfished (postseason) Alts. 1, 2, 2b, 3, 3b, 3c, 4, 4b: Same as approaching overfished Alternatives. FPA 5: Variable among stocks with Washington coastal coho, SRFC and KRFC like Alt 3b; Puget Sound coho MSST between Alt. 3 and 3b; other stocks like Alt. 3. <u>Rebuilt</u> (postseason) based on stock achieving S_{MSY}: Alt. 1/2/2b: status quo; one year>S_{MSY} FPA 3/3b/3c: 3-year geometric mean≥S_{MSY} Alt. 4/4b: 3-year arithmetic mean ≥S_{MSY}	Alt. 1: Overfished determinations less likely to occur compared to Alt. 2 Alt. 2: overfishing determination would rarely occur, so negligible impacts are expected. Overfished determinations more likely to occur compared to status quo, although it may not be indicative of a long-term trend. Alt. 3 (FPA): poses greatest risk of negative effects and Alt. 2 poses the least risk for overfished SDC. More accurately represents risk to reproductive potential. Decreased probability of overfished determinations when faced with a single weak year-class; decreased probability of rebuilt determinations when faced with a single strong year-class for weak stocks. Geometric mean is less sensitive to large values and more sensitive to low values; geometric mean is most appropriate and currently used for log-normal distributions, such as salmon abundances. Alt. 4: for overfished SDC provides the greatest risk of positive effects. Arithmetic mean is more sensitive to large values; less precautionary than using the geometric mean. Constraining fisheries to prevent a stock from becoming overfished has a positive effect. An overfished determination has no direct biological effects. Overall, the SDC alternatives could result in beneficial or positive impacts in the long-term, but not significant.	Overfishing: Economic effect of Alt. 2 for the overfishing SDC should have long-term positive economic effects in terms of harvest. Short-term economic effects could be negative compared to the status quo if exploitation or harvest rates and access to production in excess of F_{MSY} are constrained. Effects would not be significant due to rare occurrence. Overfished and Approaching Overfished: Alt. 4 would have the fewest negative short-term economic effects and long term negative economic effects in terms of harvest. Alt. 2b would have the greatest short-term negative economic effects in terms of harvest. Effects would not be significant because fishery closures are not required. Rebuilt: There would be short-term negative economic impacts from the 3-year geometric mean for Alt. 3 and 4 in terms of lower harvest and impact on price. Effects would not be significant because fishery closures are not required.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
Overfishing Limit (OFL), Acceptable Biological Catch (ABC), Annual Catch Limit (ACL), and Annual Catch Target (ACT)	2.3	2-10	Four (1, 2, FPA 3, 3b)	- Alt. 1: status quo; currently implemented; reference points of OFL, ABC, ACL, & ACT are not specified for any stock; stocks managed using tools such as quotas and time/area closures - Alt. 2: OFLs, ABLs, ACLs, & ACTs (as needed) are expressed in terms of catch (Consistent with NS1G); OFL and ABC are specified on the basis of stock-specific exploitation rates and abundances; ABC is buffered from the OFL by 5-10% to account for scientific uncertainty - FPA 3: OFLs, ABCs, ACLs, & ACTs (as needed) are expressed in terms of spawning escapement; OFL and ABC are specified on the basis of stock-specific exploitation rates and abundances; ABC is buffered from the OFL by 5-10% to account for scientific uncertainty; KRFC managed for 40,700 natural spawners (S_{MSY}); spawning escapement is the most commonly used metric - Alt. 3b: identical to Alt. 3 except KRFC is managed for 35,000 natural spawners; inconsistent with MSA	Alt. 1: not consistent with MSA and NS1Gs Alt. 2: most consistent with NS1Gs; most complicated to estimate and additional tools would need to be developed FPA 3: more conservative and protective of KRFC than Alt. 3b; would have long-term positive effects on KRFC, but not significant; generally consistent with NS1Gs, as guidelines allow for flexibility; most consistent with FMP objectives, salmon biology; current management structure; technically feasible For SRFC, there are direct positive effects with Alt. 2 & 3. For KRFC, the effect is small or negligible. Alt 3b: similar to status quo for KRFC, no significant effects.	Alt. 2 and FPA 3 for ACLs should have long-term positive effects because the ACL framework would help ensure the stock is exploited at levels that do not exceed F_{MSY}. Short-term effects are likely to be negative in terms of harvest. For KRFC, Alt. 2 and 3 may have a short-term negative economic effect due to decreased harvest, but would have long-term positive effects due to managing for MSY.
Accountability Measures (AMs)	2.4		Three (*1, 2, & FPA 3*)	- Alt. 1: inseason authority; mixed-stock quota monitoring, quota partitioning, and trading; gear/bag/size/trip limits; boundary modifications; landing restrictions; inseason monitoring and reporting requirements; SAFE document; conservation alert; postseason monitoring; overfishing concern assessment; notice to managers; methodology review - Alt. 2: Same as Alt. 1 except modification of conservation alerts to only require notice to managers; modification of overfishing concern renamed as abundance alert; possible adoption of an ACT; AMs occur when ACL is exceeded, such as notice to managers and reevaluation of ACLs and AMs - FPA 3: similar to Alt. 2 except that conservation alert and overfishing concern actions no longer considered AMs and no longer retained in FMP	AMs would have offsetting positive and negative effects; not significant Alt. 1: does not meet the purpose and need of the proposed action; not a viable alternative	The alternatives are expected to have some level of direct or indirect economic impacts (such as on harvest levels), but none of the accountability measures would have significant economic impacts since some effects are offsetting and AMs are generally preventive or corrective measures and mostly administrative in nature.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
De minimis fishing provisions	2.5		Seven *(1, 2/2b, 3/3b, 4, 5 & FPA 6*	*De minimis* exploitation rates of 25% for SRFC and KRFC spawner escapement less than S_{MSY} Alt. 1: status quo; currently implemented for KRFC; *de minimis* fishing not defined for SRFC Alt. 2, 2b: F=0 at midpoint between S_{MSY} and MSST Alt. 3, 3b: F=0 at MSST Alt. 4: F=0 at 0.5*MSST Alt. 5: F< 0.25 below the midpoint between S_{MSY} and MSST (unstructured reduction) FPA 6: F≤0.25 at S_{MSY} until the midpoint of S_{MSY} and MSST; F≤0.10 at MSST until ½ of MSST; F=0 at S=0 Alts. 2b, 3b – similar to Alt. 2, 3 except that KRFC is managed for 35,000 natural spawners, rather than S_{MSY}	Alt. 1: managing for an annual target of 35,000 natural area adult KRFC spawners (less than S_{MSY}) is inconsistent with MSA and NS1Gs ; not consistent with NS8 because of lack of *de minimis* fishing for SRFC Alt. 2, 3, 4: would achieve OY Alt. 2b, 3b, 5: would not achieve OY; inconsistent with MSA and NS1Gs No significant impacts from *de minimis* alternatives, but long-term negative impacts to KRFC from Alts. 2b, 3b, and 5.	Alternatives 2-6 should provide short-term positive economic effects compared to the Status Quo Alternative. These alternatives may have long term negative economic effects because SRFC could become overfished more frequently, which could lead to more restrictions on future fisheries. For KRFC, Alternatives 2, 4, and FPA 6 may have a short-term negative economic effect on harvest, but would have a long-term positive effect because of managing for MSY. Alternative 5 yielded the highest cumulative ocean commercial ex-vessel value and recreational trips across all MSST conventions and management zones, However, Alt 5 has mixed results for river tribal and non-tribal recreational catches, i.e., Status quo fared better for non-tribal river recreational catches.

Note: NS = Not significant; Although there could be some positive or negative economic impacts associated to different amendment alternatives relative to status quo, the economic significance would be none or not significant, i.e., the value of change expected to be much less than $100 million to the case of the West Coast salmon fishing industry under PFMC.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria; SONC-Southern Oregon Northern California

1.0 INTRODUCTION

The reauthorization of the Magnuson-Stevens Act (MSA) in 2006 established new requirements to end and prevent overfishing through the use of annual catch limits (ACLs) and accountability measures (AMs). The reauthorization also contained new requirements for the Scientific and Statistical Committee (SSC) to recommend acceptable biological catch (ABC) levels to the Council. On January 16, 2009, National Marine Fisheries Service (NMFS) published amended guidelines for National Standard 1 (NS1Gs) to provide guidance on how to comply with new provisions of the MSA. In order to comply with these new requirements and guidelines, the Salmon Fishery Management Plan (FMP) needs to be amended.

The process to amend the Salmon FMP began in March 2009 with initiation of scoping of an FMP amendment to address the new MSA requirements and NS1Gs. At that time the Council also identified some related issues that should be considered in the amendment process, including *de minimis* fishing provisions and updates to stock conservation objectives. The Council was interested in alternatives to complete fishery closures when stock projections were below objectives. Most salmon stocks had some form of allowance for these circumstances, but a few did not, resulting in situations like 2008-2009 (fishery closures) and 2006 (emergency rule promulgation).

1.1 Document Organization

This is an integrated document in regard to the assessments required for an FMP amendment. The Council decision process for this amendment is outlined in Section 1.3. The description of the proposed amendment and impacts in Sections 2.0, 4.0 and 5.0 contain key elements necessary for a Regulatory Impact Review/Initial Regulatory Flexibility Analysis (RIR/IRFA) and Environmental Assessment (EA). Section 5.0 summarizes the relationship of this amendment to other existing laws and policies. Section 5.5 contains or references the information required for a complete RIR/IRFA. The proposed FMP wording changes necessary to implement the amendment appears in Section 6.0.

1.2 Purpose and Need for Action

The purpose of the proposed action is to provide a framework for specifying biological and management reference points and AMs that will meet the requirements of the revised MSA and NS1Gs to account for uncertainty in the fishery management process, reduce the probability of overfishing, and include clear and objective status determination criteria (SDC), while integrating with existing management processes and capabilities to the degree possible.

This action is needed to bring the Salmon FMP into compliance with new requirements to end and prevent overfishing in the MSA, as amended in 2007, and to address the corresponding 2009 revised NS1Gs (CFR § 600.310). The MSA now requires specification of ABC, ACLs, and AMs. The NS1Gs establish a detailed framework that integrates the existing and new biological reference points and AMs. In addition, the proposed action needs to describe SDC associated with overfished and overfishing determinations in the Salmon FMP to ensure consistency with the MSA and NS1Gs and to address issues with ambiguity, timeliness, and implementation of annual management measures.

Specifically the proposed action needs to:

- Classify salmon stocks in the FMP as “in the fishery” or as “ecosystem components”;
- Identify the salmon stocks for which the international exception to MSA 303(a)(15) (specification of ACLs and AMs) will apply;

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- Revise the SDC for overfishing, overfished, approaching overfished, and rebuilt to be "measurable and objective" as required by the MSA, and establish maximum fishing mortality threshold (MFMT) and minimum stock size threshold (MSST) reference points used for status determinations;
- Establish a framework for the specification of the following reference points: overfishing limit (OFL), ABC (with a corresponding ABC control rule), ACL, and possibly annual catch target (ACT);
- Establish AMs to prevent the ACL from being exceeded, where possible, and establish AMs to address overages of the ACL;
- Explain how and why "flexibility" in the application of the NS1Gs will be applied in the Salmon FMP;
- Clarify any discrepancies with current "exceptions" as identified in the Salmon FMP with new terminology of the MSA; and
- Integrate, to the extent possible, existing management processes and capabilities.

1.3 Plan Development Schedule and Council Advisory Committee Participation

The expectation for this action was that the Council would recommend to the U.S. Secretary of Commerce (Secretary) adoption of an amended Salmon FMP in time for implementation of regulations affecting ocean salmon fisheries commencing May 1, 2011. However, the exact form and wording of the final recommendations depended on the results of the analyses and findings that are presented in this document. To facilitate this effort an *ad hoc* Salmon Amendment Committee (SAC) was appointed to develop and analyze alternatives and to report to the Council on the progress of the overall initiative.

The SAC included representatives from NMFS Northwest Region (NWR), Southwest Region (SWR), Northwest Fisheries Science Center (NWFSC), Southwest Fisheries Science Center (SWFSC), and General Counsel, plus members of the Salmon Technical Team (STT) representing state and tribal agencies, and a member of the SSC. The committee was responsible for preparing the draft amendment and Council/public review documents, including modeling and analytical components and written narratives, and for Federal regulatory streamlining responsibilities, including the Council/NMFS interface and Federal internal policies to allow for timely Secretarial review and an approval/disapproval decision of the final Council action at the November 2010 meeting. Individual SAC members were called upon to prepare or submit report sections depending on their particular area of expertise and availability to assist in Council activities. The names of committee members and their affiliations appear in Appendix A.

It is anticipated that adoption of proposed amended Salmon FMP will be completed in time for the 2012 preseason process and implementation of regulations affecting ocean salmon fisheries effective May 1, 2012.

1.3.1 Council Decision Process

The Council recommendations for amending the FMP were based on findings using a stepwise process, as follows:

1. Thorough review of the history, management framework, scientific literature, pertinent regulatory documents and administrative orders, and social and economic data as they relate to the management of Pacific Coast Chinook, coho, and pink salmon stocks;
2. Development of a set of alternatives using the Council meeting process to solicit input from the public and Council advisory groups;
3. Analysis and evaluation of alternatives relative to i) National Oceanic and Atmospheric Administration (NOAA) Environmental Review Procedures, ii) the National Standards of the

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

MSA, iii) the long-term productivity of the stocks addressed in the FMP, iv) protection of ESA-listed species, v) community economic impacts, and vi) other applicable law; and
4. Establishment of the biological conditions, regulatory timeframe, and associated regulatory considerations for implementation of regulations as part of the Council's annual ocean salmon management process.

1.4 Background and Related Documents

1.4.1 Scoping Summary

The Council initiated the FMP amendment process after NMFS had published the final rule for NS1Gs. The Council initially identified the following topics for tentative inclusion in the amendment process:

- ACL and AM;
- Revised SDC for overfishing and overfished designations;
- Revising stock conservation objectives to include updated maximum sustainable yield (MSY) values, exploitation rate approaches, and *de minimis* fishing provisions for stocks without such measures;
- Exceptions to the ACL and AM requirements for stocks managed under the Pacific Salmon Treaty (PST), and ;
- Sector ACL/AM for multi-jurisdictional fisheries.

The Council directed that preliminary alternatives be developed to facilitate further scoping of issues at the September 2009 meeting. The SAC held a meeting in August 2009, which was open to the public, to discuss and further develop issues for Council consideration, and to consider possible alternatives that could exemplify approaches to those issues.

At the September 2009 Council meeting, the SAC presented its scoping summary to the Council and its advisory bodies (SSC, STT, SAS). After receiving the SAC report, statements from the advisory bodies, and providing an opportunity for public comment, the Council directed that the amendment process focus on issues directly related to the MSA requirements and NS1Gs related to ACL/AM and SDC, including:

- Determine which stocks or stock complexes would be subject to ACLs and AMs;
- Establish ACLs and AMs for appropriate stocks or stock complexes;
- Revising SDC for Overfishing and Overfished designations;
- Characterizing stock conservation objectives relative to specified reference points (MSY, OFL, ABC, ACL, and ACT), and;
- Council action required under the FMP overfishing criteria relating to *de minimis* fishery provisions and fishery closures.

The Council directed the SAC to develop suites of alternatives that would encompass the range of options for the above topics. Alternatives were to include formation of stock complexes with indicator stocks to facilitate setting ACL/AM, with options for quota management in salmon fisheries south of Cape Falcon, and options for using buffers to facilitate traditional time/area salmon fisheries south of Cape Falcon.

The SAC met several times between the September 2009 and June 2010 Council meetings to develop alternatives for presentation to the Council at its June 2010 meeting. All meetings of the SAC were noticed in the Federal Register, were open to the public, and provided formal opportunity for public comment.

At the June 2010 Council meeting, the Council recommended preliminary preferred alternatives (PPAs) for stock classification and application of the international exception to the ACL and AM requirements for salmon stocks currently identified in the Salmon FMP. The Council also recommended including the alternatives presented in the SAC Progress Report (PFMC 2010) for SDC, OFL/ABC/ACL frameworks, and *de minimis* fishery provisions for the range of alternatives analyzed during preparation of this EA. The Council also recommended a variation on the SDC alternatives be developed, and directed the SAC to structure *de minimis* fishing provisions to decrease fishing mortality rates to zero before stock abundance approached zero.

At the September 2010 Council meeting the Council provided additional guidance on the Alternatives, and specified PPAs for stock classification, SDC, ACLs, AM, and *de minimis* fishing provisions. The Council accepted the alternatives developed by the SAC, and added a new stock classification alternative and new alternatives for Klamath River fall Chinook (KRFC) affecting MSST and *de minimis* fishing provisions. The Council also requested the state and tribal co-managers provide input to the SAC regarding appropriate choices for SDC reference points for Washington coastal and Puget Sound coho stocks to facilitate analyses of the Alternatives.

At its November 2010 meeting the SAC presented an update on development of the Alternatives and requested clarification and changes on a number of issues, including formation of a stock complex(s) to address far-north migrating (FNM) Chinook stocks, consistency in use of annual and 3-year mean SDC, and schedule for taking final Council action on Amendment 16. The Council provided the requested guidance and scheduled final action for June 2011.

The SAC met May 16-17, 2011 to finalize the draft EA, which was released for public comment with the Council's June 2011 briefing materials.

The Council took final action on Amendment 16 at its June 2011 meeting, and transmitted the final draft EA to NMFS on September 12, 2011.

1.4.2 Related Documents Incorporated by Reference

There are numerous documents available related to Council-area salmon management, which were in the analyses in this EA and support the decision at hand. These documents incorporated by reference are briefly described below and their relevance to the analysis is explained.

1.4.2.1 Pacific Coast Salmon Plan (Salmon FMP)

The Salmon FMP (PFMC 2007) establishes conservation and allocation guidelines for annual management. This framework allows the Council to develop measures responsive to stock status in a given year. Section 3 of the current Salmon FMP describes the conservation objectives for Salmon FMP stocks necessary to meet the dual MSA objectives of obtaining optimum yield (OY) from a fishery while preventing overfishing. Each stock has a specific objective, generally designed to achieve MSY, maximum sustained production (MSP), or in some cases, an exploitation rate to serve as an MSY proxy. The Salmon FMP also specifies criteria to determine when overfishing may be occurring and when a stock may have become overfished. These conditions are referred to as a Conservation Alert and an Overfishing Concern, respectively. In addition, the Salmon FMP also specifies required actions when these conditions are triggered. The alternatives described in Section 2 are structured around the actions required when a Conservation Alert is triggered.

The annual 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

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

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 2000 SEIS accompanied Amendment 14, implemented in 2001, which set the current Salmon FMP conservation objectives, and described the criteria and actions for a Conservation Alert and an Overfishing Concern. These EISs represent information and analytical resources that, as appropriate, are incorporated into this document.

1.4.2.2 Review of Ocean Salmon Fisheries

This Stock Assessment and Fishery Evaluation (SAFE) document is the first in a series of annual documents prepared by the STT. It provides an historical context for fishery impacts, spawning escapement, and management performance for Salmon FMP 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. The Review of 2010 Ocean Salmon Fisheries (PFMC 2011a) SAFE document provides a baseline for fishery impacts and economic assessments used in this EA. The most recent version of the review report for the previous year is available from the Council office beginning in late February.

1.4.2.3 Preseason Reports I, II, and III

Preseason Report I is the second in the series prepared by the STT and presents projected stock abundances for Salmon FMP stocks, including the methodology and performance of predictors. The most recent version of the report is available from the Council office beginning in late February (PFMC 2011b).

Preseason Report II presents the range of regulatory ocean fishery alternatives that the Council was considering for the coming salmon season. It is distributed to the public and reviewed in public hearings to solicit public input of preferred management measures. This document, along with Preseason Report I and the Review of Ocean Salmon Fisheries, also constitutes an EA describing and analyzing the effects of the annual regulation alternatives on the environment. The most recent version of the report is available from the Council office beginning in late March (PFMC 2011c).

Preseason Report III is the final document in the series prepared by the STT. It details the final management measures adopted by the Council for recommendation to NMFS for the coming season's regulations. It includes an analysis of the effects of the management measures on conservation objectives for key salmon stocks. The most recent version of the report is available from the Council office beginning in late April. (PFMC 2011d)

1.4.2.4 2006 Ocean Salmon Regulations EA (2006 Regulations EA)

The 2006 regulations EA analyzes the environmental and socioeconomic impacts of proposed management measures for ocean salmon fisheries occurring off the coasts of Washington, Oregon, and California. The document evaluated the 2006 annual salmon ocean harvest management measures with respect to compliance with the terms of the Salmon FMP, obligations under the PST, and the level of protection required by all consultation standards for salmon species listed under the ESA. The range of alternatives analyzed in the 2006 Regulations EA included the effects of three levels of *de minimis* fishing strategies on KRFC when the stock was projected to fall below the 35,000 natural spawner floor for the third consecutive year. The 2006 EA supported NMFS' Finding of No Significant Impacts (FONSI) for the 2006 ocean salmon regulations. The affected environment Section and socioeconomic analysis of the

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2006 Regulations EA represent the current environmental baseline and a reasonable expectation of economic impacts for recent years, and are incorporated by reference in this EA.

1.4.2.5 Salmon Amendment 15 Environmental Assessment

The EA for Salmon FMP Amendment 15 (PFMC and NMFS 2007) analyzes the environmental and socioeconomic impacts of allowing limited (*de minimis*) harvest levels of KRFC in ocean salmon fisheries during years that might otherwise be closed because of a projected shortfall in the KRFC conservation objective. The purpose of the initiative was two-fold: (1) to give more flexibility to the rule-making process when a Conservation Alert for KFRC was triggered; and (2) to provide for appropriate opportunities to access more robust Chinook salmon stocks that are typically available in the Council-managed area. This would allow for Council action without the need for NMFS to declare and approve an emergency rule. The initiative was needed to prevent fishery restrictions that impose severe economic consequences to local communities and states. While Amendment 15 sought to provide management flexibility in times of low KRFC abundance, there was an overriding mandate to preserve the long-term productive capacity of the stock to ensure meaningful contributions to ocean and river fisheries in the future.

Two approaches were used to analyze the biological effects of the Status Quo and *de minimis* fishery alternatives: 1) pre-season implementation of the alternatives using 1985-2006 pre-season ocean abundance and fishery impact estimates (hindcast analysis), and; 2) development and application of a KRFC population model that incorporated available information on stock productivity, stock dynamics, effect of ocean and river fisheries on stock abundance, and precision of pre-season stock abundance and ocean fishery impact projections (stochastic stock recruitment model; SSRM). The hindcast analysis was instructive with regard to *de minimis* fishery implementation procedure and frequency based on past years data, but was not an appropriate methodology for projecting natural spawning escapements.

A statistical analysis was done relating natural spawning escapement in the Salmon, Scott, and Shasta Rivers to total Klamath Basin natural spawning escapement using the SSRM. Review of available population viability information and KRFC biological data were used to establish effective population size criteria for these important mid-Klamath River Basin natural spawning streams

1.4.2.6 Klamath River Fall Chinook Stock-Recruitment Analysis

This report consisted of (STT 2005): 1) an estimate the parameters of a Ricker-type stock-recruitment model, including an estimate of the spawner abundance expected to generate maximum sustainable yield; 2) a correlation analysis of production (survival) and river flow conditions during the juvenile freshwater phase; and 3) a correlation analysis of production and river flow conditions during the parent spawning period.

Three models were used to develop spawner reference point estimates assuming a Ricker-type stock-recruitment relationship. Model 1 used only parent spawner abundance as a predictor of subsequent brood recruitment. Model 2 included both parent spawner abundance and a measure of post-freshwater-rearing survival as predictors of subsequent recruitment. This measure of post-freshwater-rearing survival covered the period from the onset of juvenile outmigration in May-June, through the end of August of that same year. Model 3, under development by the Canadian Department of Fisheries and Oceans, was based on a meta-analysis of Ricker stock-recruitment relationships for Chinook salmon populations from the Oregon coast through Southeast Alaska, and used accessible watershed area (5th order and higher streams) as a predictor of subsequent recruitment. Model 2 was ultimately determined to represent the best approach, and resulted in estimates of 40,700 natural area adult spawners for MSY spawning escapement based on data from brood years 1979-2000.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

1.5 Relevant Issues

The alternatives in this EA were initially screened to determine if they deserved further consideration and analysis. The criteria used for the initial screening were based on feasibility, and meeting the purpose and need statement, including requirements of MSA and NS1Gs. Specific criteria evaluated included:

- OFL/ABC/ACL framework includes catch (C) or spawning escapement (S) based reference points such that OFL>ABC≥ACL, or escapement-based reference points such that OFL<ABC≤ACL
- SDC are measurable and objective
- The probability of overfishing is less than 50 percent
- The probability of becoming overfished is less than 50 percent

Viable alternatives were then analyzed to provide a basis for comparing and contrasting alternatives and selecting a preferred alternative. In addition to the above criteria, the analysis consisted of evaluating the following:

A*dministrative implementation feasibility*. Factors affecting administrative implementation include the ability of management agencies to:

- Monitor fisheries in-season
- Take in-season action to close fisheries
- Take in-season action to modify management measures necessary to meet preseason objectives
- Assess fisheries and compliance with objectives and standards

Scientific assessment capability. Factors affecting scientific assessment include:

- Preseason forecasting of exploitation rates, abundance, and harvest impacts used to develop annual management measures
- Postseason assessment of those factors to determine compliance with achieving reference points
- Relative uncertainty of methods for estimating reference points

In order to analyze the environmental impacts of the alternatives (Chapter 4 of this EA), the following criteria were evaluated:
The relative short and long-term economic effects on the fishery. Factors affecting economic impacts include:

- Coastal community impacts
- Angler Trips
- Foregone opportunity
- Allocation of resources among fishing sectors

The effects on cultural resources and activities. Factors affecting cultural resources include:

- Tribal access to harvestable surplus
- Potential for full utilization

The relative effects on biological factors. Biological factors include:

- Risk of overfishing
- Risk to long-term stock productivity

Section 6.02 of the NOAA Administrative Order 216-6 enumerates a specific set of guidelines for identifying potentially significant environmental impacts resulting from a fishery management action. These factors are:

- The relative effects of the Alternatives to jeopardize the sustainability of any target species that may

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

be affected by the action.

- The relative effects of the Alternatives to jeopardize the sustainability of any non-target species.
- Whether 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 MSA and identified in FMPs.
- Whether the proposed action may be expected to have a substantial impact on biodiversity and ecosystem function within the affected area.
- The relative effects of the Alternatives to have a substantial adverse impact on public health or safety.
- The relative effects of the Alternatives to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species.
- The relative effects of the Alternatives to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species.
- If significant social or economic impacts are interrelated with significant natural or physical environmental effects.

  During initial scoping, this factor was not considered likely to be affected by the proposed action because significant effects to the natural environment were not expected; therefore, it was not further considered in the EA.
- If effects on the quality of the human environment are likely to be highly controversial.

  During initial scoping, this factor was not considered likely because the analyses of the proposed action would be based on the best available science, and different or controversial analytical methods were not anticipated; therefore, this factor was not further considered in the EA.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.0 DESCRIPTION OF ALTERNATIVES

This Section provides a description of the alternatives considered under this EA. Alternatives were developed for:

- Stock classification and application of the MSA international exception (Section 2.1)
- SDC (Section 2.2)
- OFL/ABC/ACL frameworks (Section 2.3)
- AMs (Section 2.5)
- *De minimis* fishing provisions (Section 2.5)

Alternatives were then evaluated relative to meeting the purpose and need of the proposed action (Section 1.2) using the criteria established in Section 1.5. Additional analysis of the effects of the alternatives on the socioeconomic and biological environments is presented in Chapter 4.

2.1 Stock Classification

The MSA requires that an FMP describe the stocks of fish involved in the fishery. The NS1Gs provide a structure for classifying stocks in and around the fishery, and organizing stock complexes. These organizing principles are an important first step in developing an FMP that is consistent with the NS1Gs since they affect how other key provisions of the MSA and NS1Gs may be applied including, for example, SDC, ACLs, and AMs. The NS1Gs recommend that stocks identified in an FMP be classified as in or out of the fishery. Target stocks are in the fishery and some non-target stocks could also be in the fishery; EC stocks are not. Individual stocks can be managed as part of a stock complex so that, for example, data-poor stocks can be managed in association with data-rich stocks with similar characteristics. This classification scheme helps conceptualize how the fishery operates, which stocks are affected by various fishery sectors, and how SDC and ACL provisions, among other MSA Section 303(a) provisions, may be applied.

This Section identifies alternatives for how salmon stocks currently listed in the FMP could be classified in the FMP consistent with the NS1Gs § 600.310(d). It includes alternatives for designating several Chinook and pink stocks as EC and establishing complexes for some Chinook stocks. The Section also provides alternatives for application of the international exception to MSA Section 303(a)(15) (i.e., ACLs and AMs).

Criteria Used to Evaluate the Alternatives

The criteria used to evaluate alternatives related to stock classification and application of the international exception are consistency with the MSA and NS1Gs, and feasibility of implementation.

Considerations within the criterion for MSA and NS1Gs consistency include:

- Providing a description of the fishery including the species and stocks involved[3]
- Classifying the stocks in the FMP[4]
- Applying the international exception to the requirement to establish ACL mechanisms and AMs as part of the overall classification scheme where appropriate[5]

[3] MSA §303(a)(2)
[4] NS1Gs § 600.310(d)
[5] NS1Gs § 600.310(h)(2)

2.1.1 Classification Issues

The first step in the classification process is to review the stocks currently listed in the FMP and determine which stocks are still in need of conservation and management measures in Council-area fisheries; these stocks will be classified as "in the fishery" (i.e., for which MSA Section 303(a) requirements apply), consistent with the NS1Gs § 600.310(d). Stocks "in the fishery" will include target stocks (stocks that fishers seek to catch for sale or personal use, including "economic discards"), and non-target stocks (fish caught incidentally during the pursuit of target stocks in a fishery, including "regulatory discards") in need of conservation and management. Examples of target stocks in Council-area fisheries are hatchery stocks and productive natural stocks with ocean distributions primarily within the Council area. Non-target salmon stocks include ESA-listed stocks or depressed natural stocks (e.g., Strait of Juan de Fuca coho).

Stocks currently in the FMP that are not recommended to be classified as "in the fishery" can either be omitted altogether, if determined not to be in need of conservation and management measures; or can be classified as ECs (see NS1Gs § 600.310(d)(5)). If classified as an EC, they would be assessed as to their vulnerability to the fishery and monitored, but not actively managed in Council-area fisheries under the Pacific Salmon FMP. ECs do not require specification of reference points for SDC or ACLs.

The NS1Gs define stock complexes as groups of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impacts of management actions on the stocks are similar. Stock complexes may be formed to facilitate management requirements such as setting ACL, or determining stock status.

Although the international exception to ACLs and AMs is not directly related to how stocks in the fishery are classified, addressing it in this Section helps simplify the subsequent consideration of alternatives for reference points. Stocks that are subject to an international agreement may be excepted from ACL and AM requirements, but still must meet all other MSA Section 303(a) requirements, including specification of SDC and MSY.

2.1.2 Alternatives for Stock Classification

In this Section, the following alternatives are described:

- Alternatives for stocks currently included in the FMP that will be classified as "in the fishery"
- Alternatives for stocks currently included in the FMP that will be classified as ECs
- Alternatives for designating stock complexes and indicator stocks to facilitate management of data-poor stocks
- Alternatives for application of the international exception to the ACL requirements.

The proposed alternatives are broken out separately for coho, Chinook, and pink stocks. To simplify the presentation of the proposed alternatives for stock classification, current stocks listed in the FMP have been organized into groups based on the following characteristics: similar geographic area, life history, ESA-listed, and hatchery-produced (Table 2-1). Some of these stock groupings correspond to complexes identified in the current FMP, although the intent of displaying these stock groupings here is not to reference or establish stock complexes; only to simplify the presentation of alternatives. There are only two pink stocks, so no further simplification was required. Canadian Chinook, coho, and pink stocks are included in the current FMP. The alternatives include proposals to remove Canadian stocks from the FMP. Proposed alternatives also consider removing Mid-Columbia River spring Chinook from the FMP.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 2-1. Coho and Chinook stock groups and abbreviations used in classification alternative descriptions.

Coho			Chinook		
Stock Group	**Abbreviation**	**# Stocks**	**Stock Group**	**Abbreviation**	**# Stocks**
Endangered Species Act	ESA	4	Endangered Species Act – California origin	CA ESA	3
Hatchery	HAT	6	Endangered Species Act – Columbia River origin	CR ESA	5
Puget Sound	PS	5	Endangered Species Act – Puget Sound origin	PS ESA	13
Washington Coastal	WA C	4	Hatchery	HAT	6
Canadian	CAN	2	Columbia River Summer	CR S	1
			Columbia River Fall	CR F	1
			Mid-Columbia River Far-North Migrating Spring (non-ESA-listed)	Mid-C Sp	1
			Far-North Migrating Coastal Washington and Central-Northern Oregon Spring/Summer and Fall (non-ESA-listed)	FNMC	10
			S. Oregon/N. California	SONC	3(4)[a/]
			California Central Valley Fall	CVF	1
			Canadian	CAN	2
Totals		21			47

a/ The three stocks currently listed in the FMP are South Oregon Coast, Klamath River fall and Klamath River spring. Under Classification Alternatives 2 and 3, Smith River (CA) Chinook would be moved to the SONC stock group from the Eel, Mad, Mattole, and Smith rivers stock group so that the stock groups are aligned with ESA listing designations. The Smith River is not part of the California Coastal Chinook ESU which is listed as threatened.

Alternative 1 in the Tables 2-2, 2-3, and 2-4 generally represents status quo, or an adaptation of status quo to conform as closely as possible to the new MSA requirements and NS1Gs.

2.1.2.1 Classification Alternatives for Coho Stocks

All of the U.S. origin coho stocks have ocean distributions primarily in Council waters and are substantially affected by Council-area fisheries. Canadian coho stocks are also affected by U.S. fisheries. No EC stocks are proposed. Under the status quo Alternative 1, all stocks currently listed in the FMP would remain in the fishery with no reorganization of stock groups. Under Alternative 2 all coho stocks currently listed in the FMP would remain in the fishery, however, the Southern Oregon Coast Natural (OCN) stock component would be removed from the OCN stock designation and included with the Northern California coho stock designation, which would be renamed to the Southern Oregon Northern California Coastal (SONCC) coho stock, consistent with the ESU designation (Table 2-2). The OCN fishery impact matrix could then be modified to use only the Northern, North Central and South Central OCN stock components. The FMP classification would then be consistent with the current ESA consultation standard for SONCC coho, which uses Rogue/Klamath hatchery coho as a surrogate for that ESU. Alternative 3 would remove Canadian coho stocks from the FMP. Conservation and management of Canadian stocks under the FMP is not necessary as they are managed under the PST, and their status is assessed under Canadian authority, outside of the Council. However, Council-area fisheries would still be managed to comply with terms of the PST with regard to these Canadian stocks. The Council's final preferred Alternative (FPA) 4 is similar to Alternative 3 except that Willapa Bay natural coho and Oregon

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Coastal hatchery coho would be added to the FMP stocks. These stocks are currently assessed in the annual SAFE document (PFMC 2011a), and are modeled stocks in the Coho Fishery Regulation Assessment Model (FRAM). Both stocks are significantly impacted in Council area fisheries.

Table 2-2. Alternatives for classification of coho stocks.

Classification	Alternative 1 – Status Quo	Alternative 2	Alternative 3[d/]	Final Preferred Alternative[e/]
In the Fishery	HAT – 6 ESA – 4 WA C – 4 PS – 5 CAN – 2	HAT – 6[a/] ESA– 4[a/b/] WA C – 4[c/] PS – 5[c/] CAN – 2[c/]	HAT – 6[a/] ESA– 4[a/b/] WA C – 4[c/] PS – 5[c/]	HAT – 7[a/] ESA– 4[a/b/] Willapa Natural WA C – 4[c/] PS – 5[c/]
Ecosystem Component Stocks	None	None	None	None

a/ Reference points would be based on hatchery goals and ESA consultation standards. (50 CFR 600.310(h)(3)).
b/ Places the Southern OCN stock component with the Northern California stock to conform to current ESU designations.
c/ Stocks to which the MSA international exception to specification of ACL will be applied. Specification of ABC will also not be required, but specification of SDC reference points is required.
d/ Canadian stocks would be removed from the fishery.
e/ Canadian stocks would be removed from the fishery, Willapa Bay natural and Oregon Coastal hatchery coho would be added to the FMP.

2.1.2.2 Classification Alternatives for Chinook Stocks

Chinook stocks have more diverse ocean distribution and life history characteristics than coho, and therefore require different management approaches. While all coho stocks in the FMP are available to Council-area fisheries, many Chinook stocks originating in the Southern U.S. are largely unavailable due to a combination of ocean migration patterns and run timing. Therefore, Chinook stocks can be classified to reflect the management capability and characteristics of the stocks.

Alternative 1 reflects status quo, and all stocks currently identified in the FMP remain in the fishery. Alternatives 2 and 3 would identify non-ESA listed Smith River Chinook as a separate stock, rather than associating it with the ESA-listed Eel, Mattole, and Mad rivers stock group as it is currently represented in the FMP (Table 2-3). Alternative 2 removes Mid-Columbia River spring stocks from the fishery because they are not caught in Council-area fisheries (Appendix G, LaVoy 2010). Alternative 3 classifies non-ESA-listed Columbia River fall and Mid-Columbia River springs stocks as EC stocks (not in the fishery) because they are non-target stocks of the fishery, and have low vulnerability to Council-area fisheries (see Appendix B); exploitation rates on these stocks in Council-area fisheries are less than 5 percent and do not affect stock status. Alternative 3 would also remove Canadian Chinook stocks from the FMP. Conservation and management of Canadian stocks under the FMP is not necessary as they are managed under the PST, and their status is assessed under Canadian authority, outside of the Council. However, Council-area fisheries would still be managed to comply with terms of the PST with regard to these Canadian stocks. FPA 4 is similar to Alternative 2 except that Canadian Chinook stocks would also be removed from the FMP.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 2-3. Alternatives for classification of Chinook stocks.

Classification	Alternative 1 – Status Quo	Alternative 2	Alternative 3[c/]	Final Preferred Alternative 4
In the Fishery	CVF – 1 SONC - 3 HAT – 6 CA ESA – 3 CR ESA – 5 PS ESA – 13 CR S – 1 CR F[a/] – 1 Mid-C Sp [a/] – 1 FNMC [a/] – 11 CAN – 2	CVF – 1 SONC - 4[b/] HAT – 6 CA ESA – 3 CR ESA – 5 PS ESA – 13 CR S – 1 CR F[a/] – 1 FNMC [a/] – 11 CAN – 2 ~~Mid-C Sp [a/] – 1~~	CVF – 1 SONC – 4[b/] HAT – 6 CA ESA – 3 CR ESA – 5 PS ESA – 13 CR S – 1 FNMC [a/] – 11 ~~CAN – 2~~	CVF – 1 SONC - 4[b/] HAT – 6 CA ESA – 3 CR ESA – 5 PS ESA – 13 CR S – 1 CR F[a/] – 1 FNMC [a/] – 11 ~~CAN – 2~~ ~~Mid-C Sp [a/] – 1~~
Ecosystem Component Stocks	None	None	CR F [a/] – 1 Mid-C Sp [a/] – 1	None

a/ Far north migrating (FNM) stocks.
b/ Includes Smith River Chinook, which was included with the ESA-listed Eel, Mattole, and Mad rivers group in the status quo alternative.
c/ Canadian stocks would be removed from the fishery.

2.1.2.3 Classification Alternatives for Pink Stocks

Pink salmon are generally abundant in odd numbered years only. Council-area fisheries frequently provide additional opportunity to retain pink salmon (e.g., increased bag limits), but overall impacts are negligible, generally fractions of 1 percent over the last 20 years, and occur only in the northern part of the Washington coastal fishery.

Alternative 1 reflects status quo, including both pink stocks in the fishery as they are in the current FMP. Alternative 2 is the FPA, and would remove Canadian pink stocks from the FMP. Conservation and management of Canadian stocks under the FMP is not necessary as they are managed under the PST, and their status is assessed under Canadian authority, outside of the Council. However, Council-area fisheries would still be managed to comply with terms of the PST with regard to these Canadian stocks. Alternative 3 reflects the low vulnerability of pink stocks to Council-area fisheries (see Appendix B), and classifies them as EC, because they are non-target stocks and retention in Council-area fisheries does not affect stock status (Table 2-4).

Table 2-4. Alternatives for classification of pink salmon stocks.

Classification	Alternative 1-Status Quo	FPA Alternative 2	Alternative 3[a/]
In the Fishery	PS Fraser (CAN)	PS ~~Fraser (CAN)~~	None
Ecosystem Component Species	None		PS Fraser (CAN)

a/ The Canadian stock would be removed from the fishery.

2.1.2.4 Rationale for Ecosystem Components

Ecosystem component stocks are not considered to be “in the fishery,” and do not require specification of reference points. Section (d)(5) of the NS1Gs provides criteria for classification of EC stocks. Such stocks should:

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- Be a non-target species or non-target stock;
- Not be determined to be subject to overfishing, approaching overfished, or overfished;
- Not be likely to become subject to overfishing or overfished, according to the best available information, in the absence of conservation and management measures; and
- Not generally be retained for sale or personal use.

However, The NS1Gs also indicate that occasional retention of the stock would not, in and of itself, preclude consideration of the species under the EC classification. A stock's vulnerability to fisheries is also an important consideration when designating EC stocks; stocks that are highly vulnerable to Council-area ocean salmon fisheries would not be good candidates for EC classification under the Salmon FMP.

For this FMP amendment, Stock Classification Alternative 3 includes designating 2 Chinook stocks and both pink stocks as EC. Unique circumstances related to salmon are such that there are some ambiguities related to criteria for classifying EC stocks, but their classification as ECs is consistent with the intent of the NS1Gs and the overall MSA conservation and management requirements related to preventing overfishing and achieving OY.

Individual salmon caught during the ocean fishery can be distinguished at the species level (e.g., Chinook can be distinguished from coho), but stocks within a species cannot otherwise be identified and selectively released. Mid-Columbia River spring and Columbia River fall stocks are distinguished from many other Chinook stocks in the fishery by their low contribution to Council-area fisheries. Other far north migrating stocks in the FNMC stock are also caught at low rates in Council-area fisheries; however, because not all of the stocks in the FNMC group have low contribution rates, they are not proposed to be EC stocks. In the current Salmon FMP, these stocks were identified as having minimal harvest impacts if the cumulative exploitation rate in Council fisheries during the 1979-1982 base period was less than 5 percent. Fisheries are now much reduced relative to what they were 30 years ago so Council fishery exploitation rates on these stocks are generally at the low end of the 0 to 5 percent range. A more contemporary analysis of the vulnerability of these far north migrating stocks is provided in Appendix B. The vulnerability analysis shows that these stocks have low vulnerability relative to other Chinook stocks that are in the fishery, and are very low on the vulnerability scale relative to all stocks and species considered in that overall vulnerability analysis.

Another consideration for an EC designation relates to whether they are retained in the fishery. The near absence of the Mid-Columbia River spring and Columbia River fall stocks in the fishery is such that they cannot be targeted. Far north migrating Chinook are instead caught incidentally while targeting the abundant hatchery and natural-origin stocks that drive the fishery. Although these stocks are retained if caught, the NS1Gs provide that occasional retention does not itself preclude consideration of the species for EC classification.

Although Council fisheries have little impact on the Mid-Columbia River spring and Columbia River fall stocks, they are subject to management and related protections by other management jurisdictions. Columbia River fall stocks are substantially impacted in fisheries north of the U.S. Canadian border and are managed under the PST. Columbia River fall and Mid-Columbia spring Chinook stocks are caught in inland fisheries and are thus subject to management controls provided by the states of Washington and Oregon and treaty tribes. However, these stocks would not be subject to determinations for overfishing, overfished, or approaching an overfished condition if designated as EC stocks. Impacts are such that the reduced attention to stock-specific conservation and management measures in Council fisheries associated with an EC designation would have no material effect on whether the stocks become overfished or subject to overfishing in the future.

For similar reasons, Alternative 3 designates the Fraser River and Puget Sound pink stocks as ECs. Pink salmon have a two-year life cycle and are abundant only in odd numbered years. Because the pink stocks are returning to Puget Sound and the Fraser River, they are only caught in Council fisheries in the northern catch areas off Washington. The catch in Council fisheries in odd numbered years totals a few hundred or at most a few thousand fish relative to run sizes of hundreds of thousands or millions. Exploitation rates in Council-area fisheries are therefore fractions of one percent. The vulnerability analysis indicates that pink salmon are one of the least vulnerable species of all the species and stocks in the overall analysis (Appendix B).

Pink salmon are caught incidentally in the fisheries directed at other species, and retention is allowed because of the absence of any conservation constraints in Council-area fisheries. As indicated above, retention of a stock does not necessarily preclude consideration of an EC designation. Pink salmon are generally not targeted in the fishery. Recreational fishermen target Chinook and coho salmon which are larger and greatly preferred in terms of table fare. Pink salmon are also not targeted in the Council-area commercial fishery because of their low value (cents per pound). Commercial pink salmon fisheries are viable only in cases where there is localized, high volume opportunity. The inland fisheries where these stocks are caught are managed under the PST. The pink salmon stocks are also not subject to overfishing, and are not overfished or approaching an overfished condition. Impacts are such that the reduced attention to stock-specific conservation and management measures in Council fisheries associated with an EC designation would have no material effect on whether the stocks become overfished or subject to overfishing in the future.

The overriding consideration when making an EC designation is whether they are in need of conservation and management under the MSA, especially if conservation and management is necessary to prevent overfishing. Designating the Chinook and pink stocks as proposed is consistent with these requirements. The fisheries that do affect these stocks to the north and in inland areas are managed responsibly. The state, tribal, and Federal entities involved with Council-area management are also directly involved in the PST and inland management processes. Since all of these stocks return to Washington and Oregon, except Fraser pinks, the interest in protecting them is clear. Impacts to these stocks in Council fisheries are low, to the point where Council fisheries have no material effect on the status of pink stocks or to achieving OY for the other stocks in the fishery. Impacts are too low to cause overfishing or contribute to rebuilding if needed. Designating these stocks as ECs does not diminish their protection, it simply defers it to those with the ability and responsibility for their direct management. Because the EC stocks would remain in the FMP, they would continue to be monitored in order to evaluate their status. If circumstances change, their classification as ECs could be reconsidered.

Consistency with the MSA and NS1Gs: The MSA §303(a)(2) requires that an FMP contain a description of the species involved in the fishery. The NS1Gs § 600.310(d) further requires that the FMP identify target and non-target stocks in the fishery. Non-target stocks may be designated as EC species if appropriate. All of the alternatives satisfy these requirements.

Feasibility of Implementation: All of the alternatives are feasible to the extent that they classify stocks in the fishery with the level of specificity required by the MSA and NS1Gs.

2.1.3 Alternatives for Stock Complexes and Indicator Stocks

The MSA requires ACLs be specified for each stock or stock complex in the fishery, unless subject to the international exception to MSA Section 303(a)(15) (see MSA Section 303 note). Some stocks currently listed in the FMP have insufficient information to develop individual catch (or spawning escapement) based ACLs, such as Klamath River spring Chinook; therefore, formation of stock complexes may be necessary to address the intent of the NS1Gs and prevent overfishing of these data-poor stocks. Each stock complex would need one or more indicator stocks to establish annual harvest constraints (e.g., ACLs) based on status of those indicator stocks.

As mentioned above, stock complexes in the current Salmon FMP were identified for organizational purposes rather than for management at the complex level as described in the NS1Gs. These complexes may or may not have indicator stocks appropriate for specifying ACLs; for example, the northern California Coast Chinook complex has KRFC as an indicator stock, but the Oregon Coast Chinook complex does not have a single indicator stock and the two components rely on an unspecified portion of the aggregate abundance index for status determination (Table 2-5). Some alternatives propose reorganizing stock complexes to ensure that data-poor stocks are managed consistent with the NS1Gs. In Section 2.3, ACL alternatives describe the basis of annual catch limits as spawning escapement or catch. In order to consider a catch- or spawning escapement-based ACL for a stock, a preseason (before fishing) forecast of its abundance would be necessary, and a post season estimate of adult equivalent (AEQ) catch in all fisheries or spawning escapement would be necessary to assess compliance. A postseason estimate of catch in all fisheries for a specific stock requires a data-intensive accounting process, generally involving coded-wire tag (CWT) analysis. While tagging programs and CWT analyses are routinely conducted for many large stocks, most small stocks are not as well-analyzed, if at all. Some stocks also lack escapement monitoring programs and forecasts sufficient to support individual escapement-based ACLs. Therefore, ACLs cannot be established for some individual stocks. These stocks may be formed into complexes with more data-rich stocks of similar characteristics to facilitate meeting the requirements for specifying ACLs for all stocks in the fishery. This Section describes alternatives for forming the stock complexes that would be necessary to consider a catch- or spawning escapement-based ACL.

2.1.3.1 Stock Complexes for Chinook

Four Chinook complexes could be established to facilitate compliance with ACL requirements for data-poor stocks that are in the fishery. These complexes would represent stocks with similar ocean distribution patterns and vulnerability in Council-area fisheries. ACLs would be specified for indicator stocks within the complexes. As information becomes available for data-poor stocks, they could be included as indicator stocks for the complex, or managed independently. Information necessary to serve as an indicator stock includes a preseason forecast of abundance available by April, the ability to model fishery impacts on the stock so that fisheries can be structured to achieve the ACL, and the ability to estimate postseason AEQ catch and exploitation rates (for catch-based ACLs) or spawning escapement (for escapement-based ACLs).

The first complex, designated Central Valley fall (CVF) complex, would consist of fall and late fall Chinook from the Sacramento and San Joaquin basins, and the indicator stock would be Sacramento River fall Chinook (SRFC). The stocks in this complex are the non-ESA-listed stocks currently identified in the FMP as the California Central Valley complex. All stocks in this complex have similar vulnerability to Council-area fisheries, being distributed primarily south of Cape Falcon, Oregon. Only SRFC have a defined conservation objective, but the objective is intended to provide adequate hatchery and natural escapement of San Joaquin fall and Sacramento late fall stocks as well (PFMC 2007). Because of the close genetic similarity, these stocks were placed in the same evolutionarily significant unit (ESU) (Central Valley Fall and Late Fall-Run Chinook Salmon ESU; Myers et al. 1998). The SRFC stock has made up at least 69 percent of the returning adults in the stock complex since 1971, and has averaged 88 percent (PFMC 2010a). Both San Joaquin fall Chinook and Sacramento River late fall Chinook have averaged 6 percent of the total return over the same period. SRFC is an appropriate indicator stock for this complex because of the large fraction of the total population represented, and the

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

similar vulnerability to other stocks in the complex. In addition, the stock is currently used as an indicator stock for this complex and its conservation objective includes the needs of the other stocks in the complex. Currently, SDC for San Joaquin fall Chinook and Sacramento River late fall Chinook is undefined, and until separate objectives for those stocks are developed, they would not be acceptable indicator stocks.

The second complex, designated Southern Oregon and Northern California (SONC) complex, would consist of Chinook stocks south of the Elk River, Oregon to, and including, the Klamath River, plus Umpqua River spring Chinook. The indicator stock for this complex would be KRFC. Stocks in this complex would include Klamath River spring and fall Chinook, Smith River Chinook (currently associated with the ESA-listed group of Eel, Mattole, and Mad Rivers), Rogue River spring and fall Chinook, Umpqua River spring Chinook, and Chinook from smaller systems along the Southern Oregon Coast. Because of the close genetic similarity, most of these stocks were placed in the Southern Oregon and Northern California Coastal Chinook Salmon ESU (Myers et al. 1998). Upper Klamath and Trinity River stocks are in their own ESU, and Umpqua River spring Chinook are in the Oregon Coast ESU. Umpqua River spring Chinook were included in the SONC complex because they have an ocean distribution (and therefore vulnerability) more similar to the other stocks in the SONC complex than to fall Umpqua stocks and mid- northern-Oregon Coast Chinook ESU stocks, which are considered FNM stocks. All stocks in the SONC complex have similar vulnerability to Council-area fisheries, being distributed primarily south of Cape Falcon, Oregon. There is insufficient abundance information to assess the relative proportions of the stocks in the SONC complex, but ocean genetic stock identification studies indicate that Klamath and Rogue stocks have comparable contributions to ocean fisheries in Oregon, with other southern Oregon and Northern California stocks contributing less. Of the stocks in the SONC complex, only KRFC and Southern Oregon Chinook have conservation objectives specified in the FMP; however, the Southern Oregon Coast Chinook conservation objective is part of an aggregate that includes Central and Northern Oregon Coast stocks. The aggregate conservation objective is assessed through spawning densities in index streams and no forecasts of abundance or exploitation rate in fisheries are available preseason. ODFW is currently reviewing available information with the intent of developing stock-specific objectives, but until that process is complete, only KRFC have adequate information available to serve as an indicator stock for the SONC complex. The FMP specifies that the productive potential for Klamath River spring and southern Oregon Coast Chinook are protected by management objectives for KRFC, at least in part because of the relatively large allocation of KRFC impacts to river tribal and recreational fisheries (PFMC 2007).

The third complex, designated FNMC complex, would consist of spring/summer and fall Chinook stocks from the Central and Northern Oregon Coast (from the Elk River north, except Umpqua River spring Chinook), and spring/summer and fall coastal Chinook stocks north of the Columbia River. Indicator stocks for this complex would be Hoko, Quillayute, Hoh, Queets, and Grays Harbor fall Chinook. The stocks in this complex are grouped together because of their similar ocean distribution patterns, which result in low vulnerability to Council-area fisheries and greater susceptibility to Canadian and Alaskan fisheries (Appendices B and G). These stocks are not ESA-listed, but the indicator stocks are subject to terms of the PST. Stock proportions of the complex are not readily available.

The fourth complex, designated as the Mid-Columbia River spring complex (Mid-C Sp), would include four spring stocks from the middle Columbia River between Bonneville and McNary dams. All of these stocks have similar vulnerability to Council-area fisheries. These stocks are similar to ESA-listed spring stocks in the upper Columbia River that are subject to little or no impact in Council-area fisheries (Appendix G, LaVoy 2010 provides an example of the distribution of CWT recoveries for the Yakima stock). Because of their close genetic similarity, these stocks are placed in the same ESU. These stocks have similar ocean distributions, but are caught almost entirely in in-river fisheries. None of these stocks

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

currently has an FMP conservation objective, although there is likely sufficient data to develop a conservation objective for one or more of the stocks in the complex. Developing a conservation objective for one or more of the stocks in the complex would be a high priority, but their status would presumably be undefined until that occurred. Mid-Columbia River spring Chinook are currently defined as a complex under Status Quo, Alternative 1. Under Alternative 2 and FPA 4, the complex would be removed from the fishery, and under Alternative 3 it would be designated as an EC.

Consistency with the MSA and NS1Gs: The MSA §303(a)(2) requires that an FMP provide a description of the species or stocks involved in the fishery. The NS1Gs § 600.310(d) further indicate that the FMP may identify stock complexes and associated indicator stocks. No stock complexes are proposed for coho or pink salmon, but four complexes are proposed for Chinook. The Status Quo, Alternative 1 identifies stock complexes for Chinook, but these were formed for organizational purposes rather than for management at the complex level as specified in the NS1Gs. The complexes identified in the FMP are not all formed based on common distributions, life histories, or vulnerabilities, and do not have associated indicator stocks. The Status Quo, Alternative 1 is therefore inconsistent with the MSA and NS1Gs. The four Chinook stock complexes that are proposed were formed based on their common geographical distributions, life histories, and fishery vulnerabilities. Indicator stocks are identified for three of the four complexes. The indicators stocks are relatively data-rich and have associated reference points and SDC that can be used for managing the stock complexes. The Mid-Columbia River Spring Chinook complex does not currently have an associated indicator, but it appears that there is sufficient data for one or more of the stocks in the complex to develop the conservation objectives and other reference points that would be required. Classification Alternatives 2, 3, and FPA 4 propose to remove the Mid-C Spring Chinook stock from the fishery, in which case development of reference points would not be required.

Feasibility of Implementation: The Status Quo, Alternative 1 is feasible as it is based on the current FMP. However, as identified above, it is not consistent with the MSA or NS1Gs. Stock classification Alternatives 2, 3, and FPA 4 propose development of three or four Chinook stock complexes, all of which are feasible and could be implemented.

Table 2-5. Alternatives for identifying Chinook stock complexes and indicator stocks. Stock classification alternatives that the complex would be associated with are also identified (see Table 2-3).

Stock Complex	Component Stocks	Indicator Stocks	Stock Classification Alternative
Central Valley Fall Chinook (CVF)	Sacramento River fall San Joaquin River fall Sacramento River late fall	Sacramento River fall	Alternative 2 Alternative 3 FPA 4
Southern Oregon northern California Chinook (SONC)	Rogue River fall and spring Umpqua River spring Smith River fall and spring Klamath River fall and spring Other small basins in Oregon south of the Elk River	Klamath River fall	Alternative 2 Alternative 3 FPA 4
Far-North-Migrating Coastal Chinook (FNMC)	Spring and fall stocks from Oregon tributaries north of and including the Elk River (except Umpqua spring) Willapa fall Grays Harbor spring and fall Queets Spring/summer and fall Hoh spring and fall Quillayute summer and fall Hoko summer/fall	Grays Harbor fall Queets fall Hoh fall Quillayute fall Hoko summer/fall	Alternative 2 Alternative 3 FPA 4
Mid-Columbia River spring (Mid-C Sp)	Klickitat Warm Springs John Day Yakima	None currently available	Alternative 3
California Central Valley	All Central Valley fall, late fall, winter and spring stocks	Sacramento River fall	Status Quo Alternative 1
Northern California Coast	All spring and fall stocks between San Francisco Bay and the OR/CA border	Klamath River fall	Status Quo Alternative 1
Oregon Coast	All spring and fall stocks between the Columbia River and the OR/CA border	None	Status Quo Alternative 1
Columbia River	All spring, summer, and fall stocks of the Columbia River Basin	None	Status Quo Alternative 1
Washington Coast	All spring, summer, and fall stocks north of the Columbia River through the Western Strait of Juan de Fuca	None	Status Quo Alternative 1
Puget Sound	All spring, summer, and fall stocks from U.S. tributaries to Puget Sound and the Eastern Strait of Juan de Fuca	None	Status Quo Alternative 1
Southern British Columbia	Spring and fall stocks British Columbia coastal streams and the Fraser River	None	Status Quo Alternative 1

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.1.4 The International Exception

The MSA requires that FMPs establish ACL mechanisms and AMs for all stocks and stock complexes in the fishery, but provides an exception from the requirement for stocks or stock complexes that are managed under an international agreement in which the U.S. participates. Several coho, Chinook, and pink stocks in the Salmon FMP are subject to management under the PST. The PST is a bilateral treaty between the U.S. and Canada that relates to the management of salmon stocks affected by the fisheries of both nations. Under MSA Section 3(24) "The term 'international fishery agreement' means any bilateral or multilateral treaty, convention or agreement which relates to fishing and to which the United States is a party." The PST clearly meets the criteria specified in the MSA and NS1Gs related to international agreements. Although FMP stocks (i.e., stocks in the fishery) managed under an international agreement may be excepted from the ACL and AM requirements (and including exception to specification of ABC according to the NS1Gs), these stocks still require the specification of SDC.

Application of the international exception depends to a degree on how stocks are classified – i.e., its application is only relevant to stocks in the fishery that would otherwise require ACLs and AMs. In the preceding Section, Alternative 3 classified two Chinook stocks and two pink stocks as ECs (Tables 2-3 and 2-4). Ecosystem components are "out of the fishery," and as a result, do not require specification of ACLs or other reference points and MSA Section 303(a) requirements. These stocks might have been considered for the international exception if classified as stocks in the fishery, but such a designation is moot since none of the MSA Section 303(a) requirements apply to EC stocks. Because of the close relationship between stock classification and application of the international exception, the alternatives for use of the international exception are combined with the alternatives for stock classification described below (Table 2-6).

There are currently no stocks to which the MSA international exception (from the 2007 MSA amendments) has been applied, as reflected in the Status Quo Alternative (Table 2-6). Under Classification Alternative 2, the international exception to specification of ABC, ACLs, and AMs would be applied to Puget Sound, Washington Coastal and Canadian coho stocks, Columbia River summer Chinook, the FNMC Chinook complex, Columbia upriver fall Chinook, and Canadian Chinook, and Puget Sound pink stocks. These are all the non-ESA-listed stocks subject to the PST. Under stock Classification Alternative 3, the international exception would not be applied to Chinook stocks classified as EC (Columbia upriver fall, Mid-Columbia River spring Chinook, Puget Sound and Canadian pink salmon); otherwise application of the international exception would be similar. Under FPA 4, the international exception would be applied as in Alternative 2 except that Canadian coho and Chinook would not require the exception as they would be removed from the FMP.

Table 2-6. Proposed Application of the MSA international exception to specification of ABC and ACLs to stocks managed under the Pacific Salmon Treaty and associated stock classification alternatives.

	Stock Classification Alternative			
Stocks	**Alternative 1 - Status Quo**	**Alternative 2**	**Alternative 3**	**FPA 4**
Coho	None	PS - 5 WA C - 5 CAN - 2	PS - 5 WA C - 5	PS - 5 WA C - 5
Chinook	None	CR S – 1 FNMC – 11 CR F – 1 CAN -2	CR S – 1 FNMC – 11	CR S – 1 FNMC – 11 CR F – 1
Pink	None	PS	None	PS

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Consistency with the MSA and NS1Gs: The MSA requires that FMPs establish ACL mechanisms and AMs for all stocks and stock complexes in the fishery, but provides an exception from the requirement for stocks or stock complexes that are managed under an international agreement in which the U.S. participates. The use and applicability of the international exception depends to a large degree on how stocks are classified. So, as discussed above, alternatives for use of the international exception are described in conjunction with those related to classification.

Several coho, Chinook, and pink stocks are managed under the PST. The PST is consistent with the definition of an "international fishery agreement" provided in MSA Section 3(24). NS1G 300 (h)(2)(ii) provides that stocks managed under an international agreement may be excepted from the ACL and AM requirements. The Status Quo Alternative does not apply the international exception to any stocks. Alternatives 2, 3, and FPA 4 propose use of the international exception for several coho, Chinook, and pink stocks depending on how those stocks are otherwise classified. Application of the international exception in Alternatives 2, 3, and FPA 4 is consistent with the MSA and NS1Gs.

Feasibility of Implementation: All of the alternatives related to application of the international exception are feasible and could be implemented.

2.2 Alternatives for Reference Points – Status Determination Criteria

Status Determination Criteria must be specified in fishery management plans to determine the status of a stock or complex.[6] This Section presents alternatives to use as SDC to determine:

- Overfishing
- Overfished
- Approaching overfished
- Rebuilt

SDC will be applied to natural stocks for which specification of these reference points is appropriate and possible based on the best available science. These reference points will not be specified for any stocks that are identified in the FMP as EC. NS1Gs § 600.310(d)(5)(iii) specify that EC stocks are not considered in the fishery, and are thus not subject to any of the MSA 303(a) requirements.

The NS1Gs' provision on flexibility[7] explains that there are limited circumstances that may not fit the standard approaches set forth in the NS1Gs and cites hatchery and ESA-listed stocks as examples where alternative approaches may be appropriate. For ESA-listed stocks in the FMP, the NS1G's flexibility provision will be utilized and ESA consultation standards will serve as all required reference points, including SDC reference points and ACLs. For hatchery stocks as defined in Table 3-1 of the FMP, hatchery goals will continue to serve as their conservation objective and will serve as alternative approaches to specification of all required reference points, including SDC reference points and ACLs.

Some natural stocks listed in the FMP currently are managed on the basis of indicator stocks. SDC will continue to be applied to and specified only for individual stocks and not for stock complexes as a whole. The status of non-indicator stocks will not change as a result of indicator stock status changes. Stock complexes under FPA 4 primarily reflect similar ocean distribution and exploitation patterns, and are therefore suitable for establishing ACLs and managing Council-area ocean fisheries. However, most stocks experience different fishing and non-fishing impacts in the freshwater environment than other

[6] See MSA §303(a)(10) and 50 CFR 600.310(e)(2)
[7] 50 CFR 600.310(h)(3)

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

stocks, even within the same stock complex, and may have different productivities. Therefore, status of stocks within the complex is not necessarily well-correlated.

Stocks managed under an international agreement can be excepted from specification of ABC and ACL reference points (50 CFR 600.310(e)(2)(ii)), but they are still required to have MSY and SDC specified. Based on the Stock Classification Alternative 3 (Section 2.1 of this EA), the relevant stocks for specifying SDC reference points include KRFC, SRFC, Columbia Upper River summer Chinook, and indicator stocks in the FNM Chinook complex, and Washington Coast and Puget Sound coho. Based on the Stock Classification Alternative 2, Columbia Upper River fall Chinook would also require specification of SDC. These stocks are relatively data-rich, having age-structured information and models to assess compliance with both S- and F-based SDC. If Mid-Columbia River spring Chinook remain in the fishery as proposed in Alternative 1, they would also require SDC; although this would require development of new information that is not currently available for the stock. For pink stocks, classification alternatives include designation as ECs or applying the international exception. SDC would not be required if designated as ECs; SDC would be required for Puget Sound pink stocks if it remains in the fishery even if under the international exception. Based on FPA 4 for Stock Classification (Section 2.1 of this EA), the relevant stocks for specifying SDC reference points include KRFC, SRFC, Columbia Upper River summer and fall Chinook, indicator stocks in the FNMC Chinook complex, Washington Coast and Puget Sound coho, and Puget Sound pink salmon.

2.2.1 Criteria Used to Evaluate the Alternatives

The criteria used to evaluate SDC alternatives were consistency with the MSA and NS1Gs, and feasibility of implementation. Considerations within the criterion for MSA and NS1Gs consistency include:

- The SDC should be objective and measurable[8]
- The SDC should be assessed annually[9], if possible
- The SDC to determine overfishing[10] should be based on either:
  1. the fishing mortality rate (F) exceeding the maximum fishing mortality threshold[11] (MFMT), i.e., **F > MFMT**, or
  2. the annual catch exceeding the overfishing limit (OFL), i.e., **annual catch > OFL**
- The SDC to determine overfished[12] should be based on the minimum stock size threshold[13] (MSST) and must be expressed in terms of spawning biomass or other measures of reproductive potential, and should equal whichever of the following is greater: One-half (½) the MSY stock size (S_{MSY})[14], or the

[8] MSA §303(a)(10)

[9] 50 CFR 600.310(e)(2)(ii) explains that if SDC should be specified and expressed in a way that enables monitoring of each stock or complex to determine annually, if possible, whether overfishing has occurred or if a stock or complex is overfished.

[10] 50 CFR 600.310(e)(2)(ii)(A)

[11] MFMT is the level of fishing mortality (F), on an annual basis, above which overfishing is occurring. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential. 50 CFR 600.310(e)(2)(i)(C)

[12] 50 CFR 600.310(e)(2)(ii)(B)

[13] MSST means the size below which the stock or stock complex is considered to be overfished. 50 CFR 600.310(e)(2)(i)(F)

[14] MSY stock size (S_{MSY}) means the long-term average size of the stock or stock complex, measured in terms of spawning biomass or other appropriate measure of the stock's reproductive potential that would be achieved by fishing at F_{MSY}. 50 CRF 600.310(e)(1)(i)(C). For salmon, the appropriate measure of the stock's reproductive potential is the number of adult spawners (S).

minimum stock size at which rebuilding to S_{MSY} would be expected to occur within 10 years, if the stock or complex were exploited at the MFMT.

- SDC to determine approaching overfished[15] are when a stock is projected to have more than a 50 percent chance that the stock size (S)[16] will decline below the MSST within two years.
- SDC to determine when a stock is rebuilt should be based on a stock achieving S_{MSY}.[17]

2.2.2 Overview of Alternatives

For all of the alternatives:

- SDC are specified for each stock, as opposed to a stock complex;
- all determinations, except approaching overfished, are made postseason; and
- all status determinations are made annually.

Table 2-7 provides a description of the SDC alternatives, including formulaic representations. More detailed descriptions of the alternatives and assessment relative to the evaluation criteria above are provided in subsequent sections.

The proposed alternatives to the status quo all incorporate the reference points identified in the NS1Gs (e.g., F_{MSY}, MFMT, MSST). However, the proposed definitions of some of these references points differ slightly from those in the NS1Gs to accommodate the life history of Pacific salmon, where reproduction is semelparous and a stock's full reproductive potential can be spread out over a multi-year period. These modified approaches are proposed in accordance with the provision allowing for flexibility in the application of the NS1Gs.[18]

[15] 50 CFR 600.310(e)(2)(i)(G)
[16] Size (S) of the stock or complex for salmon is the number of adult spawners.
[17] 50 CFR 600.310(j)(3)(i)
[18] 50 CFR 600.310(h)(3)

Table 2-7: Overview of SDC alternatives for overfishing, overfished, approaching overfished, and rebuilt (S = Spawning Escapement; C = catch; t = year; GM = Geometric mean). F and S used are most recent postseason values available unless otherwise noted.

Status Category	**Alternative 1: Status Quo Determination Based on Three Consecutive Years: MSST = S_{MSY}**	**Alternatives 2 & 2b Determination Based on a Single Year: MSST = 0.5*S_{MSY} or 0.75*S_{MSY} (2b)**	**Alternative 3, Determination Based on 3-Year Geometric Mean: MSST = 0.5*S_{MSY}**	**Alternative 3b & 3c Determination Based on 3-Year Geometric Mean: MSST = 0.75*S_{MSY} (3b) or 0.86*S_{MSY} (3c)**	**Alternative 4 and 4b Determination Based on 3-Year Arithmetic Mean: MSST = 0.5*S_{MSY} or 0.75*S_{MSY} (4b)**	**FPA 5, Determination Based on 3-Year Geometric Mean: MSST is variable among stocks**
Overfishing	S(t,t-1,t-2)<MSST and C(t,t-1,t-2) > MSST-S(t,t-I,t-2) i.e. fishing contributed to Overfishing Concern	F > MFMT in one year, with MFMT = F_{MSY}.	Same as Alternative 2 i.e., single year basis	Same as Alternative 2 i.e., single year basis	Same as Alternative 2 i.e., single year basis	Same as Alternative 2 i.e., single year basis
Overfished	S(t,t-1,t-2)<MSST Current NMFS interpretation of Overfishing Concern as defined in FMP.	S < MSST in one year.	GM(S) < MSST over three year period.	Same as Alternative 3 with MSST = 0.75*S_{MSY} (3b) or MSST = 0.86*S_{MSY} (3c)	0(S) < MSST over three year period.	GM(S) < MSST over three year period. MSST = 0.75*S_{MSY} for KRFC, SRFC, WA C coho; Status Quo SDC for PS coho, and 0.5*S_{MSY} for other stocks.
Approaching overfished	S(t-1,t-2)<MSST and S(t) forecast < MSST	S < MSST in one year. S used is current preseason forecast.	GM(S) < MSST over three year period. S used are 2 most recently available postseason values and current preseason forecast.	Same as Alternative 3 with MSST = 0.75*S_{MSY} (3b) or MSST = 0.86*S_{MSY} (3c)	0(S)< MSST over three year period. S used are 2 most recently available postseason values and current preseason forecast.	GM(S) < MSST over three year period. S used are 2 most recently available postseason values and current preseason forecast.
Rebuilt	S > S_{MSY} in one year or as otherwise determined in rebuilding plan.	S ≥ S_{MSY} in one year.	GM(S) ≥ S_{MSY} over three year period.	Same as Alternative 3	0(S) ≥ S_{MSY} over three year period.	GM(S) ≥ S_{MSY} over three year period.

The status categories for overfished, approaching overfished, and rebuilt within each alternative should be considered together, given the need to have comparable metrics among these abundance-based SDC.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.2.3 SDC Alternative 1: Status Quo

The current Salmon FMP does not explicitly define when a stock is considered to be experiencing overfishing, overfished, or is approaching overfished. While SDC are not currently specified, the FMP has identified indicators of a declining status for a stock that trigger Council action (see below). However, triggering of the status indicators has resulted in status determinations of overfished, approaching overfished, and rebuilt, as indicated in the Report to Congress on Status of U.S. Fisheries (NMFS 2010a).

A **"conservation alert"** is triggered during the annual preseason process if a stock is projected to fall short of its conservation objective (MSY, MSY proxy, MSP, or spawning escapement floor).

An **"overfishing concern"** is triggered if a stock fails to meet its conservation objective (evaluated postseason) for three consecutive years. If an overfishing concern is triggered, the FMP requires an assessment of factors that led to the shortfall. The Council directs its STT to work with state and tribal fishery managers to complete an assessment of factors that led to the overfishing concern within one year. Based on the results of the assessment, the STT will recommend management actions (i.e., a rebuilding plan) that will result in recovery of the stock in as short a time as possible, preferably within ten years or less, and provide criteria for identifying stock recovery and the end of the overfishing concern. In addition the Council directs its Habitat Committee (HC) to work with Federal, state, local, and tribal habitat experts to review the status of the essential fish habitat affecting this stock and, as appropriate, provide recommendations to the Council for restoration and enhancement measures within a suitable time frame. The timing of this process is described in Figure 2-1 below.

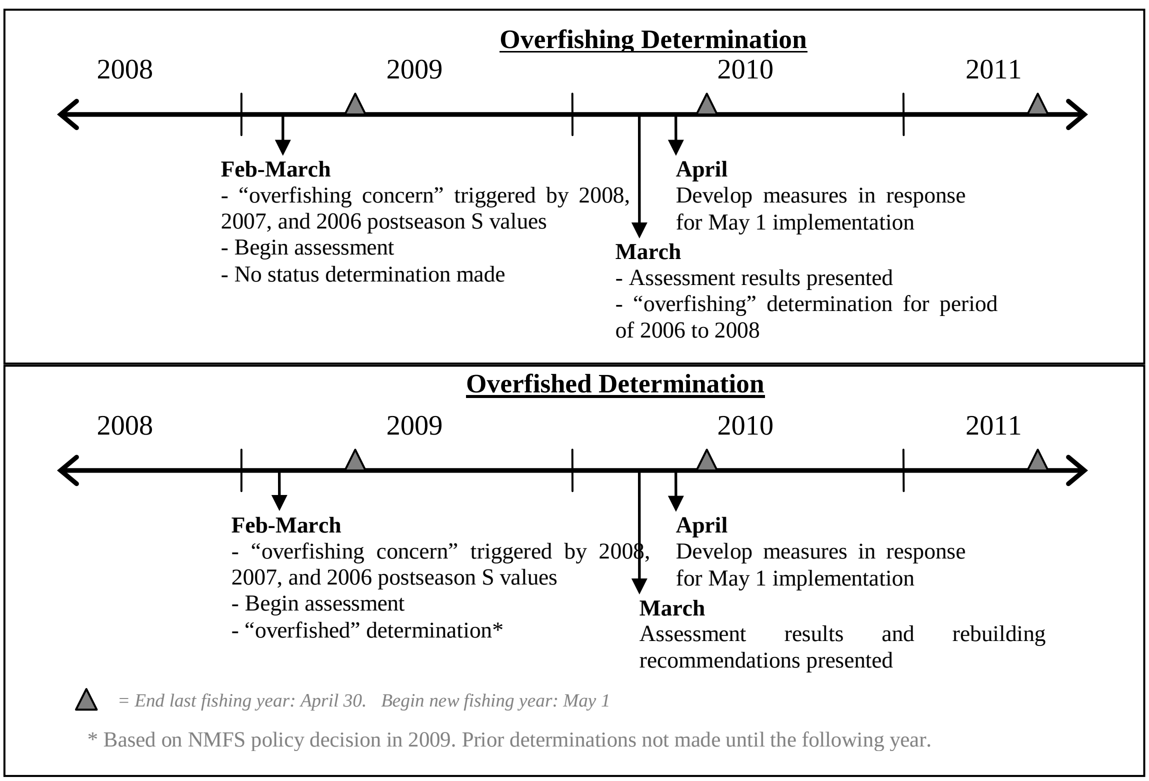

Figure 2-1. Timeline for overfishing concern process, making status determinations, and implementation of management response. Example timeline assumes "overfishing concern" is triggered in 2009.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Because the FMP provides no specific guidance about when or under what circumstances a stock should be considered subject to overfishing or overfished, it has resulted in confusion and inconsistent status determinations. Absent clearly defined SDC, NMFS made a policy decision in 2009 to declare a stock "overfished" if it triggers an "overfishing concern" under the FMP.

2.2.3.1 Status quo definition of overfishing.

After the triggering of an overfishing concern, the STT conducts an assessment to determine whether overfishing occurred. If the STT assessment concludes that excessive fishing contributed to a stock not meeting its conservation objective for three consecutive years, overfishing may be said to have occurred.

2.2.3.2 Status quo definition of overfished

As of 2009, a NMFS policy decision was made to interpret a stock that has not met its conservation objective for three consecutive years (i.e., an overfishing concern under the FMP) to be overfished.

2.2.3.3 Status quo definition of approaching overfished

When a stock has failed to achieve its conservation objective for two consecutive years and is projected not to meet the objective in the third year, the FMP requires some specific action by the Council. The Council must notify pertinent fishery and habitat managers, advising them the stock may be temporarily depressed or approaching an overfishing concern and request the pertinent state and tribal managers to do a formal assessment of the primary factors leading to the shortfalls and report their conclusions and recommendations to the Council no later than the March meeting prior to the next salmon season.

2.2.3.4 Status quo definition of rebuilt

The default criterion in the FMP for when a stock is considered rebuilt is when its conservation objective is met for one year. In cases where a rebuilding plan has been adopted, the stock is considered rebuilt when the criteria defined in the rebuilding plan have been met.

2.2.3.5 Evaluation of Status Quo SDC Alternatives

Consistency with the MSA and NS1Gs: The status quo alternative is partially consistent with NS1Gs, but is deficient in several important areas.

Overfishing: Determination if overfishing occurred is not measurable for some stocks and is not objective. Overfishing determinations are case-specific; based on the STT assessments made after a stock has triggered an overfishing concern, not on an annual basis. Overfishing has generally been determined based on an amount of catch (analogous to an OFL) as opposed to a rate of fishing (analogous to a MFMT), and specification of the catch amount that results in overfishing has been determined differently for various STT overfishing assessments. There is also a time lag of up to one year after the overfishing concern is triggered to conduct an assessment. During the interim, no status determination is made. This process has not resulted in a consistent definition of overfishing across stocks and is ambiguous.

Overfished: Overfished status, while not defined in the FMP, is interpreted by NMFS as a stock subject to an overfishing concern. The NMFS interpretation of overfished is both objective and measurable. The assessments of whether stocks have met conservation objectives are made annually during the preseason planning process, and are made in the year immediately following triggering of an overfishing concern. The overfished status is based on the MSY conservation objective, which in this case is equivalent to an MSST; however, overfished is not defined in the FMP, which is not consistent with the NS1Gs.

Approaching Overfished: The status quo alternative is consistent with NS1Gs in that there are specific objective and measurable criteria to use for determining when a stock is approaching an overfishing

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

concern, which has been interpreted as overfished. Approaching overfished determinations are made annually during the preseason planning process. If the stock has failed to meet its conservation objective for the two previous years, and the forecast of S equals the conservation objective, the probability of becoming overfished in the current year is 0.5, assuming an unbiased predictor. If the forecast of S is lower than the conservation objective, the probability of becoming overfished in the current year is greater than 0.5, assuming an unbiased predictor.

Rebuilt: The default criterion in this alternative is compatible with the NS1Gs because it requires a stock to achieve its MSY-based conservation objective. The overfishing assessment process, which includes specifying rebuilt criteria in a formal rebuilding plan, could result in criteria that are not consistent with the NS1Gs because rebuilding benchmarks may not be measurable or objective. It is also unclear when the default rebuilding plan should be implemented versus development of a separate rebuilding plan.

Feasibility of Implementation: Implementation is feasible as status quo is the current status determination process. However, the requirement for STT overfishing assessments, including development of criteria for overfishing, overfished, and rebuilt, can be burdensome given time constraints and can lead to inconsistencies in status determination.

The combination of terminologies used under the status quo has also proven very confusing. Even though a stock is determined as "overfished" under the status quo, an "overfishing concern" under the FMP is nevertheless triggered, leading to a great deal of confusion among stakeholders and the public about the true status of the stock. For instance, the stock might be determined as "overfished" but not "subject to overfishing," yet it has triggered an "overfishing concern."

2.2.4 Alternative 2: Single Year Basis SDC, MSST = $0.5*S_{MSY}$

Single year based SDC are used for many fish species, and the NS1Gs recommend a default overfished criteria (MSST) of $0.5*S_{MSY}$. This alternative would require determination of overfishing, overfished, approaching an overfished condition, and rebuilt based on annual evaluations. Status determinations would be predicated upon meeting various fishing mortality (F) or escapement (S) benchmarks in the previous year only (current year for approaching overfished).

2.2.4.1 Overfishing

A stock would be considered subject to overfishing when the postseason estimate of F exceeds the MFMT, where the MFMT is defined as $F_{MSY.}$ Stock-specific estimates of F_{MSY} based on spawner-recruit data would be used if available. Otherwise, proxy values based on species-specific meta-analyses would be used. A meta-analysis for Chinook is shown in Appendix C. Stock-specific overfishing determinations would be made annually and based on exploitation during a single biological year. Figure 2-2 illustrates alternative SDC reference points for KRFC and SRFC relative to the current conservation objectives and the estimated and proxy values for F_{MSY} and S_{MSY}.

2.2.4.2 Overfished

A stock would be considered overfished if S falls below its MSST in a single year, with MSST defined as $0.5*S_{MSY}$. Stock-specific overfished determinations would be made annually.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

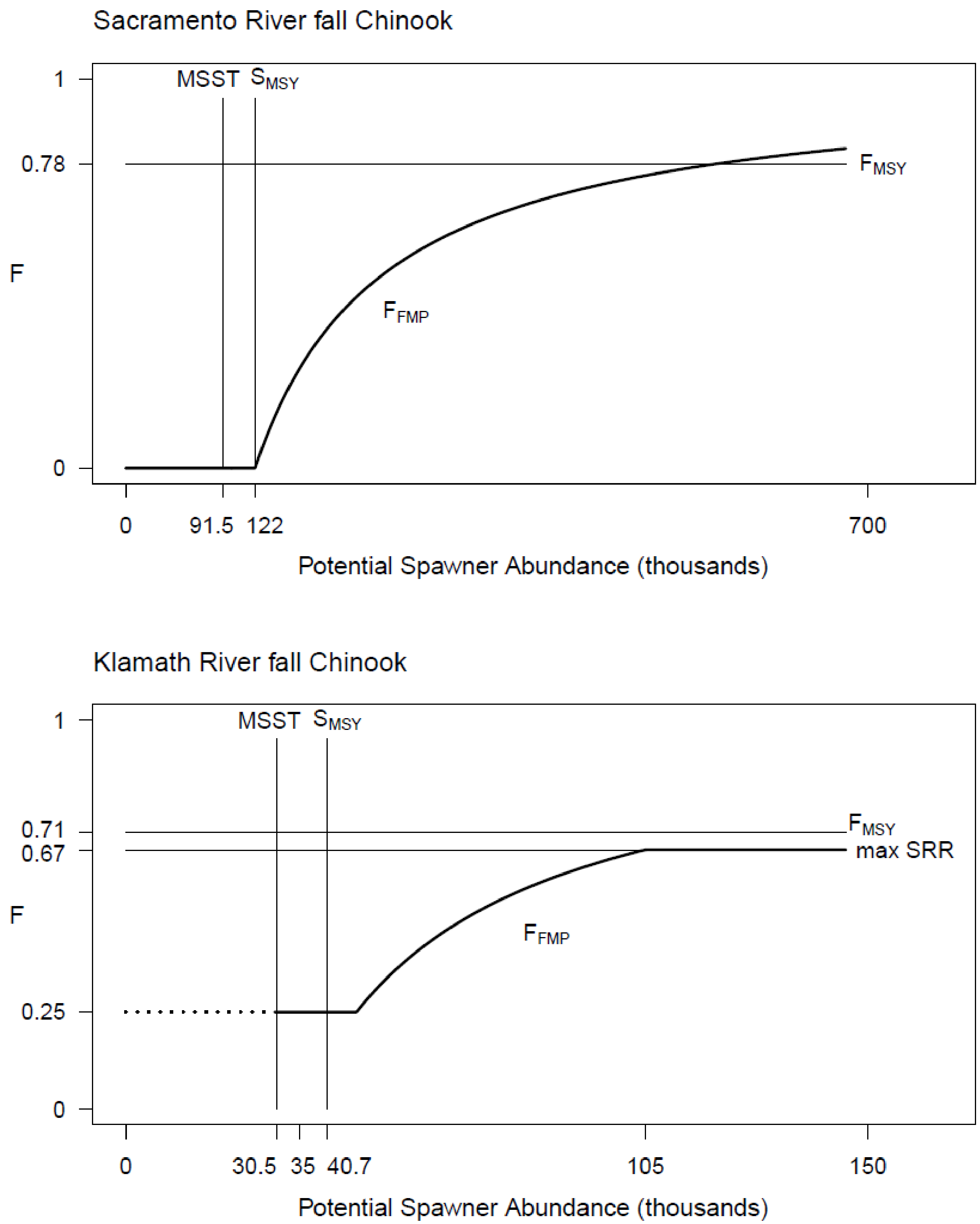

Figure 2-2. Current conservation objective control rules for Sacramento River fall Chinook and Klamath River fall Chinook. Proposed SDC reference points are superimposed on the control rules. MSST is assumed to be equal to 0.75^*S_{MSY} in this figure.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.2.4.3 Approaching an Overfished Condition

An approaching overfished determination would be made when the preseason forecast of S falls below MSST in a single year. Stock-specific determinations would be made each year during the preseason planning process.

2.2.4.4 Rebuilt

A stock would be rebuilt when S exceeds S_{MSY} for one year. The determination would be made annually during the preseason process.

2.2.4.5 Evaluation of Single Year SDC Alternatives

Consistency with the MSA and NS1Gs: The Alternative 2 SDC are consistent with NS1Gs.

Overfishing: Alternative 2 SDC to determine overfishing are based on MFMT, which is objective and measurable. Determinations would be made annually, and for some stocks could be made in the year immediately following the year in which exploitation may have occurred. However, estimating fishing mortality rate (F) for other stocks may take longer due to the availability of stock-specific run reconstruction information. An overfishing SDC based on MFMT is consistent with one of the definitions in the NS1Gs.

Overfished: Alternative 2 SDC to determine overfished are based on MSST, which is objective and measurable. Determinations would be made annually, and generally could be made during the preseason planning process following the most recent return year. Defining MSST in terms of S is consistent with the NS1Gs' requirement to define MSST as a measure of reproductive potential. The MSST level of $0.5*S_{MSY}$ is also identified in the NS1Gs as an appropriate level, provided the stock would be capable of rebuilding to S_{MSY} within 10 years if exploited at MFMT. Defining MSST as $0.5*S_{MSY}$ for salmon is appropriate because salmon populations are relatively productive compared to other managed fish species (Appendix B), and have demonstrated many times the ability to rebuild quickly, well within 10 years.

Approaching Overfished: Alternative 2 SDC to determine approaching overfished are objective and measurable. The criterion would be determined annually during the preseason planning process. If the preseason forecast of S equals the MSST, the probability of becoming overfished in the current year is 0.5, assuming an unbiased predictor. If the forecast of S is lower than the MSST, the probability of becoming overfished in the current year is greater than 0.5, assuming an unbiased predictor. The NS1Gs define approaching overfished to occur when a stock is projected to fall below the MSST within two years. The short life history of salmon is such that it is not possible to predict stock size beyond the current forecast year. Nonetheless, Alternative 2 allows us to assess whether a stock is approaching an overfished condition annually based on the best available science. The NS1Gs provide some flexibility in the specification of references points and specifically reference Pacific salmon in this context.

Rebuilt: Alternative 2 SDC to determine rebuilt are objective and measurable; benchmarks would be clearly identifiable. Rebuilt status determinations would be made annually during the preseason planning process. The NS1Gs generally refer to a rebuilt condition as achieving a stock or complex's S_{MSY}.

Feasibility of Implementation: Implementation of Alternative 2 is generally feasible. Postseason estimates of both F and S are routinely made for many stocks, though new methods may be needed for some stocks to obtain postseason estimates for these quantities in the immediately previous year. In some cases, postseason estimates of F made in the following year may be of lower quality than estimates made two or three years later. This alternative will also streamline the process for assessing SDC and reporting to Congress.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Other Considerations: While it is, or can be, possible to make an overfished determination based on metrics estimated one year prior, it is not clear whether this accurately represents the status of salmon stocks. Salmon stock abundances can be quite variable, owing in part to the semelparous nature of reproduction and short generation times. Hence, falling below the MSST in a single year may not be indicative of a longer-term trend toward depressed abundance or the ability of the stock to produce MSY on a continuing basis. This reasoning also applies to the rebuilt determination. A single strong year-class resulting in one year of exceeding S_{MSY} for a severely depressed stock may not truly represent that the stock is rebuilt.

This alternative would likely increase the frequency that overfished determinations are made compared to status quo since an overfished determination would be based on a single year of low return ($0.5*S_{MSY}$) rather than three consecutive years of return below S_{MSY}. Overfished determinations normally involve conducting an assessment of the cause of the overfished condition, and development and implementation of a rebuilding plan may be required. Conducting assessments and developing rebuilding plans impact management agency workload and funding needed to support processes like Council meetings and advisory body meetings (e.g., STT). In addition, other tasks have to be delayed, resulting in indirect effects to other administrative programs, which could impact the biological and socioeconomic environments at some level.

2.2.5 Alternative 2b: Single Year SDC, MSST = $0.75*S_{MSY}$

Alternative 2b SDC would be identical to Alternative 2 SDC except that Overfished and Approaching Overfished would be based on a value of 0.75 S_{MSY} rather than $0.5*S_{MSY}$, which may be more appropriate for aggregate stocks that include more vulnerable sub-stocks.

2.2.6 Alternative 3: 3-Year Geometric Mean Basis SDC, MSST = $0.5*S_{MSY}$

Salmon are relatively short-lived species with spawning escapements of coho and pink salmon dominated by a single year-class, and Chinook spawning escapements dominated by no more than two year-classes. The abundance of year-classes can fluctuate dramatically with combinations of natural and human-caused environmental variation. Therefore, it is not unusual for a healthy and relatively abundant salmon stock to produce occasional spawning escapements which, even with little or no fishing impacts, may be significantly below the long-term average associated with the production of MSY. Therefore, low stock size in one year is not necessarily a cause for concern; however, longer-term stock depression could signal the beginning of a critical downward trend, which may jeopardize the capacity of the stock to produce MSY over the long-term if appropriate actions are not taken.

Alternative 3 would require determination of overfished, overfishing, approaching overfished, and rebuilt based on annual postseason evaluations. The definition of overfishing in Alternative 3 is equivalent to Alternative 2. However, the definitions of overfished, approaching overfished, and rebuilt are different in that they require multi-year postseason estimates of S to be assessed. The multi-year alternatives use a 3-year geometric mean to determine overfished, approaching overfished, and rebuilt status.

2.2.5.1 Overfishing

Same as Alternative 2: A stock would be considered subject to overfishing when the postseason estimate of F exceeds the MFMT, where the MFMT is defined as F_{MSY}. Stock-specific estimates of F_{MSY} based on spawner-recruit data will be used if available. Otherwise, proxy values based on species-specific meta-analyses would be used. A meta-analysis for Chinook is shown in Appendix C. Stock-specific overfishing determinations are made annually and based on exploitation during a single biological year.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.2.5.2 Overfished

A stock would be considered overfished if the 3-year geometric mean of S fell below the MSST, defined as $0.5*S_{MSY}$. Overfished determinations would be made annually using the three most recently available postseason estimates of S.

2.2.5.3 Approaching an Overfished Condition

An approaching overfished determination would be made if the geometric mean of the two most recent postseason estimates of S, and the current preseason forecast of S, are below the MSST.

2.2.5.4 Rebuilt

A stock would be rebuilt when the 3-year geometric mean of S exceeds S_{MSY}.

2.2.5.5 Evaluation of 3-Year Geometric Mean SDC Alternatives

Consistency with the MSA and NS1Gs: The Alternative 3 SDC are consistent with NS1Gs.

Overfishing: Same comments as Alternative 2.

Overfished: Alternative 3 SDC to determine overfished are based on MSST, which is objective and measurable. Determinations would be made annually, and generally could be made during the preseason planning process following the most recent return year. MSST is not defined in a single year as in the NS1Gs (CFR 600.310 (e)(2)(ii)(B); however, the multi-year criterion does more accurately reflect the risk to reproductive potential as discussed above. Defining MSST in terms of S is consistent with the NS1Gs' requirement to define MSST as a measure of reproductive potential. The MSST level of $0.5*S_{MSY}$ is also identified in the NS1Gs as an appropriate level, provided the stock would be capable of rebuilding to S_{MSY} within 10 years if exploited at MFMT. Defining MSST as $0.5*S_{MSY}$ for salmon is appropriate because salmon populations are relatively productive compared to other managed fish species (Appendix B), and have demonstrated many times the ability to rebuild quickly, well within 10 years.

Approaching Overfished: Alternative 3 SDC to determine approaching overfished are objective and measurable. The criterion would be determined annually during the preseason planning process. If the stock failed to meet the MSST for the two previous years, and the forecast of S equals the MSST, the probability of becoming overfished in the current year is 0.5, assuming an unbiased predictor. If the forecast of S is lower than the MSST, the probability of becoming overfished in the current year is greater than 0.5, assuming an unbiased predictor.

Rebuilt: Alternative 3 SDC to determine rebuilt are objective and measurable; benchmarks would be clearly identifiable. Rebuilt status determinations would be made annually during the preseason planning process. The NS1Gs generally refer to a rebuilt condition as achieving a stock or complex's S_{MSY}.

Feasibility of Implementation: Same comments as Alternative 2.

Other Considerations: Overfished, approaching overfished, and rebuilt status defined in Alternative 3 are designed to acknowledge the variability common in salmon populations. Salmon stock abundances can be quite variable owing in part to the semelparous nature of reproduction and short generation times. Reproductive potential of a stock, given the inherent variability of salmon populations, may best be described using a multi-year metric. Use of the geometric mean of the most recently available 3-year postseason estimates of S would decrease the probability of a stock being declared overfished as a result of a single weak year-class. Conversely, a single strong year-class would be unlikely to result in a rebuilt status for an otherwise severely depressed stock. Survival processes lead to variability in adult abundance

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

that is approximately lognormally distributed. Lognormally distributed data have a skewed distribution where large values are possible, but the lower end the distribution is bounded by zero. The geometric mean was chosen instead of the arithmetic mean because the geometric mean is less sensitive to large values. For similar reasons, geometric means are routinely used rather than arithmetic means to assess the status of ESA-listed species. The multi-year approach to status determination is currently used in the FMP to identify an overfishing concern for the same reasons, although the metric is different.

2.2.7 Alternative 3b: 3-Year Geometric Mean Basis SDC, MSST = 0.75*S_{MSY}

Alternative 3b SDC would be identical to Alternative 3 SDC except that Overfished and Approaching Overfished would be based on a value of 0.75*S_{MSY} rather than 0.5*S_{MSY}.

2.2.8 Alternative 3c: 3-Year Geometric Mean Basis SDC, MSST = 0.86*S_{MSY}

Alternative 3c SDC would be identical to Alternative 3 SDC except that overfished and approaching overfished would be based on a value of 0.86*S_{MSY} rather than 0.5*S_{MSY}. This alternative would result in an MSST for KRFC of 35,000 natural area adult spawners, and would therefore provide some consistency with the status quo spawning escapement floor (conservation objective) for that stock.

2.2.9 Alternative 4: 3-Year Arithmetic Mean Basis SDC, MSST = 0.5*S_{MSY}

Alternative 4 SDC would be similar to Alternative 3 SDC except that overfished and approaching overfished, and rebuilt would be based on a 3-year arithmetic mean rather than a 3-year geometric mean.

Salmon abundance over time follows a log-normal distribution. The geometric mean is appropriate for describing the most likely value of such distributions and is most sensitive to low values. For salmon abundance distributions, the arithmetic mean will generally be higher than the geometric mean, and more than half the observations will be below the arithmetic mean. High values have more influence on the arithmetic mean. The choice of which mean to use will affect how often stocks are determined to be overfished, and levels needed to achieve rebuilt status, with the geometric mean being more precautionary. The geometric mean is currently used in other aspects of salmon assessment and management, including the ongoing status reviews of all ESA-listed species being conducted by NMFS.

2.2.10 Alternative 4b: 3-Year Arithmetic Mean Basis SDC, MSST = 0.75*S_{MSY}

Alternative 4b SDC would be identical to Alternative 4 SDC except that Overfished and Approaching Overfished would be based on a value of 0.75*S_{MSY} rather than 0.5*S_{MSY}.

2.2.11 FPA Alternative 5: 3-Year Geometric Mean Basis SDC, MSST Variable Among Stocks

2.2.11.1 Overfishing

Same as Alternative 2: A stock would be considered subject to overfishing when the postseason estimate of F exceeds the MFMT. Stock-specific estimates of F_{MSY} based on spawner-recruit data were used if available, except for Washington coastal coho. For Washington coastal coho, an MFMT value of F=0.65 was adopted to be consistent with PSC management constraints. For stocks without adequate spawner-recruit data, proxy values based on species-specific meta-analyses were used. A meta-analysis for Chinook is shown in Appendix C. Stock-specific overfishing determinations are made annually and based on exploitation during a single biological year.

2.2.11.2 Overfished, Approaching an Overfished Condition, and Rebuilt

FPA 5 SDC would be identical to other 3-year geometric mean alternatives except that MSST would be variable among stocks, with most stocks based on MSST = 0.5*S_{MSY}, except for SRFC, KRFC, Grays

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Harbor, Queets, Hoh, and Quillayute coho MSST = 0.75*S_{MSY}, and Puget Sound coho MSST would equal the stock specific low/critical abundance breakpoint multiplied by one minus the low exploitation rate limit. Setting MSST at levels above 0.5*S_{MSY} was considered appropriate for SRFC and KRFC because both stocks are aggregates, which include more vulnerable sub-stocks. Washington coastal and Puget Sound stocks had MSST greater than 0.5*S_{MSY} to be consistent with existing management constraints associated with PSC requirements.

2.2.11.3 Evaluation of FPA 5 SDC Alternatives

Consistency with the MSA and NS1Gs: Same comments as Alternative 3; FPA 5 overfishing SDC are consistent with NS1Gs.

Overfishing: Same comments as Alternative 2.

Overfished: Same comments as Alternative 3; MSST is defined in terms of S, consistent with the NS1Gs' requirement, although MSST for stocks vary between 0.5*S_{MSY} and 0.75*S_{MSY}. FPA 5 overfished SDC are consistent with NS1Gs.

Approaching Overfished: Same comments as Alternative 3; FPA 5 approaching overfished SDC are consistent with NS1Gs.

Rebuilt: Same comments as Alternative 3; FPA 5 rebuilt SDC are consistent with NS1Gs.

Feasibility of Implementation: Same comments as Alternative 2; FPA 5 SDC are feasible to implement.

Other Considerations: Same comments as Alternative 3.
MFMT for Grays Harbor, Queets, Hoh, and Quillayute coho are F=0.65, the maximum allowed exploitation rate under PSC management framework, which is more conservative than the stock specific estimates in Appendix E except for Quillayute coho (F=0.59 from Appendix E) (Table 2-8). Reference points should be based on the best available science, but adopting more conservative values can provide a more precautionary and consistent management approach. However, adopting a less conservative value for Quillayute fall coho MFMT, which exceeds the best available estimate of F_{MSY}, is inconsistent with National Standard 2 and could increase the probability of overfishing.

2.2.12 Stock-Specific Considerations

Specification of SDC are dependent on identifying S_{MSY} reference points for individual stocks. The specification of S_{MSY} may also establish a conservation objective, (annual management constraint) for that stock. The individual S_{MSY} values identified in the SDC alternatives are, in some cases, different than those currently used as conservation objectives and management targets.

For example, SRFC have a range of 122,000-180,000 natural and hatchery spawners as their conservation objective. The SDC alternatives specify a single S_{MSY} value of 122,000, and yet other levels of S within the goal range have been targeted by the Council. FPA 5specifies S_{MSY} = 122,000 (Table 2-9), and MSST is 0.75*S_{MSY}.

FPA 5 for KRFC uses the S_{MSY} estimate of 40,700 and MSST of 0.75*S_{MSY}. All other natural Chinook stocks use the best current estimates of S_{MSY} and MSST of 0.5*S_{MSY} (Table 2-9). MSST for KRFC and SRFC are more conservative than for other Chinook stocks to provide additional protection for sub-stocks within the KRFC and SRFC stock aggregates.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Puget Sound coho have conservation objectives based on stepped exploitation rates associated with abundance break points. These objectives were established through the *U.S. v. Washington* process, and subsequently adopted into the PST and the Salmon FMP. The abundance break points correspond to S_{MSY} under average and low survival conditions and range from $0.59*S_{MSY}$ to $0.75*S_{MSY}$. Using an MSST of $0.5*S_{MSY}$ would result in overfished status criteria at stock sizes that are less than the lower break point estimate of S for all Puget Sound coho stocks. Using an MSST of $0.75*S_{MSY}$ would result in overfished status criteria at stock sizes that are greater than the lower break point estimate of S for most Puget Sound coho stocks (Table 2-8). FPA 5 uses the abundance breakpoints for MSST for Puget Sound coho stocks (Table 2-8).

Washington Coastal coho have FMP conservation objectives based on a range of S_{MSY} associated with high and low smolts per female and marine survival. The status quo control rule uses the lower end of the range as MSST. S_{MSY} could also be based on other values used to manage these stocks, for example, the mid-point of the range could be used for S_{MSY} with $0.5*S_{MSY}$ or $0.75*S_{MSY}$ for MSST. The mid-point of the S_{MSY} range is also used to categorize annual stock status for the PSC management process (Table 2-8). Analysis of stock-recruitment data provides additional estimates of S_{MSY} and F_{MSY} for these stocks (Appendix E), which were used in analyzing SDC in this FMP amendment process. While the estimates in Appendix E represent the best available science, FPA 5 uses the lower end of the status quo escapement range as S_{MSY} for Queets and Quillayute fall coho, which are more conservative than the estimates presented in Appendix E, to be consistent with the PSC management framework. For Hoh coho, the S_{MSY} estimate in Appendix E is used because it is more conservative than the lower end of the status quo conservation objective. For Grays Harbor coho, the best estimate of S_{MSY} is derived from the status quo conservation objective, which represents S_{MSP} (spawners estimated to produce maximum sustainable production), multiplied by the estimate of F_{MSY} from Appendix E. FPA 5 uses $0.75*S_{MSY}$ for MSST for Washington coastal coho.

As mentioned above, MFMT for Grays Harbor, Queets, Hoh, and Quillayute coho are F=0.65, the maximum allowed exploitation rate under PSC management framework, which is more conservative than the stock specific estimates in Appendix E except for Quillayute coho (F=0.59 from Appendix E).

Estimates of F_{MSY}, S_{MSY} and MSST have not been adopted for Willapa natural coho, which is proposed to be added to the FMP as part of Stock Classification FPA 4. Values for these reference points will be established through the Salmon Methodology Review process as soon as practical.

The current conservation objective and control rule for Oregon South Coast Chinook could allow for S-based SDC; however, there is insufficient information to directly assess F-based SDC. Oregon South Coast Chinook, or some stock components thereof, may soon have new objectives that would facilitate setting F-based SDC, pending an ongoing review/revision of management objectives for that stock complex (Table 2-9).

The Canadian Chinook and coho stocks identified in the FMP are actually large stock management units made up of many individual stocks. The Canadian management agencies are responsible for determining the status of these individual stocks as they relate to provisions of the PST and other Canadian statutes. The Council has no authority to monitor or assess status of these individual stocks, or to specify their management objectives. The Council also has no authority to establish reference points for the larger stock units. Therefore, specification of SDC for Canadian stocks in the Council's Salmon FMP is not feasible (Tables 2-8, 2-9). Stock Classification FPA 4 removes Canadian Chinook, coho and pink salmon stocks from the FMP, so SDC reference points are not required for those stocks. The Council will continue to abide by the terms of the PST and manage its fisheries accordingly.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 2-8. Status determination criteria reference points, assumptions and issues for coho stocks.

Coho Stock	S_{MSY}		MFMT (F_{MSY})		MSST				
	Est	Basis	Est	Basis	Alt 1 Status Quo Cons Obj	Alt 2, 3, & 4 0.5*S_{MSY}	Alt 2b, 3b & 4b 0.75*S_{MSY}	Alt 3c 0.86*S_{MSY}	FPA 5 Varies among stocks
CCC – ESA Endangered	Unk	NA	Unk	NA	0.0 HR in CA: ESA BO	Unk	Unk	Unk	Unk
SONCC – ESA Threatened	Unk	NA	Unk	NA	0.13 Ocean ER: ESA BO	Unk	Unk	Unk	Unk
OCN – ESA Threatened	Unk	NA	Unk	NA	0.08-0.45 ER: ESA BO	Unk	Unk	Unk	Unk
LCN – ESA Threatened	Unk	NA	Unk	NA	Ocean & MS CR ER: ESA BO	Unk	Unk	Unk	Unk
Oregon Coastal - Hatchery	Unk	ODFW	UnDef	NA	NA	NA	NA	NA	NA
Columbia River Late - Hatchery	14,100	TAC	UnDef	NA		NA	NA	NA	NA
Columbia River Early - Hatchery	7,100	TAC	UnDef	NA	7,100	NA	NA	NA	NA
Willapa Bay - Hatchery	6,100	WDFW	UnDef	NA	6,100	NA	NA	NA	NA
Quinault - Hatchery	??	QIN?	UnDef	NA	??	NA	NA	NA	NA
Quillayute Summer - Hatchery	300	WDFW	UnDef	NA	300	NA	NA	NA	NA
S. Puget Sound - Hatchery	52,000	WDFW	UnDef	NA	52,000	NA	NA	NA	NA
Grays Harbor	24,426	S_{MSP} FMP *F_{SMY} App C	0.65	PSC	35,400	12,213	18,320	21,007	18,320
Queets	5,800	FMP	0.65	PSC	5,800-14,500	2,750	4,350	4,730	4,350
Hoh	2,520	App E	0.65	PSC	2,000-5,000	1,260	1,890	1,935	1,890
Quillayute Fall	6,300	FMP	0.65	App E	6,300-15,800	2,937	4,725	5,051	4,725
Strait of JdF	11,000	FMP	0.60	FMP	7,000	5,489	8,234	9,442	7,000
Hood Canal	14,350	FMP	0.65	FMP	10,750	7,175	10,762	12,340	10,750
Skagit	25,000	FMP	0.60	FMP	14,875	12,500	18,750	21,500	14,875
Stillaguamish	10,000	FMP	0.50	FMP	6,100	5,000	7,500	8,600	6,100
Snohomish	50,000	FMP	0.60	FMP	31,000	25,000	37,500	43,000	31,000
Canadian Coastal	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA
Fraser River	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 2-9. Status determination criteria reference points, assumptions and issues for Chinook stocks. Sp/Su = Spring/Summer, Su/F = Summer/Fall.

	S_{MSY}		MFMT (F_{MSY})		MSST				
Chinook Stock	**Est**	**Basis**	**Est**	**Basis**	**Alt 1 Status Quo Cons Obj**	**Alt 2, 3, & 4 $0.5*S_{MSY}$**	**Alt 2b, 3b & 4b $0.75*S_{MSY}$**	**Alt 3c $0.86*S_{MSY}$**	**FPA 5 Varies Among Stocks**
Sacramento River Winter – ESA Endangered	Unk	NA	Unk	NA	CA Time/Area /Size restriction: ESA BO	Unk	Unk	Unk	Unk
Sacramento River Spring – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Northern California Coast (Eel, Mattole, Mad Rivers) -ESA Threatened	Unk	NA	Unk	NA	≤ 0.16 Ocean ER on Age-4 KRFC: ESA BO	Unk	Unk	Unk	Unk
Upper Willamette Spring – ESA Threatened	Unk	NA	Unk	NA	≤ 0.15 FW ER: ESA BO	Unk	Unk	Unk	Unk
LCR Natural – ESA Threatened	Unk	NA	Unk	NA	≤ 0.37 ER: ESA BO	Unk	Unk	Unk	Unk
North Fork Lewis Fall – Part of LCR ESU	5,700 5,791	FMP CTC	0.76	CTC	5,700: ESA BO	Unk	Unk	Unk	Unk
Snake River Fall – ESA Threatened	Unk	NA	Unk	NA	≤0.70 Base Period ER: ESA BO	Unk	Unk	Unk	Unk
Snake River Sp/Su – ESA Threatened	Unk	NA	Unk	NA	≤ 0.055 to 0.17 FW ER: ESA BO	Unk	Unk	Unk	Unk
Upper Columbia River Spring – ESA Endangered	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Eastern Strait of Juan de Fuca Su/F – ESA Threatened	Unk	NA	Unk	NA	Comp. Chinook ER: ESA 4(d) Rule	Unk	Unk	Unk	Unk
Skokomish Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Nooksack Sp/early Fall – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Skagit - Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Skagit Sp – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Stillaguamish Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Snohomish Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Cedar River Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
White River Spring – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk
Green River Su/F – ESA Threatened	Unk	NA	Unk	NA		Unk	Unk	Unk	Unk

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Chinook Stock	S_{MSY} Est	S_{MSY} Basis	MFMT (F_{MSY}) Est	MFMT (F_{MSY}) Basis	MSST Alt 1 Status Quo Cons Obj	Alt 2, 3, & 4 $0.5*S_{MSY}$	Alt 2b, 3b & 4b $0.75*S_{MSY}$	Alt 3c $0.86*S_{MSY}$	FPA 5 Varies Among Stocks
Nisqually River Su/F – ESA Threatened	Unk	NA	Unk	NA	1,100: ESA 4(d) Rule	Unk	Unk	Unk	Unk
Lower Columbia River Fall - Hatchery	15,400	TAC	UnDef	NA	15,400	NA	NA	NA	NA
Lower Columbia River Spring - Hatchery	2,700	TAC	UnDef	NA	2,700	NA	NA	NA	NA
Mid-Columbia River Bright Fall - Hatchery	Unk	TAC	UnDef	NA	Hatchery Egg Take	NA	NA	NA	NA
Spring Creek Fall-Hatchery	7,000	TAC	UnDef	NA	7,000	NA	NA	NA	NA
Willapa Bay Fall-Hatchery	8,200	WDFW	UnDef	NA	8,200	NA	NA	NA	NA
Quinault Fall–Hatchery	Unk	QIN	UnDef	NA	Egg Take	NA	NA	NA	NA
Sacramento Fall	122,000	Lower	0.78	App C	122,000	61,000	91,500	104,920	91,500
Klamath River Fall	40,700	STT	0.71	STT	35,000 floor: FMP	20,350	30,525	35,000	30,525
Smith River Fall	UnDef	NA	0.78	App C	UnDef	UnDef	UnDef	UnDef	UnDef
Southern Oregon	150,000 to 200,000	FMP	0.78	App C	>60 spawners/ mi: FMP	UnDef	UnDef	UnDef	UnDef
Central and Northern Oregon		FMP	0.78	App C		UnDef	UnDef	UnDef	UnDef
Klickitat, Warms Springs, John Day and Yakima River - Spring	Unk	FMP	Unk	NA	ER Exception	Unk	Unk	Unk	NA
Upper River Bright - Fall	39,625	CTC	0.86	CTC		19,182	29,719	34,078	19,182
Upper River - Summer	12,143	CTC	0.75	CTC		6,072	9,107	10,443	6,072
Willapa Bay - Fall	3,393	WDFW	0.78	App C		1,696	2,545	2,918	1,696
Grays Harbor Fall	11,388	S_{MSP} FMP $*F_{SMY}$ App C	0.78	App C		5,694	8,541	9,794	5,694
Grays Harbor Spring	1,092		0.78	App C		546	819	939	546
Queets - Fall	2,500	FMP	0.87	App C		1,250	1,875	2,150	1,250
Queets – Sp/Sur	700	FMP	0.78	App C		350	525	602	350
Hoh - Fall	1,200	FMP	0.90	App C		600	900	1,032	600
Hoh Sp/Su	900	FMP	0.78	App C		450	675	774	450
Quillayute - Fall	3,000	FMP	0.87	App C		1,500	2,250	2,580	1,500
Quillayute - Sp/Su	1,200	FMP	0.78	App C		600	900	1,032	600
Hoko -Su/F	850	FMP	0.78	App C		425	637	731	425
Canadian Coastal	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA
Fraser River	UnDef	FMP	UnDef	FMP	UnDef	NA	NA	NA	NA

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.2.13 Council Response to Triggering SDC

Under the status quo SDC Alternative the FMP prescribes actions that the Council must take when a conservation alert or overfishing concern are triggered, including notifying relevant management agencies of stock status, developing assessments of stock status and causes of triggering SDC, implementing management responses, adopting criteria for ending an overfishing concern (PFMC 2007). Under SDC Alternatives 2-4, these actions would be revised and/or associated with new SDC thresholds. The following actions are proposed for Alternatives 2-4 for each SDC category, and are included in the proposed FMP language presented in Appendix I.

2.2.13.1 Overfishing

The STT will report postseason exploitation rates in the annual SAFE document, and when overfishing occurs, the Council shall:

1. notify the NMFS NWR administrator of the STT's findings;
2. direct the STT to assess the mortality rates in fisheries impacting the stock of concern and report their findings;
3. immediately take action to ensure Council area fisheries are not contributing to overfishing, and;
4. notify pertinent management agencies of the stock's status and the contribution of various fisheries to the total exploitation rate.

2.2.13.2 Overfished

When the overfished status determination criteria set forth in this FMP have been triggered, the Council shall:

1. notify the NMFS NWR administrator of this situation;
2. notify pertinent management entities;
3. structure Council area fisheries to reduce the likelihood of the stock remaining overfished and to mitigate the effects on stock status, and;
4. direct the STT to propose a rebuilding plan for Council consideration within one year.

Upon formal notification from NMFS to the Council of the overfished status of a stock, a rebuilding plan must be developed and implemented within two years.

The STT's proposed rebuilding plan will include:

1. an evaluation of the roles of fishing, marine and freshwater survival in the overfished determination;
2. any modifications to the criteria set forth [in section 2.2.10.2 of this EA] for determining when the stock has rebuilt,
3. recommendations for actions the Council could take to rebuild the stock to S_{MSY}, including modification of control rules, if appropriate, and;
4. a specified rebuilding period.

In addition, the STT may consider and make recommendations to the Council or other management entities for reevaluating the current estimate of S_{MSY}, modifying methods used to forecast stock abundance or fishing impacts, improving sampling and monitoring programs, or changing hatchery practices.

Based on the results of the STT's recommended rebuilding plan, the Council will adopt a rebuilding plan for recommendation to the Secretary. Adoption of a rebuilding plan will require implementation either through an FMP amendment or notice and comment rule-making process. Subject to Secretarial approval, the Council will implement the rebuilding plan with appropriate actions to ensure the stock is rebuilt in as short a time as possible based on the biology of the stock but not to exceed ten years, while

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

taking into consideration the needs of the commercial, recreational and tribal fishing interests and coastal communities. The existing control rules provide a default rebuilding plan that targets spawning escapement at or above MSY, provided sufficient recruits are available, and targets a rebuilding period of one generation (two years for pink salmon, 3 years for coho, and 5 years for Chinook). If sufficient recruits are not available to achieve spawning escapement at or above MSY in a particular year, the control rules provide for the potential use of *de minimis* exploitation rates that allow continued participation of fishing communities while minimizing risk of overfishing. However, the Council should consider the specific circumstances surrounding an overfished determination and ensure that the adopted rebuilding plan addresses all relevant issues.

Even if fishing is not the primary factor in the depression of the stock, the Council must act to limit the exploitation rate of fisheries within its jurisdiction so as not to limit rebuilding of the stock or fisheries. In cases where no action within Council authority can be identified which has a reasonable expectation of contributing to the rebuilding of the stock in question, the Council will identify the actions required by other entities to recover the depressed stock. Due to a lack of data for some stocks, environmental variation, economic and social impacts, and habitat losses or problems beyond the control or management authority of the Council, it is possible that rebuilding of depressed stocks in some cases could take much longer than ten years. The Council may change analytical or procedural methodologies to improve the accuracy of estimates for abundance, harvest impacts, and MSY escapement levels, and/or reduce ocean harvest impacts when it may be effective in stock recovery. For those causes beyond Council control or expertise, the Council may make recommendations to those entities which have the authority and expertise to change preseason prediction methodology, improve habitat, modify enhancement activities, and re-evaluate management and conservation objectives for potential modification through the appropriate Council process.

In addition to the STT assessment, the Council may direct its Habitat Committee (HC) to work with federal, state, local, and tribal habitat experts to review the status of the essential fish habitat affecting this stock and, as appropriate, provide recommendations to the Council for restoration and enhancement measures within a suitable time frame. However, this action would be a priority only if the STT evaluation concluded that freshwater survival was a significant factor leading to the overfished determination. Upon review of the report from the HC, the Council will take actions to promote any solutions to the identified habitat problems.

2.2.13.3 Approaching an Overfished Condition

When a stock is approaching an overfished condition the Council shall:

1. notify the NMFS NWR administrator of this situation;
2. notify pertinent management entities, and;
3. structure Council area fisheries to avoid the stock becoming overfished and to mitigate the effects on stock status.

2.2.13.4 Rebuilt

When a stock is determined to be rebuilt, the Council shall:

1. notify the NMFS NWR administrator of its finding, and;
2. notify pertinent management entities.

2.2.13.5 Evaluation of Council Response to Triggering SDC

Consistency with MSA and NS1Gs: The Council responses to triggering SDC are consistent with the MSA and NS1Gs. The MSA requires FMPs to contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery if the fishery is overfished or approaching

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

an overfished condition[19], and rebuild overfished fisheries[20] 304(e). The NS1Gs recommend Councils submit a rebuilding plan to NMFS within 15 months of notice that a fishery is overfished[21], and specify a rebuilding time period not to exceed 10 years[22]. The actions specified under Sections 2.2.12.1 and 2.2.12.3 require the Council to end any overfishing immediately, consistent with the MSA and NS1Gs. Actions under 2.2.12.2 require development of a rebuilding plan, consistent with the MSA and NS1Gs.

Feasibility of Implementation: The actions specified under Sections 2.2.12.2-4 relating to notifications, assignments, and content of assessments and rebuilding plans are within the Council's authority and will ensure that administrative processes are clear and efficient. All these actions are feasible to implement.

2.3 Alternatives for Reference Points: OFL, ABC, ACL and Associated Frameworks

Alternatives for specification of OFL, ABC, and ACL reference points will be made on an individual stock basis for all stocks as required based on the best available science. These reference points will not be specified for any stocks that are identified in the FMP as EC species[23] or stocks that are exempt due to management under an international agreement. A statutory exception exists to the requirement for specification of an ACL where they are "otherwise provided for under an international agreement…"[24]. The NS1Gs state that for internationally-assessed stocks, an ABC as defined in the NS1Gs is not required if they meet this international exception (see Section 2.1.4 for a list of salmon stocks proposed for classification as EC and stocks proposed as meeting the international exception).

The reference points identified in this Section will not be specified for hatchery stocks and ESA-listed stocks identified in the FMP. This is consistent with the NS1Gs, which provide the flexibility to consider alternative approaches for specifying ACLs and AMs. The NS1Gs generally allow for flexibility for stocks with unusual life history characteristics like Pacific salmon, and particularly for species listed under the ESA and hatchery stocks[25]. For stocks classified as hatchery stocks (Tables 2-8 and 2-9), hatchery escapement goals will continue to serve as conservation objectives rather than specifying MSY-based reference points (see Section 2.3.5.3 of this EA). For stocks classified as ESA stocks (Tables 2-8 and 2-9), ESA biological opinions and associated consultation standards will continue to provide necessary controls to ensure their long-term conservation (see Section 2.3.5.4 of this EA).

Based on stock classification Alternatives 2, 3, and FPA 4 in Section 2.1 of this EA, the relevant stocks for specifying OFL/ABC/ACL reference points are SRFC and KRFC. It is possible that Willapa Bay coho, South Oregon Coast Chinook, or some stock components thereof, may also support specification of these reference points prior to or shortly after implementation of this FMP amendment, depending on the outcome of an ongoing review/revision of management objectives for those stocks. The Oregon Coast stocks could serve either as additional indicator stocks for the SONC complex, form an independent complex, or be managed as individual stocks.

2.3.1 Criteria Used to Evaluate the Alternatives

The criteria used to evaluate reference point alternatives were consistency with the MSA and NS1Gs, and feasibility of implementation.

[19] MSA §303(a)(10)
[20] MSA §304(e)
[21] 50 CFR 600.310(j)(2)(ii)(B)
[22] 50 CFR 600.310(j)(3)(i)(B)
[23] 50 CFR 600.310(d)(5)
[24] MSRA§104(b)(1)
[25] 50 CFR 600 310(h)(3)

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Considerations within the criterion for MSA and NS1Gs consistency include:

- Establishing a mechanism for specifying Annual Catch Limits[26]. ACLs must be specified in the FMP, implementing regulations, or annual specifications. The process should describe timeframes and address application to indicator and individual stocks. Use of exceptions (i.e., international fishery agreements) and flexibility provisions should be described.
- Describing the role of the SSC in recommending MSY and ABC[27]. The SSC must provide recommendations for ABC, and a process for applying the ABC control rule must be established.
- Accounting for uncertainty. ACLs are intended to reduce the risk of overfishing by accounting for scientific uncertainty in the fishery management process. The NS1Gs require that the probability of overfishing should not exceed 50 percent, but acceptable levels of risk reduction for ACLs are not specified so alternatives will be evaluated for simple compliance, and ranked if there are differences in risk reduction.
- Consistency with approaches in the NS1Gs for each reference point. The NS1Gs define OFL, ABC, and ACL reference points as values that will be specified annually (or multiple years, if necessary) based on catch, expressed in terms of numbers or weight of fish and including all sources of fishing mortality from all fisheries (Federal and nonfederal). The reason for this is because the two statutorily required reference points (ABC and ACL) include the term "catch," which is most frequently defined in fisheries management in those terms.

2.3.2 Alternative Reference Points for OFL, ABC, and ACL

The stock classification alternatives affect the viability of approaches for specifying these reference points, as will the specification of SDC for overfishing. Regarding the latter, implementation feasibility and assessment capability are of particular interest. Based on the classification alternatives presented in Sections 2.1, Table 2-10 presents a conceptual view of stock-specific-based alternatives to be further considered.

Table 2-10. Overview of alternatives for OFL, ABC, ACL, ACT, and the associated framework.

Alternatives	OFL	ABC	ACL	ACT[a/]	Framework
1) Status Quo	Not identified	Not identified	Not identified	Not identified	--NA— Current conservation objectives specified to achieve S_{MSY} annually
2) Catch (C) Based	C_{OFL}	C_{ABC}	C_{ACL}	C_{ACT} [a/]	$C_{OFL} > C_{ABC} = C_{ACL} > C_{ACT}$ $C_{OFL}(t) = N(t) \times F_{MSY}$ $C_{ABC}(t) = N(t) \times F_{ABC}$ F_{ABC} = 95% or 90% F_{MSY} [b/]
3) FPA Spawning Escapement (S) Based	S_{OFL}	S_{ABC}	S_{ACL}	S_{ACT} [a/]	$S_{OFL} < S_{ABC} = S_{ACL} < S_{ACT}$ $S_{OFL}(t) = N(t) \times (1-F_{MSY})$ $S_{ABC}(t) = N(t) \times (1-F_{ABC})$ F_{ABC} = 95% or 90% F_{MSY} [b/]

a/ ACT could be used, as needed, but is undefined at this time.
b/ The buffer to account for scientific uncertainty is either 95 percent or 90 percent of F_{MSY}, depending on whether the F_{MSY} value represents a stock-specific estimate (Tier-1) or proxy value (Tier-2), respectively.

[26] MSA Section 303(a)(15); 50 CFR 600 310(h)
[27] MSA Section 302(g)(1)(B); 50 CFR 600 310(f)(3-4)

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

F_{MSY} is defined as the constant value of the total annual exploitation rate (independent of stock abundance) that would result in MSY over the long-term under prevailing ecological and environmental conditions.

All of the N, C, and F quantities in Table 2-10 are defined in terms of adult spawner equivalents (AEQ). For salmon, AEQ spawner units are biologically the most meaningful metric to use for these quantities, and are used as the basis of current conservation objective control rules. AEQ units are the number of would-be spawners represented by the respective quantity, absent further fishing. Thus, S by definition is expressed in AEQ units. For C, an adult fish caught in freshwater has an adult spawner equivalence of one, but a fish caught in the ocean has an adult spawner equivalence of less than one. A fish in the ocean may or may not have survived natural mortality, and may or may not have matured in the current year to return to freshwater to spawn. Thus, ocean catch, in AEQ units, is discounted for natural mortality and maturation. N is pre-fishery ocean abundance also discounted for natural mortality and maturation. F is the total exploitation rate of AEQ spawners, C/N.

For succinctness, in the following sections the quantities N, C, and F will be simply referred to as "abundance," "catch," and "exploitation rate," without the AEQ spawner qualifier except as necessary to discuss issues specifically pertaining to that concept.

2.3.3 Alternative 1: Status Quo – Not defined

Under the status quo, each stock is managed according to its individual conservation objectives. Current conservation objectives are based on exploitation rates or escapement goals. OFL, ABC, ACL, and ACT are not reference points that are currently specified for any stock.

Description: All current FMP conservation objectives can be translated into exploitation rate control rules, which specify the allowable total exploitation rate (i.e., includes all mortality from Federal and nonfederal fisheries) on the basis of the abundance of the stock. The four control rule types are:

- constant escapement
  - Example: Columbia River summer Chinook
- escapement range
  - Example: Sacramento River fall Chinook. 122,000 – 180,000 natural and hatchery adult spawners
- exploitation rate with floor level of escapement
  - Example: Klamath River fall Chinook. 33-34 percent total exploitation rate on potential adult natural area spawners, but no fewer than 35,000 naturally spawning adults in any one year
- stepped exploitation rate
  - Example: Skagit Coho. ≤60 percent total exploitation rate at pre-fishing abundance ≥62,500; ≤35 percent total exploitation rate at pre-fishing abundance ≤62,500 and ≥22,857; ≤20 percent total exploitation rate at pre-fishing abundance ≤22,857

Exploitation rate-based models are coupled with annual stock abundance forecasts to evaluate whether proposed fishery management measures are simultaneously consistent with the control rules of all FMP-managed stocks, the ESA consultation standards of all ESA-listed stocks, requirements of meeting PST obligations, and giving due consideration to hatchery stock goals (egg-take needs).

The ocean salmon fishery is a mixed-stock fishery; therefore, total Federal ocean harvest is managed to a level not to exceed the allowable ocean harvest of the most limiting stocks in the fishery. The potential ocean harvest of some stocks is often forgone in a given year, although overfishing still could occur on those stocks due to fishing mortality from nonfederal fisheries. While the management paradigm for

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

ocean salmon harvest has been termed "weak-stock management," the resulting harvest is achieving optimum yield for the fishery each year.

Currently, ocean salmon harvest along the west coast is managed using either catch limits (quotas) or catch expectations (based on time and area closures). Off the Washington coast mixed-stock quotas (not to be confused with complexes) are used to control the ocean harvest. Off the Oregon coast, both mixed-stock quotas and time/area closures (effort control) are used. The quotas off Washington and Oregon are monitored in-season and have rarely been exceeded (Appendix F). Off the California coast, time/area closures are primarily used to manage ocean harvest and are based on an expected effort and catch associated with achieving stock-specific conservation objectives.

Consistency with MSA and NS1Gs: Because the Status Quo Alternative does not specify ACLs, it is not consistent with the MSA or NS1Gs, does not meet the purpose and need of the proposed action, and is not a viable alternative.

Accounting for Uncertainty: While OFL, ABC, and ACL are not currently specified in the Status Quo Alternative, this does not imply that the risk of overfishing is, or has been, high. Compared to the F_{MSY} approach described in the NS1Gs, however, it is not readily apparent whether or how the current set of control rules governing the exploitation of FMP-managed stocks account for scientific uncertainty. By overlaying the estimated F_{MSY} value onto the current control rules, it can be demonstrated that the current exploitation rate control rules are generally conservative (buffered) relative to F_{MSY}, with the exception of SRFC at high abundance levels (Figure 2-3).

Feasibility of Implementation: The Status Quo Alternative is currently implemented.

2.3.4 Overview of Alternatives 2, FPA 3 and 3b

Alternatives 2, FPA 3, and 3b specify OFL, ABC and ACL in terms of either catch or spawning escapement; these reference points are derived using exploitation rate (i.e., F_{MSY} and F_{ABC}) and abundance for each stock. F_{MSY} and F_{ABC} are defined in terms of total exploitation rate across all salmon fisheries (Federal and nonfederal jurisdictions). Impacts in non-salmon fisheries are included in the natural mortality assumptions used to estimate population parameters for salmon stocks; therefore, all fishing mortality sources are accounted for when reference points are specified. Current conservation objectives for all FMP-managed stocks can be expressed as exploitation rate control rules, with exploitation rates dependent on stock abundance.

OFL: OFL would be derived from the stock-specific estimate of F_{MSY}, or an F_{MSY} proxy, and abundance. OFL will be expressed in terms of either catch (C) or spawning escapement (S). Stock-specific estimates of F_{MSY} based on spawner-recruit data will be used if available. Otherwise, proxy values based on species-specific meta-analyses would be used. The derivation of the F_{MSY} proxy value for Chinook (0.78) is shown in Appendix C.

ABC and the ABC Control Rule: ABC will be derived from an ABC control rule. The first step in determining the annual ABC is to specify $F_{ABC.}$ The second step requires applying F_{ABC} to the abundance to derive the annual ABC value expressed in terms of C or S.

F_{ABC} is a constant exploitation rate which is reduced from F_{MSY} by a buffer that accounts for scientific uncertainty. Two tiers of buffers have been established based on the level of scientific uncertainty associated with stocks having different levels of data-richness. Taking such a tiered approach to

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

specification of the ABC is consistent with the NS1Gs[28] and appropriately accounts for the differences in scientific uncertainty among the stocks (Appendix D).

- Tier-1: For stocks that have sufficient data to conduct a stock-specific spawner-recruit analysis, and for which F_{MSY} has been directly estimated, the buffer level is 5 percent ($F_{ABC} = F_{MSY} \times 0.95$).
- Tier-2: For stocks that have not undergone a spawner-recruit analysis, and F_{MSY} has been determined by proxy, the buffer level is 10 percent ($F_{ABC} = F_{MSY} \times 0.90$).

The resulting SRFC and KRFC control rules, both the status quo forms and with incorporation of the ABC control rule, are displayed in Figure 2-3. With regard to SRFC, the control rules depicted assume the FPA S_{MSY} = 122,000. For SRFC, the most notable difference between status quo and the control rule incorporating the ABC is the specification of the maximum exploitation rate at F_{ABC}. Without the ABC control rule, the target exploitation rate for SRFC continues to increase with increasing abundance, approaching F = 1 as abundance increases. For KRFC, the status quo maximum allowable exploitation rate is 0.67, and application of the ABC control rule results in a minor change in maximum allowable F from 0.67 to 0.68. Under FPA 3 the control rule for KRFC would target an escapement of 40,700 natural area adult spawners. This would result in a decrease in the allowable exploitation rate over a portion of the range, because of the target spawner escapement level of S_{MSY} = 40,700 instead of the status quo conservation objective (escapement floor) of 35,000. Under Alternative 3b, the control rule for KRFC would target an escapement of 35,000 natural area adult spawners.

[28] 50 CFR 600.310 (f)(4)

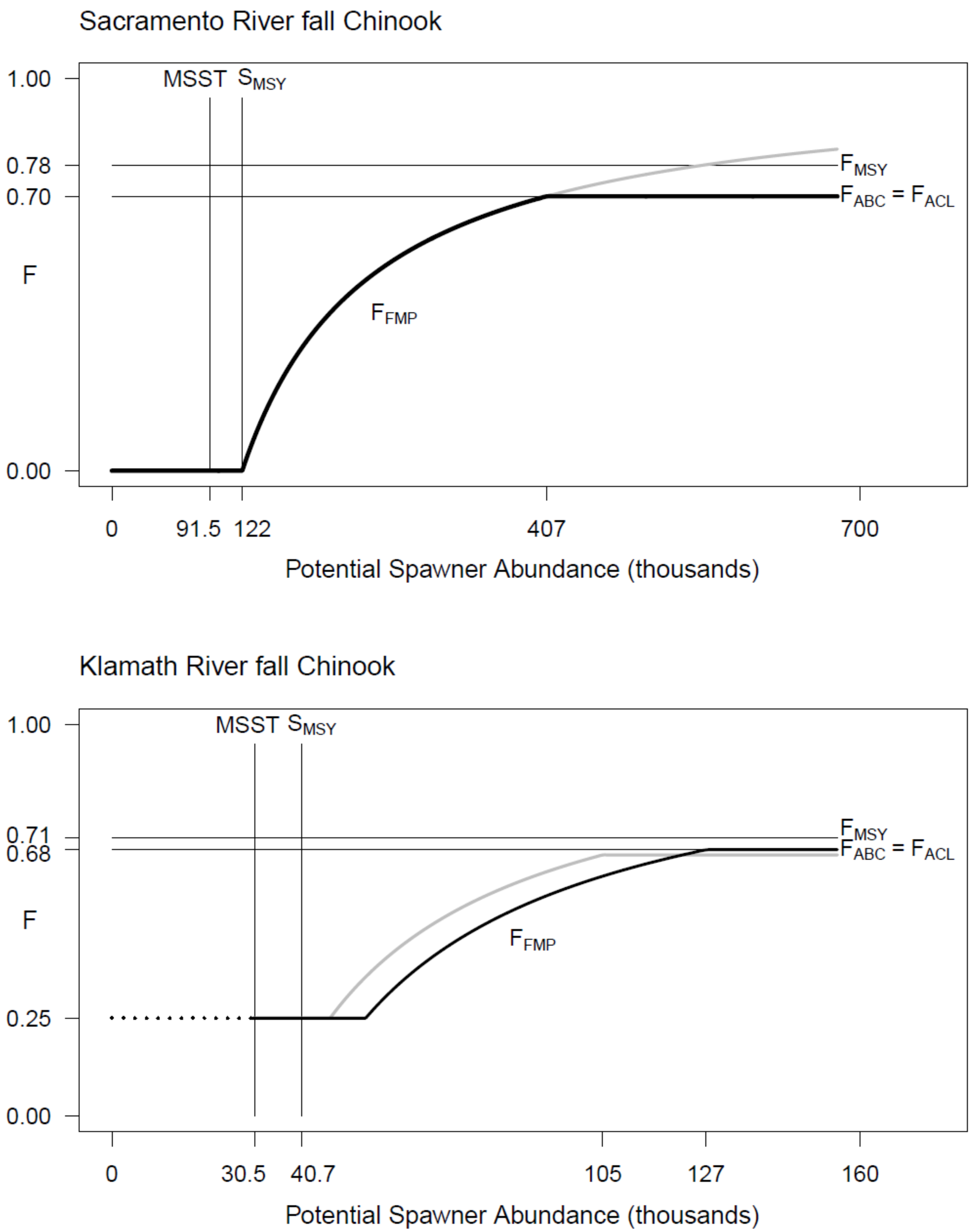

Figure 2-3. Status quo (thick gray line) and Alternative 2 and Final Proposed Alternative (FPA) 3 (thick black line) F-based control rules for SRFC and KRFC. Reference points FPA MSST, S_{MSY}, F_{MSY}, F_{ABC}, and F_{ACL}, are denoted by thin black lines.

Scientific Uncertainty and Specification of ABC: For both the C-based alternative and the S-based alternatives, the ABC is buffered from the OFL (i.e., reduced from the OFL under the C-based alternative and increased from the OFL under the S-based alternative) to account for scientific uncertainty as described in the NS1Gs. For Alternative 2, the ABC is determined preseason by multiplying the F_{ABC} by the abundance forecast. For FPA 3 and Alternative 3b, the ABC is determined preseason by multiplying 1-F_{ABC} by the abundance forecast.

However, the determination of whether the ABC is exceeded on an annual basis will be made using *postseason* estimates of abundance and the specified value of F_{ABC} (or its complement), which are actual values as opposed to preseason forecasts. Since the ABC will be evaluated on a postseason basis, with postseason estimates of abundance, the probability of overfishing is exclusively dependent on whether F_{ABC} exceeds the true value of $F_{MSY.}$ Hence, the focal source of scientific uncertainty is uncertainty in the true value of $F_{MSY.}$

Preseason salmon abundance forecasts are imprecise, and comprise a large share of the uncertainty in annual preseason forecasts of catch and escapement. However, the methods used for salmon abundance forecasting and assessment are generally unbiased over the long-term. The STT routinely reviews forecast methodologies looking for evidence of bias in particular, and makes necessary revisions when appropriate. Although forecast errors may be large in any particular year, the forecasting methods used result in a balancing of errors across years. The combination of (1) unbiased abundance forecasts and assessment variability, (2) the ABC control rule that specifies F_{ABC} as the maximum allowable exploitation rate, and (3) the buffer between F_{ABC} and F_{MSY} to account for scientific uncertainty in the true value of F_{MSY}, combines to result in an annual probability of overfishing of less than 50 percent.

The tiered approach to setting the ABC control rule reflects the expectation of different levels of uncertainty in F_{MSY} for salmon stocks with differing levels of data-richness. Appendix D quantifies uncertainty in the true value of $F_{MSY,}$ both in the case where F_{MSY} is directly estimated, and for the case where an F_{MSY} proxy is relied upon. The 5 and 10 percent buffers for Tier-1 and Tier-2 stocks, respectively, were chosen to be general buffer levels that could be applied to all salmon stocks when necessary for specifying the ABC control rule. The results presented in Appendix D demonstrate that the buffers associated with both tiers substantially reduce the likelihood of the F_{ABC} exceeding the true F_{MSY}. These results are interpreted as describing the degree to which the F_{ABC} control rule reduces the probability of overfishing.

In practice, the probability of overfishing will usually be less than the probability that F_{ABC} exceeds F_{MSY} because the target F (F_{FMP}) will be less than F_{ABC} at low to moderate abundance. From a single stock perspective, individual stock conservation objectives will continue to provide annual management targets with ACL control rules acting as upper limits. The FMP conservation objectives require target exploitation rates lower than F_{ABC} as abundance declines (Figure 2-3). This clearly meets the intent of the NS1Gs, which state that consideration should be given in the ABC control rule to reducing fishing mortality as stock size declines, but this is done through the conservation objective exploitation rate control rule rather than the F_{ABC} control rule. The conservation objective exploitation rate control rule thus provides a substantial amount of additional buffering beyond the F_{ABC} buffer at mid- and low-levels of abundance. From the perspective of the mixed-stock ocean fishery, meeting conservation objectives for ESA-listed and weak target stocks may further restrict the exploitation rate on the remaining stocks. Both of these factors frequently result in an exploitation rate that is substantially lower than the F_{ABC} value.

The retrospective analysis of overfishing (Table 4-1) demonstrates that overfishing has rarely occurred since the mid 1990s. Note that the control rules determining allowable F in past years does not include an F_{ABC} control rule with a maximum allowable exploitation rate specified at $F_{ABC.}$ Nevertheless, the salmon

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

management system described in the retrospective analysis clearly has been effective in controlling exploitation rates since the mid 1990s. Reductions in exploitation rates that occurred at this time were due to management constraints on fisheries to meet conservation objectives for both ESA-listed and weak target stocks. This management scenario, where ESA-listed and weak target stocks constrain fisheries, is not likely to change in the future. Thus, the buffer defining the ABC control rule sufficiently accounts for scientific uncertainty, and when coupled with the additional buffers present in the salmon management system, reduces the probability of overfishing to something well below 50 percent at all abundance levels.

Process of ABC Specification and SSC Approval: The NS1Gs state that Councils should "identify the body that will apply the ABC control rule (i.e., calculates the ABC) and identify the review process that will evaluate the resulting ABC," and that "the SSC must recommend the ABC to the Council."[29]

The SSC will be involved in the review and approval of the ABC control rule initially through this plan amendment, and subsequently as it reviews annual preseason forecasts. The ABC control rule itself will be fixed, but the year-specific ABC for a given stock varies depending on the preseason forecast. The SSC will have an ongoing role in recommending ABCs to the Council through their existing responsibility to review these forecasts. Forecast methods are periodically revised and these too are routinely reviewed by the SSC through the existing methodology review process. The Council's Salmon Technical Team (STT) would develop the preseason forecasts, subject to the SSCs review, and apply the SSC-approved ABC control rule each year. The annual ABC recommendations will be reported to the SSC and Council in STT Preseason Report I (PFMC 2011b). This process would follow the current preseason report process and Salmon Methodology Review process. The SSC could revisit ABC control rules annually or as needed in the fall when salmon methodologies are reviewed in preparation for the preseason process, and make recommendations to the Council if changes are appropriate.

The STT forecasts fishery impacts using harvest models, which have been developed and documented by the STT, Model Evaluation Workgroup (MEW), state, tribal, and Federal management agencies, reviewed by the SSC, and approved by the Council. These models generally use stock-specific abundance estimates, historical fishery exploitation patterns, and a combination of effort estimates and quotas to project impacts. The model algorithms generally do not change substantially from year to year, but any changes that are proposed must be reviewed by the SSC and approved by the Council. The abundance forecasts used in the harvest models are calculated annually based on methods documented in Preseason Report I, which is also reviewed by the SSC and approved by the Council. Other model inputs may be updated, such as adding another year of catch and effort data, without additional review and approval. During the preseason planning process, the STT uses the models to compare impacts from proposed management measures to that allowed under the control rules (determined by the FMP conservation objectives), so that the Council can adopt appropriate management specifications for the upcoming season.

This process allows the SSC to recommend to the Council control rules for salmon stocks that are adopted into the FMP either through formal FMP amendment or through technical review of updated conservation objectives (FMP §3.2.1). The SSC also recommends to the Council the methods used to project compliance with the control rules, and the significant annual model input data (Preseason Report I). The STT is delegated the responsibility of applying the control rule to develop annual management specifications, but in all other respects, the SSC is responsible for review and oversight of the process, and making recommendations to the Council for approval.

[29] 50 CFR 600.310 (f)(3)

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.3.4.1 Alternative 2: Catch (C) Based ACL Framework

Under this alternative, C_{OFL}, C_{ABC}, and C_{ACL} are specified for each stock considering all catch expected from Federal and nonfederal fisheries. These catch-based reference points would be derived each year by applying the corresponding exploitation rate-based values (i.e., F_{MSY} and F_{ABC}), as described above, to the forecast abundance of the stock that year.

- **C_{OFL}** is the annual catch, derived by multiplying a stock's F_{MSY} with the stock's abundance (N) in a given year (t).

$$C_{OFL}(t) = N(t) \times F_{MSY}$$

- **C_{ABC}** is the annual catch derived by multiplying a stock's F_{ABC} with the stock's abundance (N) in a given year (t).

$$C_{ABC}(t) = N(t) \times F_{ABC}$$

  As described above, F_{ABC} is reduced from F_{MSY} to account for scientific uncertainty.

- **C_{ACL}** is equal to C_{ABC}, which could be greater than allowed by stocks' conservation objectives or other factors, such as constraints to protect ESA-listed stocks (Figure 2-4). As such, the C_{ACL} would generally be considered an upper limit associated with preventing overfishing only, rather than a harvest objective.

In years with low abundance, the C_{ACL} could be specified at a level greater than the catch necessary to comply with the conservation objective escapement target. In that situation, the conservation objective escapement target would remain the management target for the fishery. In years with high abundance, the C_{ACL} would be specified at a level less than the catch necessary to reduce abundance to the conservation objective escapement target. In this situation, the fishery would be designed to achieve a catch no more than the C_{ACL} (i.e., less than C allowed to achieve the spawning escapement conservation objective).

Actual computation of the C-based reference points are typically more complicated than the examples above and in Figure 2-4 owing to the age structure and time-dependence of various fishery and biological parameters, which differs among stocks and by the nature of the conservation objective. These reference points will be used in the preseason process, along with stocks' conservation objectives, to design the fishery such that any specified C_{ACL} for a stock or complex is not exceeded and that compliance with individual stock conservation objectives are met. During the fishing year, an individual stock's or complex's C_{ACL} cannot be monitored in-season, but is assessed early in the year following the fishery.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

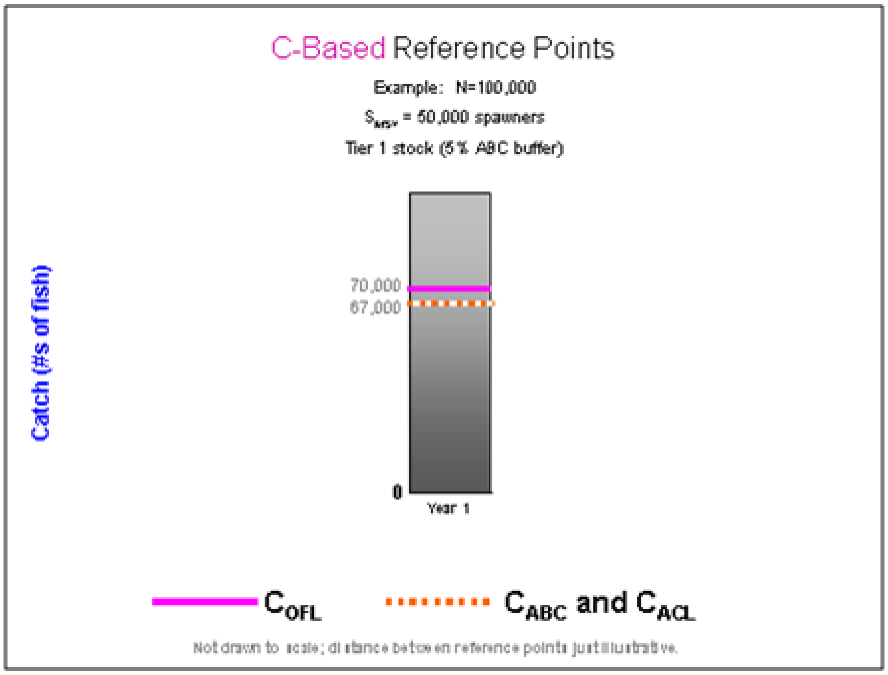

Figure 2-4: Example of C-based reference points assuming F_{MSY} = 0.70. Note that C_{ACL} is greater than allowed under management for the stock's conservation objective (S_{MSY}, 50,000 fish).

Consistency with the MSA and NS1Gs: This alternative is most obviously consistent with the statutory requirements and intent for ACLs and ABC because these reference points are expressed in terms of catch. This alternative also provides for an annual limit on catch. However, as in the S-based alternative, this limit will only be used preseason for providing an upper limit for each stock when planning fisheries and for postseason compliance assessment. Due to the nature of the mixed-stock ocean fishery and the inability to identify individual stocks caught in the ocean, even the C-based ACL cannot currently be monitored in-season. Nevertheless, designing the fishery within each year's constraints will continue to prevent overfishing in the fishery consistent with the MSA requirements.

- **NS1Gs definitions and expression of reference points**: This alternative is most obviously consistent with the NS1Gs' definitions of these reference points in that they will be expressed in terms of catch and specified annually.

- **NS1Gs' framework relationship of reference points**: This alternative is consistent with the framework established by the NS1Gs because C_{ABC} is specified at a level below $C_{OFL,}$ and C_{ACL} will be specified at a level that does not exceed C_{ABC}, specifically it will be set equal to C_{ABC}.

- **Scientific uncertainty and specification of ABC**: This alternative is consistent with requirements that the SSC recommend ABC and describes the process for application of the ABC control rule (see discussion in Section 2.3.4 above).

- **Management uncertainty**: An ACT is not, at this time, proposed for use but could be implemented, if necessary (see Section 2.4.2.4 of this EA).

- **Relationship of the ACL to accountability measures (AMs)**: The NS1Gs identify "AMs for when the ACL is exceeded."[30] Under this alternative, such AMs would be characterized as "AMs for when the C_{ACL} is exceeded." For purposes of triggering "AMs for when the ACL is exceeded" a post-season C_{ACL} will be used. The C_{ACL} will be recalculated using post-season estimates of abundance and compared with the post-season catch. "AMs for when the ACL is exceeded" would be triggered if the post-season C_{ACL} value is exceeded, not if the post-season catch exceeded the preseason $C_{ACL.}$ Alternatives for specifying AMs are discussed in Section 2.4 below.

- **Performance standard for exceeding the ACL**: The NS1Gs include a performance standard that requires a re-evaluation of this framework if the ACL is exceeded more than once in four years. This performance standard will apply if the postseason catch exceeds the C_{ACL} calculated with postseason estimated abundance, rather than the preseason $C_{ACL,}$ to ensure the performance measure is biologically meaningful. For example, if the postseason catch exceeded the preseason C_{ACL} because the actual abundance was greater than was forecast, it would not present a biological concern. It would only be a biological concern if the actual catch exceeded the postseason C_{ACL}, i.e., calculated with the updated, actual abundance estimate. The use of postseason estimates of C_{ACL} rather than preseason forecasts of this reference point is uniquely appropriate for salmon management because high quality postseason abundance estimates are able to be made each year. This allows for the biologically relevant comparison between catch and the $C_{ACL,}$ as determined using high quality abundance estimates and to obviate the need to account for preseason forecast uncertainty in N.

Feasibility of Implementation: Implementation of the C-based Alternative would require that F_{MSY} and F_{ABC} be explicitly defined for all stocks and complexes (i.e., for the indicator stocks) in the fishery requiring ACLs (SRFC and KRFC). F-based reference points are all independent of stock abundance, and would thus be fixed values across years unless the value of F_{MSY} was revised based on additional information. Implementation of this alternative would also require that current year abundance forecasts be made for the indicator stocks subject to ACL requirements prior to the preseason management planning process. This already occurs as part of the annual Council assessment and management process. No further work would be required to implement the C-based Alternative into the preseason planning process beyond what is currently done.

Implementation of the C-based Alternative would require comparing the actual catch of the stock to the C_{ACL} estimated from postseason estimates of abundance and catch each year. As discussed above, while the C_{ACL} would be calculated preseason to inform the development of annual management measures, a postseason C_{ACL} based on the more accurate postseason abundance estimate would be used to evaluate compliance with the ACL. This appears to be technically feasible (estimation methods vary by stock), though additional methods will need to be developed to estimate the AEQ catch for some stocks. The STT would conduct this work and report results annually prior to the development of Council management measures for the following year's fisheries. Determinations would be made annually, and for SRFC could be made in the year immediately following the year in which exploitation may have occurred. However, estimating fishing mortality rate (F) for KRFC would be preliminary in the year following exploitation and near final the following year due to the availability of brood specific run reconstruction information.

Current conservation objectives and control rules would change somewhat from the status quo under the C-based Alternative. Conservation objective control rules represent the exploitation rate necessary to achieve a spawning escapement conservation objective at a given abundance level), and differ from the ACL control rule, which sets an escapement level based on a static exploitation rate below F_{MSY} at all

[30] 50 CFR 600.310 (g)(3)

abundance levels (Figure 2.3). For SRFC, in years of high abundance, harvest control rule would be capped by the C_{ACL}. For KRFC, the F_{ABC} level would be slightly higher than the maximum allowed under the current conservation objective due to specification of F_{MSY} and the Tier-1 buffer defining the ABC control rule. Furthermore, the conservation objective control rule for Alternative 2 (and 3) allow exploitation rates that result in a target spawner abundance of S_{MSY} (40,700), which is higher than floor spawner abundance levels in the Status Quo Alternative (and Alternative 3b) harvest control rule (35,000, Figure 2-3).

The C-based Alternative would not require any change in the customary management measures used by the Council either north or south of Cape Falcon. In particular, it does not require that all salmon fisheries be managed by quota.

2.3.4.2 FPA 3: Spawning Escapement (S) Based ACL Framework

Under FPA 3, OFL, ABC, ACL, and ACT are specified on the basis of spawning escapement (S), which is the metric most commonly used for assessing the status of salmon stocks.

- S_{OFL}, S_{ABC}, and S_{ACL} are specified for each stock.
- The framework is: $S_{OFL} < S_{ABC} = S_{ACL} < S_{ACT}$. S_{ACT} is undefined at this time, but if ever specified, it would be at a level greater than S_{ACL}.

Under this alternative, S_{OFL}, S_{ABC}, and S_{ACL} are specified for each stock individually. These S-based reference points are derived each year by applying the corresponding exploitation rate-based values (i.e., F_{MSY} and F_{ABC}), as described above, to the pre-fishery abundance of the stock that year.

- $\mathbf{S_{OFL}}$ is the annual spawning escapement that is derived by subtracting a stock's estimate of F_{MSY} from 1 (which translates the mortality rate into a survival rate) and then multiplying that by the stock's abundance (N) in a given year (t).

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

- $\mathbf{S_{ABC}}$ is the annual spawning escapement that is derived by subtracting a stock's F_{ABC} from 1 (which translates the mortality rate into a survival rate) and then multiplying that by the stock's abundance (N) in a given year (t).

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

As described in Section 2.3.4, F_{ABC} is reduced from F_{MSY} to account for scientific uncertainty. This same approach is used for FPA 3.

  - o Tier-1: For stocks for which F_{MSY} has been directly estimated the buffer level is 5 percent ($F_{ABC} = F_{MSY} \times 0.95$).
  - o Tier-2: For stocks for which F_{MSY} has been determined by proxy the buffer level is 10 percent ($F_{ABC} = F_{MSY} \times 0.90$).

- $\mathbf{S_{ACL}}$ will be equal to S_{ABC}

The S_{ACL} will fluctuate above or below the conservation objective depending on abundance forecasts (Figure 2-5).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

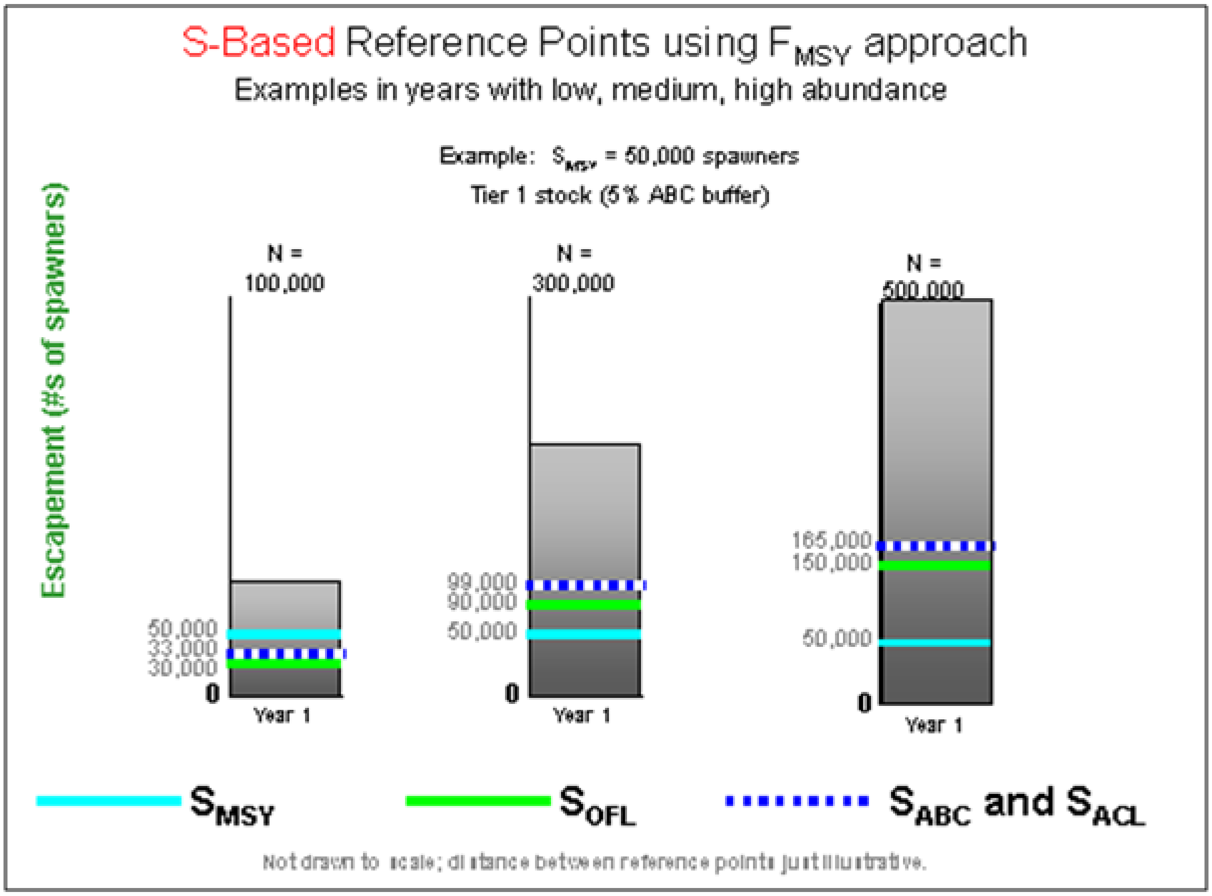

Figure 2-5. Example of Final Preferred Alternative S-based reference points assuming F_{MSY} = 0.70. Note that S_{ACL} is less than the objective in low abundance years and greater than the spawning objective under management for the stock's conservation objective (S_{MSY}, 50,000 fish).

In years with low abundance, the S_{ACL} could be specified at a level lower than the conservation objective escapement target. In that situation, the conservation objective escapement target would remain the management target for the fishery. In years with high abundance, the S_{ACL} would be specified at a level that could be greater than the conservation objective escapement target. In that situation, the fishery would be designed to achieve an amount of returning spawners no less than the S_{ACL} (i.e., greater than S specified in the conservation objective).

Actual computation of the S-based reference points above are typically more complicated than in the above examples and Figure 2-5, owing to the age composition and time-dependence of various fishery and biological parameters. Computation of S-based reference points can also vary among stocks depending on the nature of the conservation objective. These reference points will be used in the preseason process, along with stocks' conservation objectives, to design the fishery such that the number of spawners meets or exceeds any specified S_{ACL} for a stock or complex and that compliance with individual stock conservation objectives are met. During the fishing year, an individual stock's or complex's S_{ACL} cannot be monitored in-season, but is assessed early in the year following the fishery.

Consistency with the MSA and NS1Gs: While FPA 3 does not directly define annual limits in terms of catch, it does define such limits in terms of spawner escapement, and therefore, in effect, limits catch. By designing the fishery within each year's constraints and to achieve escapements no lower than each stock's S_{ACL}, they will continue to prevent overfishing in the fishery consistent with the MSA. **NS1Gs definitions and expression of reference points**: FPA 3 is generally consistent with the NS1Gs'

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

definitions of these reference points. Although they will not be expressed in terms of catch, they will be specified in terms of numbers of fish and specified annually. The NS1G's allow for "flexibility" in achieving the goals of the guidelines for species with unique life histories such as salmon. The S-based alternatives are consistent with the long-standing practice of using spawning escapement to assess the status of salmon stocks. The biology of salmon is such that escapement is the point in the species life history best suited to routine assessment and long-term monitoring.

- **Specification of ABC**: These Alternatives are consistent with requirements that the SSC recommend ABC and describes the process for application of the ABC control rule (see discussion in Section 2.3.4 above).

- **Management uncertainty**: An ACT is not, at this time, proposed for use but could be implemented, if necessary.

- **Relationship of the ACL to accountability measures (AMs)**: The NS1Gs identify "AMs for when the ACL is exceeded." Under these Alternatives, such AMs would be characterized as "AMs for when the S_{ACL} is not achieved." For purposes of triggering these postseason spawner escapement-based AMs, a postseason S_{ACL} will be used. The S_{ACL} will be recalculated using postseason estimates of abundance and compared to the postseason escapement. These AMs would only be triggered if the postseason S_{ACL} is not achieved, not if the postseason escapement fell below the preseason S_{ACL}. Alternatives for specifying AM are discussed in Section 2.4 below.

- **Performance standard for exceeding the ACL**: The NS1Gs include a performance standard that requires a re-evaluation of this framework if the ACL is exceeded more than one in four years. This performance standard would be triggered if the S_{ACL}, calculated with postseason abundance estimates, is not achieved in more than one in four years. This performance standard will only apply if the actual postseason escapement falls below the S_{ACL}, calculated with postseason estimated abundance, to ensure the performance measure is biologically meaningful. For example, if the postseason escapement estimate was lower than the preseason S_{ACL} because the actual abundance was lower than was forecast, it may not present a biological concern. It would only be a biological concern if the actual escapement was lower than the postseason S_{ACL}, i.e., calculated with actual abundance estimate. The use of postseason estimates of S_{ACL} rather than preseason forecasts of this reference point is uniquely appropriate for salmon management because high quality postseason abundance estimates are able to be made each year. This allows for the biologically relevant comparison between observed escapement and the $S_{ACL,}$ estimated with high quality abundance estimates and to obviate the need to account for preseason forecast uncertainty in N.

- **Accounting for Uncertainty**: FPA 3 is consistent with the framework established by the NS1Gs because S_{ABC} is specified with a buffer to account for scientific uncertainty in the $S_{OFL,}$ and S_{ACL} will be specified at a level equal to the S_{ABC}.

<u>Feasibility of Implementation</u>: Implementation of the S-based FPA 3 would require that F_{MSY} and F_{ABC} be explicitly defined for all stocks and complexes in the fishery (i.e., all indicator stocks) that are subject to the ACL requirements (SRFC and KRFC). F-based reference points are all independent of stock abundance, and would thus be fixed values across years unless the value of F_{MSY} was revised based on additional information. Implementation of these Alternatives would also require that current year abundance forecasts be made for these stocks prior to the preseason management planning process. This is already done as part of the Council annual management process. No additional work would be required to implement the S-based FPA 3 into the preseason management planning process.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Implementation of S-based Alternatives would require postseason estimates of abundance and escapement each year so that S_{ACL} and other reference points could be compared with their postseason values, based on the actual abundance. As discussed above, while the S_{ACL} would be calculated preseason to inform the development of annual management measures, a postseason S_{ACL} based on the more accurate postseason abundance estimate would be used to evaluate compliance with the ACL. This appears to be technically feasible (estimation methods vary by stock), and it could be done without a great deal of additional effort. The Salmon Technical Team would conduct this work and report results annually prior to the development of Council management measures for the following year's fisheries.

Status quo conservation objectives and control rules would change under the S-based FPA 3. For SRFC, in years of high abundance, target spawner abundance would be higher than that specified by the Status Quo control rule, owing to the capping of the allowable exploitation rate at F_{ABC}. For KRFC, the F_{ABC} level would be slightly higher than the maximum allowed under the conservation objective due to specification of F_{MSY} and the Tier-1 buffer defining the ABC control rule, which would result in very minor changes to target spawner abundance levels at high abundances. Furthermore, the F-based conservation objective control rule for Alternative 2 and FPA 3 specify allowable exploitation rates that result in a target spawner abundance of S_{MSY} (40,700), which is higher than floor spawner abundance level in the Status Quo Alternative (and Alternative 3b) (35,000, Figure 2-3).
The S-based FPA 3 would not require any change in the customary management measures used by the Council both north and south of Cape Falcon.

<u>Comparison to Status Quo</u>: Conservation objectives expressed as escapement control rules will be overlaid on the above S-based framework. The Council will continue to manage according to conservation objective control rules except as limited by the S_{ACL} value. Fisheries would be managed to limit the expected value of spawning escapement to no less than the S_{ACL} value. However, escapement itself would not be directly controlled in-season so as not to fall below the S_{ACL} because this cannot be readily done with salmon fisheries. Spawners encounter the ocean fisheries often months before reaching their river of origin and in areas far from the river mouths, thus, escapement can only be monitored after the ocean fisheries have occurred. It is expected that the lack of direct control of the stock-specific escapement values in-season will not be an issue given other constraints on the fisheries, such as those to limit fishery impacts on ESA-listed stocks.

2.3.4.3 Alternative 3b

Alternative 3b is identical to FPA 3 except that the control rule for KRFC would target an escapement of 35,000 natural area adult spawners.

Alternative 3b is inconsistent with the MSA requirement to manage for OY, which must be based on MSY, a reduced by relevant factors. Managing for an annual target of 35,000 natural area adult spawners would be managing for harvest levels greater than MSY.

2.3.4.4 Summary of Evaluation Criteria for Alternatives 2 and FPA 3

The primary difference between catch-based (Alternatives 2) and spawning escapement-based (FPA 3 and Alternative 3b) ACL frameworks relative to the evaluation criteria (Section 4.1.3 of this EA) are the metrics used to express the ACL framework. Alternative 2 uses catch, which is more directly consistent with the NS1Gs, whereas FPA 3 and Alternative 3b use spawning escapement, which is more consistent with the FMP conservation objectives, the biology of the species, and the current structure of the salmon management system. Using S would require invoking the flexibility provisions of the NS1Gs (Table 2-11).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 2-11. Pros and cons of Alternatives 2 and 3 relative to the evaluation criteria.

Considerations	**Alternative 2: C-Based**	**FPA Alternative 3: S-Based**
Similarity to Status Quo Processes and Terminology	**CON**: Current conservation objectives expressed in terms of spawning escapement, not catch	**PRO**: Current conservation objectives expressed in terms of spawning escapement, so will be easier to relate to current thresholds that are familiar
Risk of overfishing	No difference	
Feasibility of Implementation	No difference: adult equivalent catch (and incidental mortality) and spawning escapement must be measured to assess post-season C_{ACL} and S_{ACL}	
MSA and NS1Gs definitions and expression of reference points	**PRO**: More obviously consistent because reference points are expressed in catch, as in the NS1Gs	**CON**: Generally consistent, but requires invoking "flexibility provision" in the NS1Gs to express the reference points in spawner escapement rather than catch
NS1Gs framework relationship of reference points	**PRO**: More obviously consistent because reference points are expressed in catch, thus the relationship follows that identified in the NS1Gs where OFL would be greater than ABC, and ABC is greater than or equal to ACL	**CON**: Generally consistent but requires invoking "flexibility provision" in the NS1Gs so that the relationship would be OFL is less than ABC, and ABC is less than or equal to ACL (i.e., the inverse)
Scientific uncertainty and specification of ABC	No difference: buffer between OFL and ABC	
Management uncertainty	No difference: no ACT specified at this time	
Relationship of the ACL to AMs	No difference: AMs triggered using post-season C_{ACL} and S_{ACL}	
Performance standard for exceeding the ACL	No difference: use post-season C_{ACL} and S_{ACL}	

2.3.5 Specification of Frameworks for Stock Complexes

Application of the Alternative OFL/ABC/ACL frameworks will be necessary for CVF and SONC Chinook stock complexes using SRFC and KRFC (respectively) as indicator stocks (based on Stock Classification FPA 4 in Section 2.1 of this EA). Other stocks classified as in the fishery are either included in the CVF or SONC Chinook complexes, or are not required to have ACLs specified because of the international management exception (Section 2.1 of this EA).

2.3.5.1 Sacramento River Fall Chinook

The status quo control rule specifies an exploitation rate limit, F_{FMP} that depends on abundance, i.e., the Sacramento Index (SI) (See Figure 2-3, gray line). The current conservation objective for SRFC is a combined hatchery and natural-area escapement goal range of 122,000 to 180,000 adults. In past years, the Council has targeted various SRFC escapement levels within this range. However, for the graphical presentation in Figure 2-3, the FMP control rule depicted represents an S_{MSY} level of 122,000, which is the adopted value (Table 2-9). Under the current control rule, the F_{FMP} is zero when the SI is less than or equal to the lower end of the escapement goal range of 122,000-180,000 adults (see Section 2.5 of this EA for the FPA proposed modification of the SRFC conservation objective control rule). If the Sacramento Index exceeds 122,000 the allowable exploitation rate (F_{FMP}) is equal to the value that would result in a forecast SRFC escapement of 122,000.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

For the C-based and S-based control rules $F_{MSY} = 0.78$; the proxy value for Chinook stocks that do not have estimates of this rate is derived from stock-specific spawner-recruit analysis. This proxy value was determined to be the average F_{MSY} from Chinook stocks for which spawner-recruit analyses have been performed (Appendix C). For SRFC, therefore, $F_{ABC} = F_{MSY} \times 0.90 = 0.70$, and $F_{ACL} = F_{ABC}$. For abundance less than approximately 409,000, $F_{FMP} \leq F_{ACL}$; for abundance greater than approximately 409,000, $F_{FMP} > F_{ACL}$. Under the C-based, and S-based Alternatives, the F_{FMP} control rule would be capped at the F_{ACL} value for SI greater than approximately 409,000 (Figure 2-3).

2.3.5.2 Klamath River Fall Chinook

The status quo control rule specifies an exploitation rate limit, F_{FMP} (i.e., the spawner reduction rate) that depends on the abundance, i.e., the expected number of natural area adult spawners absent fishing (see Figure 2-3, gray line). As defined in the current conservation objective, the maximum F_{FMP} is 67 percent. At an abundance of approximately 105,000, F_{FMP} is reduced from the maximum level to an F_{FMP} that results in 35,000 natural-area adult spawners, the escapement floor component of the conservation objective. Amendment 15 of the FMP allows for a *de minimis* harvest of KRFC, $F \approx 0.25$, which is enacted at an abundance of approximately 47,000 (see Section 2.5 of this EA for a proposed modification of the KRFC *de minimis* control rule).

For Alternative 2 and FPA 3, the C-based and S-based control rules $F_{MSY} = 0.72$ and $S_{MSY} = 40{,}700$. These values are based on stock-specific spawner-recruit data and analyses (STT 2005) and considered the best available science for KRFC and result in $F_{ABC} = F_{MSY} \times 0.95 = 0.68$, and $F_{ACL} = F_{ABC}$. The F_{FMP} below an abundance of approximately 129,000 is lower than the $F_{ABC,}$ similar to the Status Quo control rule where target F is lower than the maximum F as abundance decreases. However, the control rule for Alternatives 2 and FPA 3 specify a target spawner abundance level of 40,700, which results in a different control rule relative to the Status Quo, where the target spawner abundance level is 35,000 natural-area spawners (Figure 2-3). In all cases, $F_{FMP} \leq F_{ACL;}$ that is, the current F control rule is uniformly more conservative than that allowed under a constant F_{MSY} framework.

Alternative 3b is similar to Alternative 3 except that for KRFC only, the control rule would target the 35,000 natural area spawner floor rather than S_{MSY} (40,700), as is currently done under status quo management.

2.3.5.3 Hatchery Origin Stocks

A number of hatchery stocks in the fishery are targeted and are important contributors to Council-area fisheries. Hatchery stocks are fundamentally different from natural stocks because hatcheries are man-made facilities designed with specified production capacities. Conservation objectives for hatchery stocks are based on egg take needs, usually translated in the number of adult spawners needed to meet the egg take goal. The salmon FMP recognizes these objectives and strives to meet them; however, these artificially produced stocks generally do not need the additional protection associated with ACL and AM to insure their conservation or maintain long-term production. Spawning escapement goals are set to meet broodstock needs that are limited by the capacity of the hatcheries. The purpose of most production hatcheries is to produce large numbers of fish for harvest while conservation hatcheries assist with the recovery of weak stocks. Because of protections and management provided in the hatchery environment, egg-to-smolt survival rates are much higher for hatchery stocks than for naturally produced stocks. As a consequence, stock/production relationships and MSY concepts that are fundamental to the management of natural stocks do not apply to hatchery stocks. Hatchery stocks are able to sustain exploitation rates that are much higher than natural stocks. Conservation constraints for natural stocks and ESA-listed species are such that hatchery escapement objectives are generally met with large surpluses. In the rare event that hatchery goals are not met, there are alternatives for collecting additional broodstock at alternative sites or using more active collection techniques. The NS1Gs provide flexibility in establishing

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

ACLs under certain circumstances and specifically refer to hatchery stocks and Pacific salmon in that context.[31] Because of the unique circumstance related to hatchery stocks and the flexibility provided for by the NS1Gs, hatchery escapement goals will be used as ACLs. Accountability will be achieved through the annual review and reporting of escapement relative to these goals.

2.3.5.4 Stocks Listed Under the ESA

Species that are listed as threatened or endangered under the ESA are subject to ESA Section 7 consultation. Because NMFS implements ocean harvest regulations, it is both the action and consulting agency for actions taken under the FMP. NMFS has completed a consultation for each of the ESA-listed salmon species on the effects of ocean harvest including Council-area fisheries. The resulting biological opinions set limits on incidental take, referred to as consultation standards, which are consistent with expectations for the survival and recovery of those species. NMFS periodically reviews and updates those biological opinions as required in response to new and developing information, including information developed through the ongoing recovery planning process. Each year NMFS summarizes the current consultation standard for each of the ESA-listed species and provides those to the Council in their annual guidance letter. The FMP obligates the Council to manage their fisheries subject to these standards. The standards are generally in the form of exploitation rate limits, or when necessary, time/area closures and other management regime limitations. The ESA consultation standards serve the function of ACLs for ESA-listed species. The NS1Gs provide flexibility in establishing ACLs under certain circumstances and specifically refer to ESA-listed species and Pacific salmon in that context. The biological opinions require that consultation be reinitiated if consultation standards are exceeded, or in response to new information regarding the species' status or the effects of the action on the species; therefore, the biological opinion also provides for annual accountability and ongoing review.

The purpose of the ESA is to conserve listed species and achieve their recovery to the point where the protections of the ESA are no longer required. The purpose of the MSA is to maintain stocks or rebuild stocks when necessary to levels at or above MSY, and requires the Council to identify and develop rebuilding plans for stocks that are overfished. For many fish stocks regulated under the MSA, the elimination of excess fishing pressure is the only action needed to recover the stocks. However, this is not the case for salmon stocks that are listed under the ESA.

Although harvest has certainly contributed to the depletion of west coast salmon populations, the primary reason for their decline has been the degradation and loss of freshwater spawning, rearing and migration habitats. The quality and quantity of freshwater habitat are key factors in determining the MSY of salmon populations. The Council has no control over the destruction or recovery of freshwater habitat nor is it able to predict the length of time that may be required to implement the habitat improvements necessary to recover species. Species-specific salmon recovery plans commonly assume that recovery will take decades. While the Council could theoretically establish new MSY escapement goals consistent with the limited or degraded habitat available to listed species, adoption of revised goals would potentially result in an ESA-listed species being classified as producing at MSY and, therefore, not being overfished under the MSA. The Council believes that the intent of the ESA and the MSA is the recovery of stocks to MSY levels associated with restored habitat conditions.

As species are delisted, the Council will establish new conservation objectives and reference points comparable to those for current non-listed stocks, and manage the stocks to sustain them at or above MSY levels.

[31] 50 CFR 600.310 (h)(3)

2.3.6 Alternatives Eliminated From Detailed Study

Consistent with 40 CFR 1502.14(a), several alternatives were eliminated from detailed study.

2.3.6.1 Conservation Objective Based ACL Framework

The Council considered, but did not develop an alternative ACL framework that sought to account for uncertainty by adding buffers to the current escapement-based conservation objectives. For the S-based Alternative described in Section 2.3.4.2, F-based reference points were used rather than the existing S-based conservation objectives. Introducing additional buffers into the current escapement-based conservation objectives to define stock-specific OFL, ABC, and ACL reference points, is overly conservative because the current conservation objectives are already generally more conservative than what is allowed under an MSY framework (Figure 2-6). Section 4.1.2.1 of this EA includes a brief discussion of this issue as well.

A key distinction between the two approaches is that the S_{OFL}, S_{ABC}, and S_{ACL} would remain fixed under the buffered escapement approach, while the S_{OFL}, S_{ABC}, and S_{ACL} would fluctuate every year with changing abundance under Alternative 2 and FPA 3 and could be either below or above the conservation objective (Figure 2-7).

Implications for *de minimis* fishing: Using a buffered escapement framework has implications for adopting and implementing *de minimis* fishing provisions. Specifically, if the S_{ACL} is specified at a level above the minimum escapement objective as shown on the left side of Figure 2-6, then *de minimis* fisheries that reduced escapement below the S_{ACL} would be problematic even though escapements may still be above or close to S_{MSY} levels.

Currently, the FMP requires that if a stock is projected to fall below S_{MSY}, all fisheries impacting the stock are to be closed (as was the case in 2008 for SRFC). Amendment 15 created a *de minimis* fishing mortality rate for KRFC that prescribed how fisheries should be reduced as abundance declines below S_{MSY} levels. Notably, no other Federal fisheries are entirely closed as soon as the stock drops below the S_{MSY} level.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

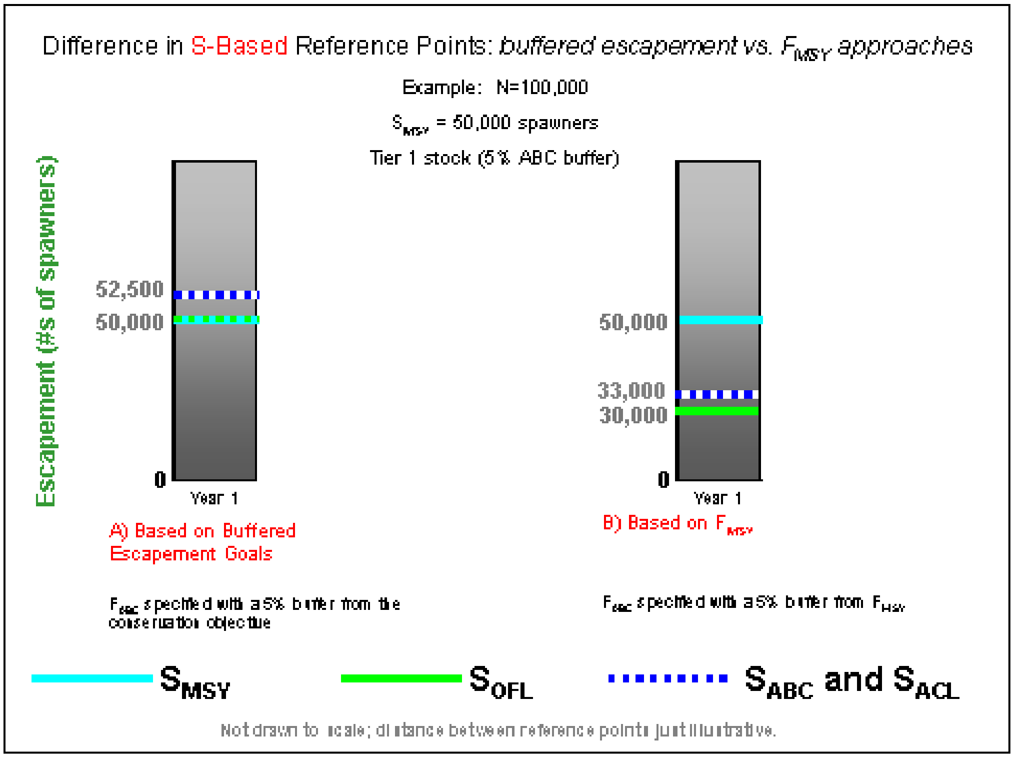

Figure 2-6. Comparison of S-based reference points with buffered escapement-based reference points and an F_{MSY} of 0.70.

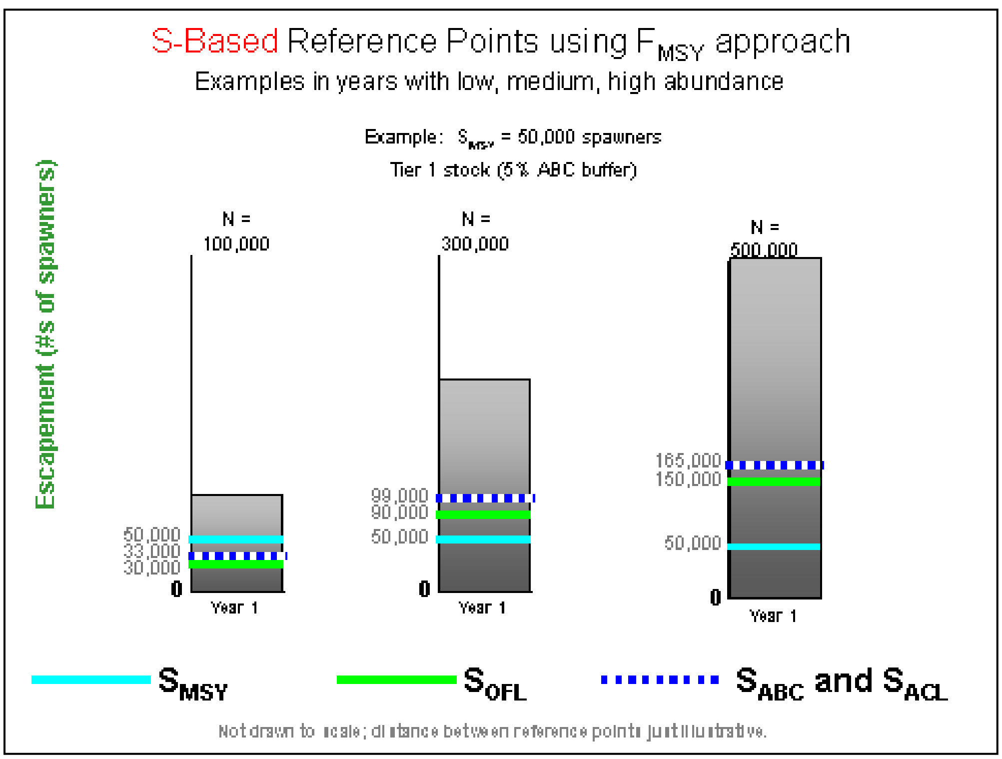

Figure 2-7. Examples of fluctuating S-based reference points in years of low and high abundance assuming F_{MSY} = 0.70.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.3.6.2 F-Based ACL Framework

The Council considered, but did not develop an alternative that would have defined the ACLs and related reference points in terms of exploitation rates. Such an F-based approach was considered but determined not to be consistent with the MSA Section 303(a)(15) and NS1Gs, and thus the purpose and need for this action, because it did not specify ACLs in terms of "catch" or numbers of fish.

2.3.6.3 Coastwide Species Based ACL Framework

The Council considered, but did not develop an alternative that would have defined ACLs and related reference points by forming species-level complexes and setting new limits on species-specific quotas that were designed to account for uncertainty. The NS1Gs allow specification of ACLs for stock complexes, and provide Pacific salmon as an example of an appropriate application of stock complex management[32]. Stock complexes are being proposed for Chinook stocks based on geography and other biological factors. No stock complexes are proposed that would group various coho stocks. Species-level complexes were considered inappropriate or impractical for several reasons. The diversity of life histories and migration patterns of the many stocks that would be in a species-level complex is inconsistent with the NS1G's requirements for forming stock complexes. If species-level quotas were formed, then reference point could, conceptually, be developed around species-level quotas. Although quotas are commonly used in fisheries north of Cape Falcon, they are generally not used in management areas south of Cape Falcon, particularly off California. These fisheries have been managed for the most part by time-area specific regulations on the number of days open to fishing, with small, mixed-stock quotas used occasionally in some areas. The harvest management models used by the Council for south of Cape Falcon Chinook fisheries, the Klamath Ocean Harvest Model (KOHM) and Sacramento Harvest Model (SHM), would require new, currently unavailable data, as well as extensive structural modifications to be successfully used to forecast harvest and escapement of KRFC and SRFC exclusively from large mixed-stock quota fisheries. In particular, the data-richness differences between KRFC (data-rich; age-structured catch and escapement data available) and SRFC (data-poor; age-structured catch and escapement data not available) results in different model structures, which does not allow for direct translation of catch expectations into large-scale mixed-stock quotas. The models, however, are well-suited for forecasting catch and escapement of their respective stocks given the current and historic blend of days-open and mixed-stock quota fisheries for Chinook, and have performed well as assessment tools for Council management in the area South of Cape Falcon.

2.3.6.4 Framework ACL Approach

Another alternative is a frameworked approach to determining F_{ABC}, which would require Council consideration on an annual basis. This alternative, referred to as the P* (P-star) approach, involves the recommendation of a quantification of scientific uncertainty or sigma value for each "tier" of salmon stocks, and Council selection of a preferred overfishing risk policy, or P*. Based on these two values, the SSC would recommend the amount of reduction from F_{MSY} to F_{ABC} for each tier. This would have to be accomplished each year, before F_{ABC} could be determined and ACL alternatives could be described for each stock.

The P* alternative does not appear to be feasible or advantageous for salmon. First, there is likely not time available in the Council's schedule for adopting the annual salmon management measures to accommodate the extra process involved in implementing the P* approach. The salmon annual management measures are developed each year on an extremely short schedule, at two Council meetings in March and April. Annual abundance information is not available until February. The Council and its advisory bodies therefore have essentially a 2-month window, including two Council meetings, in which to 1) evaluate the effects of the prior season's management measures given the current year's abundance

[32] 50 CFR 600.310(d)(8)

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

projections, 2) develop and evaluate the effects of action alternatives for the current year's management measures, including the ability of those measures to ensure that ACLs and consultation standards for ESA listed stocks are not exceeded, and 3) evaluate the effects of the Council's preferred alternative (adopted in April), usually a modified version of one or more of the action alternatives. The P* approach would require the analysis of ABC alternatives in an annual NEPA document, and would thus add to the existing workload. A straight percentage ABC control rule does not require modification on an annual basis; therefore changes to the control rule can be accomplished independent from the season-setting process, on a schedule that accommodates the necessary analysis.

2.4 Accountability Measures

In addition to ACLs, AMs are required by MSA Section 303(a)(15). The NS1Gs describe AMs as management controls to both prevent ACLs from being exceeded, and to correct or mitigate overages of ACLs if they occur.[33] AMs are intended to minimize the frequency and magnitude of overages of the ACL, and to correct any problems that caused the overage.

AMs are required for all stocks and stock complexes in the Salmon FMP that are required to have ACLs. Additional AMs may be considered for the other stocks and stock complexes in the fishery that are excepted from the ACL requirements. In this latter case, the AMs would not correspond directly to an ACL but instead to other management measures used to prevent overfishing, such as mixed-stock quotas, SDC, and conservation objectives.

2.4.1 Criteria Used to Evaluate the AM Alternatives

The criteria used to evaluate AM alternatives were consistency with the MSA and NS1Gs, and feasibility of implementation.

Considerations within the criterion for MSA and NS1Gs consistency include:

- Establishing a mechanism for specifying ACLs, including measures to ensure accountability[34]
- The NS1Gs require that AMs in a fishery be adequate to prevent ACLs from being exceeded, and that additional AMs are invoked if the ACL is exceeded. The NS1Gs identify two types of AMs:
  - In-season AMs[35], and
  - AMs for when the ACL is exceeded[36]

The NS1Gs suggest that Councils may consider using an ACT, a reference point specified at a level below an ACL, to reduce the probability of exceeding an ACL due to management uncertainty. The ACT is a type of in-season AM, although it would be specified during the preseason process and monitored in-season, if possible. NMFS stated that whether or not an ACT is explicitly specified, the AMs must address the management uncertainty in the fishery in order to avoid exceeding the ACL.[37] If an ACL has been exceeded, the NS1Gs suggest considering overage adjustments and requires them in the following year if the stock is overfished, unless the best scientific information available indicates that it is not necessary to mitigate for the overage.[38] IN the case of salmon, which have a short life history, overage adjustments in subsequent years would not effectively mitigate for the lost production in the year the overage occurred.

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[33] 50 CFR 600.310 (g)(1)
[34] MSA Section 303(a)(15), 50 CFR 600.310 (g)
[35] 50 CFR 600.310 (g)(2)
[36] 50 CFR 600.310 (g)(3)
[37] Final NS1Gs published Jan 16, 2009 (74 FR 3193), NMFS response to comment # 44, pg 3192.
[38] 50 CFR 600.310 (g)(3)

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

For the Salmon FMP, two alternatives are being considered for the ACL, a C-based ACL and the S-based ACL FPA 3. In the latter, the objective is to achieve spawning escapement above the ACL. Therefore, "AMs for when the ACL is exceeded" will apply to C-based ACLs, and "AMs for when the ACL is not met" will apply to S-based ACLs.

The NS1Gs require that if catch exceeds the ACL for a given stock or stock complex more than once in the last four years, the system of ACLs and AMs should be re-evaluated, and modified if necessary, to improve its performance and effectiveness.[39]

2.4.2 Alternative 1: Status Quo

There are no measures in the FMP identified currently as AMs; however, a number of actions meet the general intent of AMs. Some of these are implemented during the preseason planning process and in-season management. Others are implemented postseason through monitoring and reporting requirements.

In-season (and preseason) actions

- In-season authority to manage quota fisheries (FMP § 10.1) – allows NMFS to close fisheries on short notice when mixed-stock quotas are projected to be met.
- Mixed-stock quota monitoring (FMP § 7.1) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Quota partitioning (FMP § 5.3 and 10.2) – partitioning overall quota among fishery sectors and port areas and time periods allows finer scale management, thereby reducing the chance that overall quota will be exceeded.
- Quota trading (FMP § 5.3 and 10.2) – quota trading allows overages in one sector/time/area to be made up by reductions in others.
- Changes to gear/bag/size/trip limits (FMP § 6 and 10.2) – allow a measure of control over catch rates to reduce the chance of quotas being exceeded.
- Boundary modifications (FMP § 6 and 10.2) – allow limited control over catch composition to limit impacts on constraining stocks.
- Landing restrictions (FMP § 6 and 10.2) - allow better accounting of the location of catches and thus better estimates of catch composition; allow effort control.
- In-season monitoring and reporting requirements. (FMP § 7) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Conservation alert (FMP § 3.2.2) – requires closure of fisheries impacting a stock that is projected to not meet its conservation objective, and assessment of the causes of the projected failure.

Post-season actions

- Postseason monitoring and reporting through the annual SAFE document (FMP § 8) – allows postseason assessment of objectives and performance.
- Overfishing concern assessment (FMP § 3.2.3) – identifies causes of, and remedies for, triggering an overfishing concern.
- Notice to state/tribal managers (FMP § 3.2.2) – requests evaluation of causes for a stock projected to trigger an overfishing concern.
- Salmon Methodology Review Process (COP-15; PFMC 2008). – provides a process for re-evaluation of management objectives, reference points, and modification of models that relate mixed-stock impacts to stock-specific objectives and reference points.

[39] 50 CFR 600.310 (g)(3)

Although they are not associated with an ACL at this time and are not identified as AMs, most of these actions fit the intent of AMs as they are in place to minimize instances in which the mixed-stock quotas or other preseason expectations are exceeded, or individual stocks' conservation objectives are not met, and to identify and correct any problems that caused either circumstance.

Consistency with MSA and NS1Gs: Because the Status Quo Alternative does not specify these actions as AMs and currently none of the actions correspond to an ACL, it is not a viable alternative and does not meet the purpose and need of the proposed action.

Feasibility of Implementation: As these are currently being implemented, feasibility is not an issue.

2.4.3 Alternative 2 – Classify Current Measures in the FMP as AMs

As described above, a number of current FMP actions meet the intent of AMs. While some of them would not be directly working in combination with an ACL, they are in place to prevent overfishing. However, the "conservation alert" and "overfishing concern" are likely to be modified or replaced, given the proposed SDC FPA 5 (see Section 2.2 of this EA). Under this alternative, all of these AMs would both apply to stocks subject to the ACL requirements, and provide protections for other stocks that are not subject to the ACL requirements.

Alternatives for In-season (and preseason) AMs

- In-season authority to manage quota fisheries (FMP § 10.1)
- Mixed-stock quota monitoring (FMP § 7.1)
- Quota partitioning (FMP § 5.3 and10.2)
- Quota trading (FMP § 5,3 and 10.2)
- Changes to gear/bag/size/trip limits (FMP § 6 and 10.2)
- Boundary modifications (FMP § 6 and 10.2)
- Landing restrictions (FMP § 6), and
- In-season monitoring and reporting requirements. (FMP § 7)
- Conservation alert (FMP § 3.2.2), with modification

  A conservation alert occurs when a stock is projected, during the preseason process, to not meet its conservation objective. The FMP currently requires notification to relevant state, tribal, and Federal managers if a stock is not expected to meet its conservation objective, an assessment of probable causes, and closure of Council-area fisheries impacting the stock. Under this alternative, the only required action would be notification to relevant state, tribal, and Federal managers.

Alternatives for Post-season AMs

- Postseason monitoring and reporting through the annual SAFE document (FMP § 8)
- Overfishing concern (FMP § 3.2.3), with modification and renaming as **"Abundance Alert"**

  Currently, the FMP defines an overfishing concern as not meeting the conservation objective of a stock for three consecutive years. The FMP does not explicitly associate triggering of an overfishing concern with an "overfished" status determination, although this has been NMFS policy in recent years. As new and/or more explicit SDC are adopted as part of this amendment process, many of the actions currently required when an overfishing concern is triggered will be addressed through other processes. However, preserving the concept of this action as an indicator of a declining trend in stock status or bias in scientific or management methodologies may be desirable. If retained, the indicator should be renamed as an "abundance alert" to avoid any confusion with the formal SDC (i.e., overfishing, overfished, approaching overfished) and modified to remove the formal requirement for an assessment. Additionally, doing so will remove any connotation that fishing is necessarily the cause of a decline in stock abundance.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Actions associated with this indicator would include, as is currently done, notification to the relevant state, tribal, and Federal managers that a stock may be trending toward a depressed state, and that potential causes should be closely monitored or investigated, particularly with regard to excessive fishing mortality and bias in management models.

- Salmon Methodology Review Process (COP-15; PFMC 2008).

2.4.4 FPA 3 – Classify Current Measures in the FMP as AMs, Except "Conservation Alert" and "Overfishing Concern"

FPA 3 is similar to Alternative 2, with the exception that the current "conservation alert" and "overfishing concern" would be deleted from the FMP. The conservation alert and overfishing concern processes in the current FMP were designed to address requirements related to overfishing and overfished status determinations and provide associated remedies. In practice, they proved to be inadequate in part because the criteria for making overfished and overfishing determinations were not sufficiently specific. New SDC described in Section 2.2 would replace the current conservation alert and overfishing concern requirements.

2.4.5 Other AMs Associated with Both Alternative 2 and FPA 3

Annual Catch Target (ACT): An ACT may be adopted in any fishing year in which there is increased management uncertainty in the fishery causing increased uncertainty in maintaining compliance with the ACL or harvest control rule. The ACT would be specified at a level sufficiently below the ACL or the harvest control rule to buffer for the management uncertainty it is implemented to address, incorporating uncertainty in the ability to constrain catch for compliance, and uncertainty in quantifying the true catch amounts (i.e., estimation errors)[40].

AMs for When the ACL is Exceeded: There are no post-season actions currently identified that would address a situation of an ACL overage (or underage under the spawning escapement-based ACL alternative). The post-season AMs identified above are currently implemented on an individual stock basis and are directly tied to each stock's conservation objective, which would be at different levels than the proposed ACLs. For stocks not subject to the ACL requirements, these AMs would be triggered around the conservation objective. However, for those stocks and complexes subject to the ACL requirements, some of the proposed AMs above could be tied to the ACL, in addition to the conservation objective:

- Annual SAFE document (FMP § 8): Add reporting on the level of abundance in relationship to the ACL.
- Salmon Methodology Review Process (COP-15; PFMC 2008): Review methods when there are concerns with the assessment (e.g., abundance forecasts), when the stock has triggered a "conservation alert" and "abundance alert," if applicable, and when there was noncompliance with the ACL.

Re-evaluation of the ACLs and AMs System: The ACL alternatives for the Salmon FMP rely on a postseason evaluation for assessing compliance with ACLs. If the evaluation determines that catch or spawning escapement was not in compliance with the ACL more than once in four consecutive years, the Council will direct the STT to conduct an assessment of the cause. The assessment will include consideration of the tiered buffers used to account for scientific uncertainty, and may include recommendations for changing the buffers to a level that would increase the compliance rate to an appropriate level (e.g., 75 percent compliance rate). Any recommendations for changing the buffer

[40] As explained in 50 CFR 600.310(f)(6)(i)

between the ABC and OFL (i.e., ABC control rule) should be included, along with supporting analyses, in the annual Salmon Methodology Review process. The Salmon Methodology Review process includes an opportunity for review and comment by the SSC. Recommendations on changes to AMs or adding new AMs, including whether an ACT should be implemented, should also be provided in this report.

Pending the outcome of the STT re-evaluation of the system of ACLs and AMs, an ACT may be implemented as an interim measure if it was determined that the cause was related to management uncertainty in the fishery and to reduce the likelihood of future non-compliance with the ACL until any new or updated measures are approved. When it is determined that the fishery has been out of compliance with the ACL more than once in four consecutive years, an ACT may be applied to the ABC control rule with an additional buffer (in addition to the tiered scientific uncertainty buffers in the ABC control rule). The additional buffer will remain in place until either additional measures are adopted to ensure an appropriate compliance with ACLs, or it has been demonstrated that the buffer is not necessary to achieve an appropriate compliance level.

Consistency of Alternative 2 and FPA 3 with MSA and NS1Gs: Under these alternatives, all or most current actions would be reclassified as AMs and are consistent with the intent of MSA and NS1Gs. Because stocks are mixed and indistinguishable in the Council-area fisheries, in-season AMs are applied at the species level rather than being applied directly to stock-specific ACLs. In-season AMs nonetheless provide for monitoring and close control of the fisheries as intended by the NS1Gs, particularly for quota-managed fisheries. Post-season AMs provide a mechanism for assessing ACLs and other conservation objectives, and taking remedial action as required. AMs designed to address the circumstance of non-compliance with ACLs do not include overage adjustments that would be applied in the following year since such adjustments would be ineffective given the life history of salmon. However, procedural steps are described that are designed to identify the cause of non-compliance and develop appropriate remedies.

- **In-season AMs:** To the extent possible, there are in-season AMs. Their purpose is consistent with the NS1Gs that explain that in-season AMs "should include in-season monitoring and management measures to prevent catch from exceeding ACLs."[41] To date, the purpose of these actions has been to monitor and manage the mixed-stock fishery in-season to prevent overfishing, and in some cases, to keep the fishery consistent with allocation agreements. However, as mentioned above, in-season AMs would be implemented at the species level for the mixed-stock ocean fisheries, rather than at the individual stock level. Under both ACL alternatives, the ACL would be specified at the individual stock level. Although these AMs would not be directly tied to an individual stock ACL due to the nature of the fishery, this current system of in-season actions have proven to prevent overfishing (see section 4.1.2.1 and Appendix F). It should be noted that mixed-stock quotas for the stocks and complexes requiring ACLs are not consistently used south of Cape Falcon, but may be used as necessary (e.g., during the 2010 fishing year off Fort Bragg, CA).
- **ACT**: Currently, an ACT, or similar reference point, is not used in the ocean salmon fishery. While an ACT is not required by the MSA or NS1Gs, use of an ACT is proposed in situations where there is an increase in management uncertainty that would warrant its implementation. This is consistent with the NS1Gs to address management uncertainty if it is a factor leading to noncompliance with the ACL.
- **AMs for when the ACL is exceeded[42]**: Under these alternatives, there are additional post-season management actions proposed as AMs that will be directly tied to all ACLs specified, consistent with the NS1Gs. However, for Council salmon fisheries, adjustments to ACLs or ACT in the year

[41] 50 CFR 600.310 (g)(2)

[42] Under the FPA S-based ACL alternative, these will be referred to as "AMs for when the ACL is not met."

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

following an overage (underage) would not generally be effective in mitigating the overage. For coho salmon, all fish vulnerable to the fisheries are 3-year-old fish. In the year following an overage, the cohort in which the overage occurred has spawned, and fisheries impact a new cohort. For Chinook salmon, fish vulnerable to fisheries are nearly all age-3 and age-4 fish. Each year approximately half of the 3-year-old fish mature and leave the ocean, or suffer natural mortality. Fishery-related mortality may reduce their abundance by another 50 percent or more. As a result of this, Chinook salmon vulnerable to Council fisheries are typically 70 to 80 percent 3-year-old fish. In the year following an overage, the majority of fish are new recruits and adjustments because of an overage in the previous year would not be effective in mitigating the overage.

- **Re-evaluation of the ACLs and AMs System:** Under these alternatives, there is an explicit process outlined for re-evaluating the system of ACLs and AMs if there is non-compliance with the ACL more than one in four consecutive years. This is consistent with the performance standard and requirement in the NS1Gs.

Feasibility of Implementation: For those currently being implemented, feasibility of implementation is not an issue. However, it should be noted that all in-season actions are currently based on the species (e.g., mixed-stock quotas), rather than individual stock. As discussed above, it is not feasible to implement in-season actions on a stock-by-stock basis due to the inability to identify fish at the stock level during ocean fishing. For the proposed new AMs that are tied to an ACL, these are feasible to implement.

2.5 De minimis Fishing Provisions

The FMP conservation alert currently requires closure of all Council-area salmon fisheries affecting stocks that are projected not to meet their conservation objective. This provision has in some cases resulted in the closure of fisheries and foregone harvest of more abundant stocks, and in other cases resulted in the promulgation of emergency rules to gain access to more abundant stocks. However, for a number of reasons, this provision is not applied uniformly to all salmon stocks. Stocks that are subject to U.S. Court orders under *U.S. v. Washington* and *Hoh v. Baldrige* may be exempt if the parties agree on annual management objectives that differ from those of the FMP. Stocks that have exploitation rate (ER) based management objectives are permitted a minimum exploitation rate regardless of stock status. KRFC have an explicit *de minimis* fishing provision as a result of Amendment 15 (Figure 2-2). FNM stocks with minimal impacts (less than 5 percent base period exploitation rate) in Council-area fisheries are currently exempt from the conservation alert provisions in the FMP under the Status Quo Alternative, as are ESA-listed and hatchery stocks. In Classification Alternatives 2 and 3, and FPA 4, FNMC stocks are proposed to be subject to the international exception to the ACL and AM provisions. These stocks would be managed subject to the requirements of the PST. Under the Status Quo Classification Alternative, fishery closures were not contemplated because FNMC stocks were exempt from the conservation alert process. Under Classification Alternatives 2, 3, and FPA 4 fishery closures would also not occur, but because application of the international exception would permit management under PST provisions, which allow harvest at lower stock abundance. As a consequence, there is no need for the development of *de minimis* fishery provisions for FNMC stocks.

KRFC are already subject to *de minimis* provisions. SRFC is currently the only other stock that must either comply with the conservation alert provision resulting in fishery closures or require an emergency rule to implement fisheries. This is by virtue of having both a spawning escapement-based conservation objective and an abundance forecast available preseason. Other stocks may also be subject to the provision, pending completion and adoption of new conservation objectives and development of preseason forecasts for those stocks.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

De minimis fishing provisions give more flexibility to the rule-making process when the conservation objectives for limiting stocks are projected not to be met, and provide opportunity to access more abundant salmon stocks that are typically available in the Council management area when the status of one stock may preclude all ocean salmon fishing in a large region. At a minimum, this flexibility should allow for Council action without the need for NMFS to approve an emergency rule while providing for *de minimis* salmon fishery opportunity. This would reduce the risk of fishery restrictions that impose severe economic consequences to local communities and states. While this action seeks to provide management flexibility in times of scarcity, there is an overriding mandate to preserve the long-term productive capacity of all stocks to ensure meaningful contributions to ocean and river fisheries in the future, and to ensure that the total fishing mortality rate does not exceed F_{MSY}.

The criteria used to evaluate the *de minimis* alternatives were consistency with the MSA and NSGs and feasibility of implementation.

Considerations within the criteria include:

- Consistency with NS1Gs: Each Alternative will be evaluated as to whether the specified *de minimis* provisions reduce fishing mortality as stock size declines[43], and whether OY is achieved by managing for something less than MSY[44].
- Consistency with National Standard 8 (NS8): The MSA promotes the sustained participation of fishing communities, within conservation constraints[45]. *De minimis* fishing Alternatives will be evaluated qualitatively as to the relative degree that they promote the sustained participation of fishing communities.

2.5.1 *De minimis* Fishing Alternatives

For stocks that are managed for a spawner escapement objective, such as SRFC, *de minimis* fishing provisions would modify the conservation objective control rule to permit limited exploitation at low abundance levels (see Figure 2-2 for examples of conservation objective control rules with [KRFC] and without [SRFC] *de minimis* provisions). For stocks that currently have a *de minimis* fishing mechanism through the *Hoh v. Baldrige* or *U.S. v. Washington* processes, any additional *de minimis* fishing provisions would not affect the ability of the Parties to exercise their options.

Currently, *de minimis* fishing provisions are either undefined, as with SRFC, or defined inconsistently among stocks. Furthermore, *de minimis* exploitation rates for KRFC established in Amendment 15 are not explicitly defined at low abundance levels. This Section defines *de minimis* fishing alternatives (not including status quo) that are based primarily on the S_{MSY} and MSST reference points. The generic nature of these *de minimis* provisions allows them to be applied to any stock with defined S_{MSY} and MSST reference points, and can be applied regardless of the relationship between S_{MSY} and MSST. Each of the *de minimis* fishing alternatives can be applied as extensions to the current F-based conservation objective control rules at low stock abundances (Figure 2-8).

2.5.1.1 Alternative 1: Status Quo- Variable Among Stocks

Status quo *de minimis* fishing provisions are variable among stocks, and not defined for SRFC. For KRFC, the *de minimis* fishing provision from Amendment 15 to the salmon FMP are as follows:

> Within the Cape Falcon to Point Sur area, the Council may allow *de minimis* fisheries which: permit an ocean impact rate of no more than 10 percent on age–4 Klamath River fall Chinook, if the

[43] 50 CFR 600.310(f)(4)

[44] 50 CFR 600.310(e)(3)(v)(E)

[45] MSA §301(a)(8)

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

projected natural spawning escapement associated with a 10 percent age–4 ocean impact rate, including river recreational and tribal impacts, is between the conservation objective (35,000) and 22,000. If the projected natural escapement associated with a 10 percent age–4 ocean impact rate is less than 22,000, the Council shall further reduce the allowable age– 4 ocean impact rate to reflect the status of the stock[46]. When recommending an allowable age–4 ocean impact rate, the Council shall consider the following year-specific circumstances:

(i) The potential for critically low natural spawner abundance, including the risk of Klamath Basin substocks dropping below crucial genetic thresholds;
(ii) A series of low spawner abundance in recent years;
(iii) The status of co-mingled stocks;
(iv) The occurrence of *El Niño* or other adverse environmental conditions;
(v) Endangered Species Act (ESA) considerations; and
(vi) Other considerations as appropriate.

The KRFC age–4 ocean impact rate must not jeopardize the long-term capacity of the stock to produce maximum sustainable yield on a continuing basis. Implementation of *de minimis* fisheries will depend on year-specific estimates of ocean abundance and age composition, and will be determined by the STT prior to the March Council meeting. Ocean fishery impacts to the returning brood incurred during the previous fall/winter fisheries will be counted against the allowable age-4 ocean impact rate.

The final rule implementing Amendment 15 states: NMFS interprets that, consistent with the *de minimis* provisions of the FMP, the maximum allowable 10 percent age-4 ocean impact rate may be implemented only when the anticipated escapement is near the 35,000 natural spawner floor. As escapement falls below approximately 30,000, the impact rate will need to decline automatically.

Feasibility of implementation: The Status Quo Alternative is currently implemented.

Consistency with NS1Gs: For SRFC, the lack of *de minimis* provisions in the status quo results in an exploitation rate of zero at abundance levels less than or equal to S_{MSY}, which is consistent with the NS1Gs. For KRFC, the status quo *de minimis* provisions do not explicitly define how F will be reduced as stock abundance approaches zero. However, the current *de minimis* provisions identify that F must be reduced when the projected escapement of adults to natural areas is below 22,000 (or 30,000; NMFS 2007a). Because of this qualitative specification that F must be reduced at lower abundance levels, the status quo *de minimis* Alternative is consistent with the NSIGs. However, managing for an annual target of 35,000 natural area adult KRFC spawners (less than S_{MSY}) would not achieve OY in the long-term, which is inconsistent with MSA and NS1Gs.

Consistency with NS8: Status quo *de minimis* Alternatives are variably consistent with NS8. For SRFC, there are no *de minimis* provisions, which results in fishery closures (absent an emergency rule) if the stock is projected to fall below S_{MSY} in the absence of fishing. The lack of *de minimis* provisions for SRFC is not consistent with NS 8 because sustained participation would be unlikely given the lack of fishing opportunity allowed when the abundance forecast is less than S_{MSY}. KRFC status quo *de minimis* provisions are consistent with NS8 as they provide for limited KRFC impacts to occur while fisheries target other, more abundant, stocks.

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[46] NMFS interprets that, consistent with the *de minimis* provisions of the FMP, the maximum allowable 10 percent age-4 ocean impact rate may be implemented only when the anticipated escapement is near the 35,000 natural spawner floor. As escapement falls below approximately 30,000, the impact rate will need to decline automatically.

2.5.1.2 Alternative 2 and 2b: F = 0 at midpoint between S_{MSY} and MSST

Alternative 2 specifies a *de minimis* exploitation rate of 0.25, subject to a minimum spawner abundance level defined as the midpoint between S_{MSY} and the MSST [(S_{MSY} + MSST)/2].

The F-based control rule with the Alternative 2 *de minimis* provision is displayed in Figure 2-8a, top panel. As stock size declines, the allowable exploitation rate declines from F_{ABC} in order to achieve S_{MSY}, until F = 0.25. A constant exploitation rate of 0.25 is then allowed until the point where F must be further reduced in order to achieve a spawner escapement equal to the midpoint between S_{MSY} and MSST. The constant exploitation rate of 0.25 is derived from results in the FMP Amendment 15 analysis, and closely approximates the total exploitation rate on KRFC when the age-4 ocean exploitation rate equals 0.10 (PFMC and NMFS 2007). A *de minimis* total exploitation rate of 0.25 is specified rather than the ocean exploitation rate of 0.10 because the total exploitation rate accounts for mortality from all fisheries. This rate has been adopted for the other *de minimis* Alternatives because it is very likely that other Chinook stocks will be affected in a similar manner as KRFC, given the relative consistency in salmon productivity (Appendices C and D). At abundances less than or equal to the midpoint between S_{MSY} and MSST, the allowable exploitation rate is zero.

Alternative 2b is similar except that for KRFC only the control rule would target the 35,000 natural area spawner floor rather than S_{MSY} (40,700), as is currently done under the Status Quo Alternative.

Feasibility of implementation: Implementation is feasible, as the *de minimis* provision in this alternative is an extension of the current F-based control rule.

Consistency with NS1Gs: Alternative 2 explicitly decreases allowable exploitation as stock abundance decreases. This alternative would achieve OY because spawning escapement would not fall below S_{MSY} more than 50 percent of the time. At typical abundance levels the control rule targets S_{MSY}, and higher abundance levels greater escapements are targeted. Therefore, Alternative 2 is consistent with the NS1Gs.

Consistency with NS8: Alternative 2 is consistent with NS8 because it provides for some *de minimis* fishing opportunity, and therefore does not force closure of the fishery if one stock is projected to fall short of its conservation objective.

Alternative 2b: Alternative 2b would be consistent with NS8 and with the NS1G requirement to decrease exploitation rate as abundance declines; however, managing for an annual target of 35,000 natural area adult KRFC spawners would not achieve OY in the long-term, which is inconsistent with MSA and NS1Gs. .

2.5.1.3 Alternative 3 and 3b: F = 0 at MSST

Alternative 3 specifies a *de minimis* exploitation rate of 0.25, subject to a minimum spawner abundance level of MSST.

The F-based control rule with the Alternative 3 *de minimis* provision is displayed in Figure 2-8a, second panel. As stock size declines, the allowable exploitation rate declines from F_{ABC} in order to achieve S_{MSY}, until F = 0.25. A constant exploitation rate of 0.25 is allowed until the point where F must be further reduced in order to achieve a spawner escapement equal to the MSST. The description of Alternative 2 details the justification for the *de minimis* exploitation rate of 0.25. At abundances less than or equal to MSST, the allowable exploitation rate is zero.

Alternative 3b is similar except that for KRFC only, the control rule would target the 35,000 natural area spawner floor rather than S_{MSY} (40,700), as is currently done under the status quo alternative.

<u>Consistency with NS1Gs</u>: Same comments as Alternative 2.

<u>Consistency with NS8</u>: Same comments as Alternative 2.

<u>Alternative 3b</u>: Same comments as Alternative 2b.

*2.5.1.4 Alternative 4: F = 0 at 0.5*MSST*

Alternative 4 specifies a *de minimis* exploitation rate of 0.25, subject to a minimum spawner abundance level of one half of MSST (MSST/2).

The F-based control rule with the Alternative 4 *de minimis* provision is displayed in Figure 2-8a, third panel. As stock size declines, the allowable exploitation rate declines from F_{ABC} in order to achieve S_{MSY}, until F = 0.25. A constant exploitation rate of 0.25 is allowed until the point where F must be further reduced in order to achieve a spawner escapement equal to MSST/2. The description of Alternative 2 details the justification for the *de minimis* exploitation rate of 0.25. At abundance less than or equal to one half of MSST, the allowable exploitation rate is zero.

<u>Feasibility of Implementation</u>: Same comments as Alternative 2.

<u>Consistency with NS1Gs</u>: Same comments as Alternative 2.

<u>Consistency with NS8</u>: Same comments as Alternative 2.

2.5.1.5 Alternative 5: F <0.25 below midpoint between S_{MSY} and MSST

The F-based control rule with the Alternative 5 *de minimis* provision is displayed in Figure 2-8a, bottom panel. As stock size declines, the allowable exploitation rate declines from F_{ABC} until F = 0.25. A constant exploitation rate of 0.25 is allowed until the midpoint between S_{MSY} and MSST, below which F must be further reduced; however, there is no set stock size where F must equal zero. Reduction below F=0.25 would not be structured, but would be in response to year-specific circumstances such as abundance of other stocks, recent spawning escapement performance, in order to achieve a spawner abundance equal to the MSST. The description of Alternative 2 details the justification for the *de minimis* exploitation rate of 0.25.

<u>Feasibility of implementation</u>: Implementation is feasible. The current KRFC *de minimis* fishing provision has a similar structure to Alternative 5, and is currently implemented.

<u>Consistency with NS1Gs</u>: Alternative 5 *de minimis* provisions do not explicitly define how F will be reduced as stock abundance approaches zero. However, they do specify that F must be reduced when the projected escapement of adults to natural areas is below the midpoint between S_{MSY} and MSST. Requiring F to be reduced at lower abundance level is consistent with the NSIGs; however, managing for an annual target of 35,000 natural area adult KRFC spawners (less than S_{MSY}) would not achieve OY in the long-term, which is inconsistent with MSA and NS1Gs.

<u>Consistency with NS8</u>: Alternative 5 is consistent with NS8 because it provides for some *de minimis* fishing opportunity, and therefore does not force closure of the fishery if one stock is projected to fall short of its conservation objective.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

2.5.1.6 FPA 6: F = 0 at N=0

FPA 6 is a structured, two step alternative that allows some harvest at all abundance levels.

The F-based control rule with the FPA 6 *de minimis* provision is displayed in Figure 2-8b. As stock size declines, the allowable exploitation rate declines from F_{ABC} in order to achieve S_{MSY} until F=0.25. A constant maximum exploitation rate of 0.25 is allowed until the potential spawner abundance reaches the midpoint between S_{MSY} and MSST where F will be reduced proportional to abundance to no more than 10 percent at MSST. At potential spawner abundance levels less than or equal to half of MSST the allowable exploitation rate will be further reduced to levels approaching zero as abundance approaches zero.

FPA 6 also includes the following list of considerations for implementing *de minimis* fishing provisions to ensure year specific circumstances are weighed against longer-term risks:

- The potential for critically low natural spawner abundance, including considerations for substocks that may fall below crucial genetic thresholds;
- Spawner abundance levels in recent years;
- The status of co-mingled stocks;
- Indicators of marine and freshwater environmental conditions;
- Minimal needs for tribal fisheries;
- Whether the stock is currently in an approaching overfished condition;
- Whether the stock is currently overfished;
- Other considerations as appropriate.

Feasibility of implementation: Implementation is feasible, as the *de minimis* provision in this alternative is an extension of the current F-based control rule.

Consistency with NS1Gs: FPA 6 explicitly decreases allowable exploitation as stock abundance decreases. At typical abundance levels the control rule targets S_{MSY}, and at higher abundance levels greater escapements are targeted. Therefore, FPA 6 is consistent with the NS1Gs.

Consistency with NS8: FPA 6 is consistent with NS8 because it provides for some *de minimis* fishing opportunity, and therefore does not force closure of the fishery if one stock is projected to fall short of its conservation objective.

2.5.2 *De minimis* Fishing Provisions and Stock Rebuilding

De minimis fishing provisions could also serve as default rebuilding plans for stocks that become overfished (or depleted). This would provide management guidance for the stock immediately, rather than waiting a year or more for an assessment and/or rebuilding plan to be developed; however, this would not preclude development of a rebuilding plan through the current Overfishing Concern assessment process, or other processes resulting from this FMP Amendment. Under the current process, when an Overfishing Concern is triggered the STT must complete an assessment of the cause, including the role of fishing and estimation error, within one year. Based on the recommendations in the Overfishing Assessment, the Council determines necessary steps to rebuild the stock, including establishing criteria and any necessary changes to management. These steps may take the form of a rebuilding plan with a modified harvest control rule, or simply implementing the default rebuilding feature of the FMP (i.e., managing to meet the conservation objectives for all stocks annually).

The Council is usually informed that an Overfishing Concern has been triggered (or a stock is overfished) at the March Council meeting, the same time as it is beginning the preseason management process. Thus, the Council does not have the benefit of an assessment of the causes in the first year of rebuilding an overfished stock. Under the status quo conservation alert, if the stock is projected to again fall short of its conservation objective, the Council must close its fisheries that impact the stock. However, if a rebuilding plan were in place, it is likely that there would be some level of fishing allowed that would not jeopardize the stock's rebuilding requirements. Providing a similar opportunity through *de minimis* fishing provisions in the first year of rebuilding would temper the impact to fishing communities, and provide a more stable transition to management under a rebuilding plan, if necessary.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

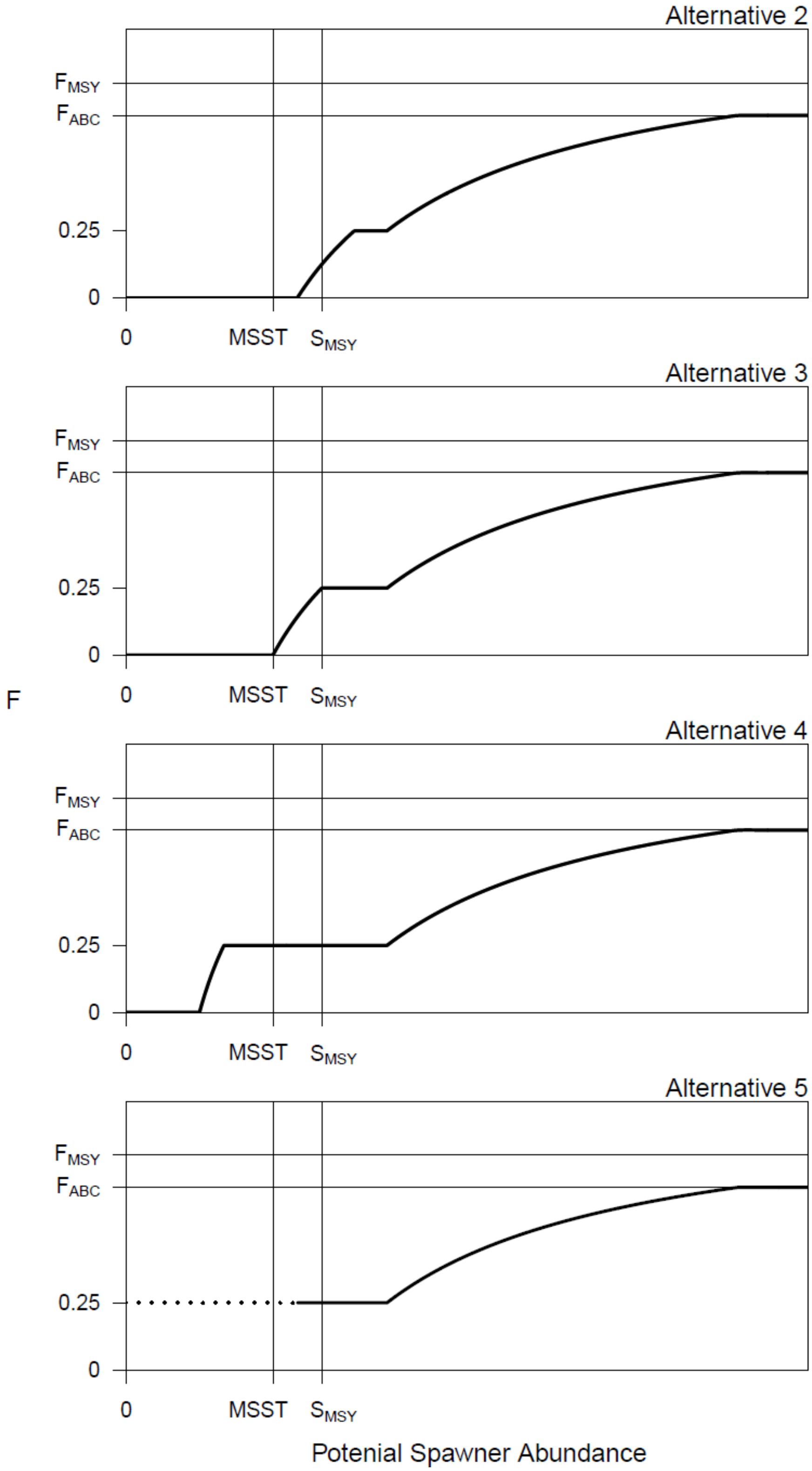


Figure 2-8a. *De minimis* fishing Alternatives 2-5. Alternative 1 (status quo) is not shown because it is variable among stocks.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

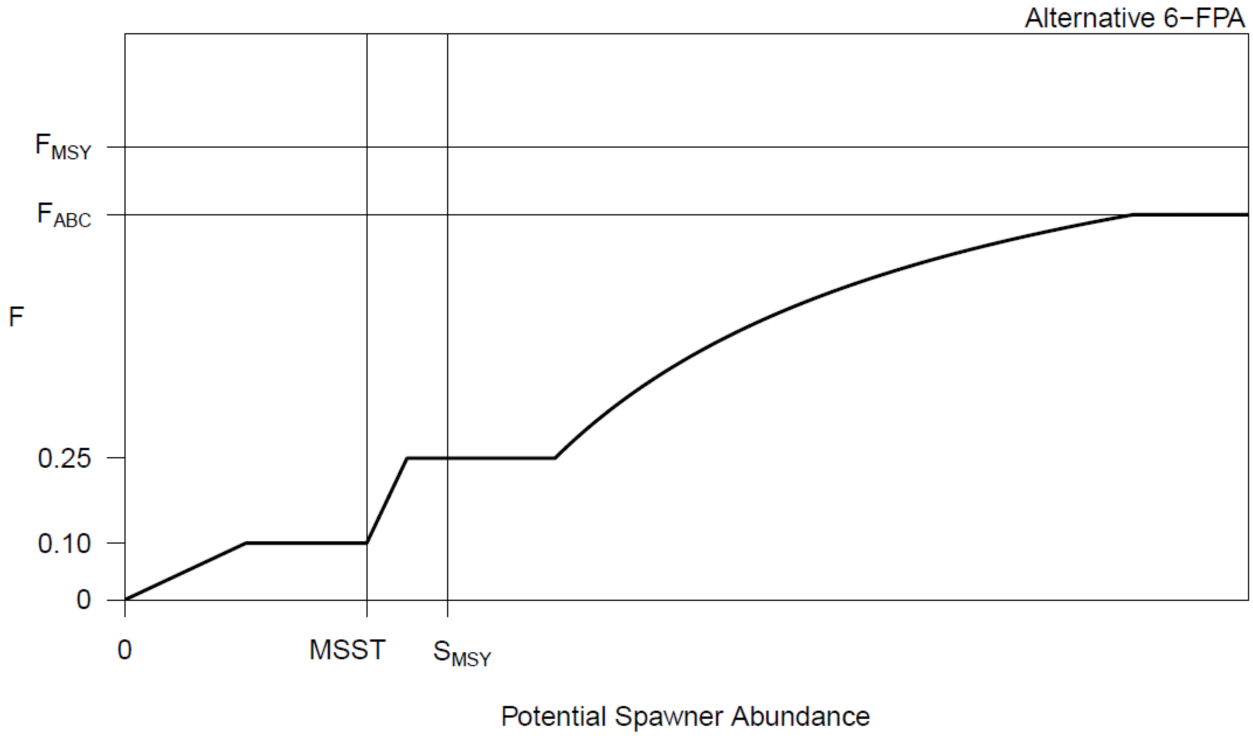


Figure 2-8b. *De minimis* fishing Final Preferred Alternative 6.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

3.0 AFFECTED ENVIRONMENT

For the purposes of this action, the general action area is between Point Conception and the U.S./Canada border, and includes the EEZ (which is directly affected by the Federal action), and the marine and internal waters of the states of Washington, Oregon, and California (which may be indirectly affected by the Federal action). Based on 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
- ESA-listed (non-salmon) species or critical habitat
- Marine mammals
- Biodiversity or ecosystem function

In this EA several of these components have been combined into categories to reduce duplication in the descriptions and to facilitate analyses of environmental effects. Thus, target and non-target species, including ESA-listed Chinook and coho salmon, will be covered in the Fish Resources Section, marine mammals and other ESA-listed species will be covered in the Protected Resources Section, biodiversity and ecosystem function and EFH will be covered in the Habitat Section, and social and economic effects will be covered in the Socioeconomic Section.

3.1 Fish Resources

Fish stocks targeted in Council-area salmon fisheries include Chinook, coho, and pink salmon stocks identified in Tables 3-1, 3-2, and 3-3 of this EA, 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. A description of the historical baseline for affected salmon stocks 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.

Other non-target Council-managed species such as groundfish, halibut, and highly migratory species are also landed jointly with salmon. For all of these stocks, fish caught on the same trip with salmon are documented.

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.

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.

Impacts to highly migratory species, primarily albacore, are managed under the Council's Highly Migratory Species FMP.

3.2 Protected Resources

Protected species include those protected by three Federal laws, the ESA, the Marine Mammal Protection Act (MMPA), and the Migratory Bird Treaty Act (MBTA).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

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. ESA-listed marine mammals that are potentially affected by salmon fisheries include Stellar sea lion, Guadalupe fur seal, and Southern Resident killer whales. Direct interaction with Stellar sea lions, Guadalupe fur seals, and killer whales are rare in salmon fisheries; however, there is new evidence suggesting salmon abundance in Puget Sound may correlate with killer whale population growth rate. Therefore there may be some indirect effects of salmon harvest on killer whale populations.

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.

A number of non-ESA-listed marine mammals may also occur in the affected area, these include: northern fur seal, California sea lion, harbor seal, northern elephant seal, bottlenose dolphin, Pacific white-sided dolphin, common dolphin, harbor porpoise, Dall's porpoise, and minke whale. These species, like all marine mammals, are protected under the MMPA. 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 pinniped species are at stable and historically high levels.

In addition, a number of non-ESA-listed sea birds have been identified that forage in areas coincident with Pacific salmon. These sea birds include grebes and loons, petrels and albatrosses, pelicans and cormorants, gulls, terns, auks, auklets, and some raptors (PFMC 1998).

3.3 Habitat, Biodiversity, and Ecosystem Function

Salmon EFH encompasses EFH for other Council-managed species north of Point Conception, California, and includes all waters extending from the seaward EEZ boundary into most currently occupied or historically accessible freshwater habitat. Appendix A of Amendment 14 (EFH Appendix A) describes salmon EFH and fishing and non-fishing impacts to this habitat. Critical habitat for ESA-listed salmon does not include Council-area ocean water.

Salmon FMP stocks interact with a number of ecosystems along the Pacific Coast, including the California Current Large Marine Ecosystem, numerous estuary and freshwater areas and associated riparian habitats. Salmon contribute to ecosystem function as predators on lower trophic level species, as prey for higher trophic level species, and as nutrient transportation from marine ecosystems to inland ecosystems.

Table 3-1. Coho stocks and complexes listed in the current Pacific Salmon FMP.

Coho Complexes	Coho Stocks	ESA Status
Oregon Production Index All Washington, Oregon, and California natural and hatchery coho stocks from streams south of Leadbetter Pt., WA.	Central California Coast	Threatened
	Southern Oregon-Northern California Coastal	Threatened
	Oregon Coastal Natural	Threatened
	Columbia River Late - Hatchery	
	Columbia River Early - Hatchery	
	Lower Columbia River - Natural	Threatened
Washington Coastal All pertinent natural and hatchery stocks originating in Washington coastal streams north of the Columbia River through the western Strait of Juan de Fuca (West of the Elwha and south of the Sekiu River).	Willapa Bay - Hatchery	
	Grays Harbor	
	Quinault - Hatchery	
	Queets	
	Hoh	
	Quillayute - Fall	
	Quillayute - Summer - Hatchery	
Puget Sound All pertinent natural and hatchery stocks originating from U.S. tributaries to Puget Sound and the eastern Strait of Juan de Fuca (east of Salt Creek).	Strait of Juan de Fuca	
	Hood Canal	
	Skagit	
	Stillaguamish	
	Snohomish	
	South Puget Sound -Hatchery	
Southern British Columbia Coast	Coastal Stocks	
	Fraser River	
4	21	4

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-2. Chinook stocks and complexes listed in the current Pacific Salmon FMP.

Chinook Complex	Chinook Stocks	ESA Status
California Central Valley All fall, late-fall, winter, and spring stocks of the Sacramento and San Joaquin Basins	Sacramento River - Fall	
	Sacramento River - Spring	Threatened
	Sacramento River - Winter	Endangered
Northern California Coast All fall and spring stocks of California streams north of the entrance to San Francisco Bay	Eel, Mattole, Mad, and Smith Rivers - Fall and Spring	Eel, Mattole and Mad River - Threatened
	Klamath River - Fall	
	Klamath River - Spring	
Oregon Coast All Oregon fall and spring stocks south of the Columbia River	Southern Oregon	
	Central and Northern Oregon	
Columbia River Basin All pertinent fall, summer, and spring stocks of the Columbia River and its tributaries	North Lewis River - Fall	Threatened
	Lower River Hatchery - Fall	
	Lower River Hatchery - Spring	
	Upper Willamette - Spring	Threatened
	Mid-River Bright Hatchery - Fall	
	Spring Creek Hatchery - Fall	
	Klickitat, Warm Springs, John Day, and Yakima	
	Snake River - Fall	Threatened
	Snake River - Spring/Summer	Threatened
	Upper River Bright - Fall	
	Upper River - Summer	
	Upper River - Spring	Endangered
Washington Coast All pertinent fall, summer and spring stocks from coastal streams north of the Columbia River through the western Strait of Juan de Fuca (west of the Elwha River)	Willapa Bay Fall (natural)	
	Willapa Bay Fall (hatchery)	
	Grays Harbor Fall	
	Grays Harbor Spring	
	Quinault Fall (Hatchery)	
	Queets Fall	
	Queets Spring/Summer	
	Hoh Fall	
	Hoh Spring/Summer	
	Quillayute Fall	
	Quillayute Spring/Summer	
	Hoko Summer/Fall	
Puget Sound All fall, summer, and spring stocks originating from U.S. tributaries to Puget Sound and the eastern Strait of Juan de Fuca (east of Salt Creek)	Eastern Strait of Juan de Fuca Summer/Fall	Threatened
	Skokomish Summer/Fall	Threatened
	Nooksack Spring - early	Threatened
	Skagit - Summer/Fall	Threatened
	Skagit - Spring	Threatened
	Stillaguamish - Summer/Fall	Threatened
	Snohomish - Summer/Fall	Threatened
	Cedar River - Summer/Fall	Threatened
	White River - Spring	Threatened
	Green River - Summer/Fall	Threatened
	Nisqually River -Summer/Fall	Threatened
Southern British Columbia Fall and spring stocks of B.C. coastal streams and the Fraser River	Coastal Stocks	
	Fraser River	
7	45	19

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-3. Pink stocks and complexes listed in the current Pacific Salmon FMP.

Pink Complex		**ESA Status**
Puget Sound		
Fraser		

3.4 Socioeconomic Environment

This Section describes the socioeconomic conditions of the 2010 fishing year, with comparisons to the most recent fishing years and recent historical averages. This Section describes the harvests of Chinook and coho, ex-vessel revenues, price, fishing effort and recreational trip information for the commercial and recreational ocean salmon fishery, and the resulting state and community personal income impacts from these commercial and recreational activities, and Klamath tribal harvest. These estimates are stratified by state, management zone, and/or port of landing. The recent year averages include a reasonable range of foreseeable seasons and economic impacts, and are used to represent the Status Quo Alternatives.

3.4.1 Introduction

Chapter IV in the *Review of 2010 Ocean Salmon Fisheries* (*Review*; PFMC 2011a) provides information on the socioeconomic impacts of the ocean salmon fisheries. More extensive information on the ocean salmon fisheries and social and economic characteristics is provided in Appendix B to the Salmon FMP (PFMC 2007). Information on fishing communities and recommended conservation measures is provided in Appendices A and B to the Council's description of West Coast fishing communities (PFMC 2007).

Most values in the Socioeconomic Environment Section of this draft EA have been rounded to the nearest hundredth (or tenth, when applicable). Averages in California and Oregon are inclusive through the year 2007, which is the period before widespread fisheries closures occurred mainly off California in 2008-2009, and through the year 2009 for Washington. For California and Oregon, 2007 was used as the most recent fishing year to compare 2010 values. For Washington, 2009 was used as the most recent fishing year to compare 2010 values. For California and southern Oregon, data values often were zero or close to zero during 2008-2009, therefore averages up to the year 2007 was used and seen as more representative of historical fishing conditions. Most tables in this Section were derived from the *Review*. A dashed entry (-) in tables in the *Review* were interpreted as a zero value, and only included in averages when the year with a zero value is within the date range specified; most dashed values indicate the season was closed or that no landings occurred. Multi-year averages for zones consisting of multiple ports were calculated by summing all the port values for each year, then dividing the sums by the number of years represented.

3.4.2 State-Level Trends: Commercial Ocean Salmon Fishery

The most substantial trend in the non-Indian commercial troll fishery in California and Oregon is the steep decline in the real ex-vessel value of landings during the 1990s, but a modest increase in the early 2000s (see Table IV-2 to IV-3 and Table IV-6 to IV-7 in the *Review*). In Washington, the commercial landing declined steeply as early as 1980s (see Table IV-4 and IV-8 in the *Review*). In the latter half of the 2000s, there has been broad decline in the commercial harvests of both Chinook and coho throughout the West coast. Therefore, the declining trends in ex-vessel values reflect primarily declining landings for Chinook and coho during those periods. Table 3-4 below summarizes the ex-vessel values and prices of ocean commercial Chinook and coho over the past 30 years in California, Oregon, and Washington.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-4. Estimates of ex-vessel value, and average price (dollars/dressed pound) of Troll Chinook and coho in nominal and real (inflation adjusted, 2010) dollars by State.

	Chinook				Coho				Total	
Year or Per	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)	Nominal Price Per Pound ($)	Real Price Per Pound ($)	Nominal Value ($*1,000)	Real Value ($*1,000)
CALIFORNIA										
1981-1985	10,945	21,485	2.42	4.69	554	1,100	1.94	4.11	11,499	22,585
1986-1990	21,151	35,145	2.56	4.22	490	801	1.36	2.72	21,641	35,946
1991-1995	7,335	10,352	2.28	3.25	143	211	1.25	2.4	7,478	10,563
2000	10,304	12,875	2.01	2.51	-	-	-	-	10,304	12,875
2001	4,773	5,832	1.98	2.42	-	-	-	-	4,773	5,832
2002	7,776	9,350	1.55	1.87	-	-	-	-	7,776	9,350
2003	12,181	14,338	1.91	2.25	-	-	-	-	12,181	14,338
2004	17,895	20,483	2.87	3.29	-	-	-	-	17,895	20,483
2005	12,913	14,303	2.97	3.29	-	-	-	-	12,913	14,303
2006	5,350	5,739	5.13	5.5	-	-	-	-	5,350	5,739
2007	7,902	8,235	5.18	5.4	-	-	-	-	7,902	8,235
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	1,246	1,246	5.47	5.47	-	-	-	-	1,246	1,246
OREGON										
1981-1985	3,582	6,995	2.46	4.77	2,248	4,580	1.45	2.82	5,830	11,574
1986-1990	9,381	15,562	2.47	4.07	3,203	5,326	1.54	2.54	12,584	20,888
1991-1995	1,971	2,787	2.24	3.19	326	482	0.64	0.93	2,297	3,269
2000	2,988	3,734	2.02	2.52	75	94	1.06	1.32	3,063	3,827
2001	4,680	5,718	1.61	1.97	41	50	0.79	0.97	4,721	5,769
2002	5,383	6,473	1.54	1.85	8	10	0.75	0.9	5,391	6,482
2003	7,186	8,459	1.97	2.32	36	43	0.85	1	7,222	8,501
2004	9,832	11,255	3.45	3.95	86	99	1.24	1.42	9,919	11,353
2005	8,466	9,377	3.17	3.51	37	41	1.87	2.07	8,503	9,418
2006	2,663	2,856	5.48	5.88	38	41	2.9	3.11	2,701	2,897
2007	2,630	2,740	5.66	5.9	193	201	1.9	1.98	2,822	2,941
2008	484	493	7.31	7.45	10	11	2.82	2.88	494	504
2009	77	78	5.06	5.11	267	270	2.04	2.06	345	348
2010	2,774	2,774	5.49	5.49	16	16	2.23	2.23	2,790	2,790
WASHINGTON										
1981-1985	1,954	3,927	2.46	4.77	1,272	2,566	1.32	2.56	3,225	6,494
1986-1990	1,310	2,168	2.61	4.32	360	586	1.62	2.67	1,670	2,754
1991-199	550	797	2.17	3.09	120	174	0.86	1.23	670	971
2000	224	280	1.71	2.14	34	42	1.09	1.36	258	323
2001	349	426	1.44	1.76	34	42	0.69	0.84	383	468
2002	756	909	1.11	1.33	2	2	1.58	1.9	758	911
2003	951	1,119	1.15	1.35	40	47	0.74	0.87	991	1,167
2004	1,079	1,235	2.14	2.45	106	121	1.16	1.33	1,185	1,356
2005	1,273	1,410	2.7	2.99	16	18	1.65	1.83	1,290	1,428
2006	1,029	1,103	4.64	4.98	16	18	1.69	1.81	1,045	1,121
2007	905	943	4.9	5.11	48	50	1.46	1.52	953	993
2008	673	687	6.73	6.86	36	36	2.49	2.54	709	723
2009	893	903	5.76	5.82	276	279	2.02	2.04	1,169	1,181
2010	3,083	3,083	5.61	5.61	32	32	2.14	2.14	3,115	3,115

Coastwide, the number of commercial vessels landing salmon has drastically declined since 1990 (from Tables D-4, D-5, D-6 in the *Review*). In 2010, there was a decline in the number of vessels landing salmon (216 vessels) in California compared to 2007 (601 vessels), and a 66 percent decline compared to the 2001-2007 average (640 vessels) (Table 3-4). In Oregon, there was a 15 percent decline in vessels landing salmon in 2010 (369 vessels) compared to 2007 (436 vessels), and a 23 percent decline compared to the 2001-2007 average (481 vessels). In Washington, there was a 20 percent increase in vessels landing salmon in 2010 (116 vessels) compared to 2009 (97 vessels), and a 41 percent increase compared to the 2001-2009 average (82 vessels). Similar trends were apparent for the number of vessels landing 90 percent of total pounds of salmon troll catch by state (Table 3-5, from Tables D-12, D-13, and D-14 in the *Review*).

Table 3-5. Number of registered vessels making troll commercial salmon landings.

	California			Oregon			Washington		
	Total vessels	Vessels landing 90% of catch		Total vessels	Vessels landing 90% of catch		Total vessels	Vessels landing 90% of catch	
Year or Period		No. of Vessels	Percent of Fleet		No. of Vessels	Percent of Fleet		No. of Vessels	Percent of Fleet
2010	216	84	39%	369	139	38%	116	73	63%
Previous fishing year (2007 for CA & OR; 2009 for WA)	601	293	49%	436	232	53%	97	61	63%
Average (2001-2007 for CA & OR; 2001-2009 for WA)	640	299	47%	481	252	52%	82	49	60%

3.4.3 State-Level Trends: Recreational Ocean Salmon Fishery

Recreational ocean salmon fishing estimates include mainly private vessels and charter boats. Some shore-based fishing occurs, although this component accounts for a low amount of the recreational ocean salmon catch. In 2010, a combined total of 48,800 estimated recreational trips occurred in California, and 27 percent of these trips were charter boat trips (13,100) (Table 3-6; Tables IV-11, IV-12, IV-13 in the *Review*). The total number of estimated recreational trips in 2010 (48,800 trips) reflects a 70 percent decline, compared to the 2001-2007 average in California (161,900 trips). The 2010 trip estimate is also substantially less than the number of trips in California in 2007 (105,900 trips).

In 2010, a combined total of 53,300 estimated recreational trips occurred in Oregon, and about nine percent of these trips were charter boat trips (5,000 trips) (Table 3-6; Table IV-12 in the *Review*).
The combined total of estimated recreational trips also declined to 53,300 trips in 2010, down 50 percent from the 2001-2007 average (106,400 trips), and substantially less than 2007 (88,300 trips).

In 2010, a combined total of 80,800 estimated recreational trips occurred in Washington, and 33 percent of these trips were charter boat trips (26,500 trips) (Table 3-6; Table IV-13 in the *Review*). In Washington, the decline was less pronounced than in California and Oregon; the combined number of estimated recreational trips in 2010 (80,800 trips) experienced a 9 percent decline from the 2001-2009 average (88,900 trips), and was less than the previous year (98,900 trips). In recent years, recreational ocean trips have been supported in Washington and Oregon by the implementation of mark-selective fisheries for coho. Council-area wide, the number of charter trips was estimated to be about 44,600 trips in 2010, and the number of private vessel trips was estimated to be about 138,300 trips (a total of about 182,900 trips).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-6. Estimated number of recreational ocean salmon angler trips by state.

Year or Period	California	Oregon	Washington
2010	48,800	53,300	80,800
Previous fishing year (2007 for CA & OR; 2009 for WA)	105,900	88,300	98,900
Average (2001-2007 for CA & OR; 2001-2009 for WA)	161,900	106,400	88,900

While fishing impacts are calculated on a stock-specific basis, 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:

(a) 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;
(b) Between Cape Falcon and Humbug Mountain (42°40' 30" N. lat.) on Oregon's north and central coast;
(c) The Klamath Management Zone (KMZ), which covers ocean waters from Humbug Mountain in southern Oregon to Horse Mountain (40°05' N. lat.) in northern California;
(d) From Horse Mountain to Point Arena; and
(e) From Point Arena to the U.S./Mexico border.
There are also numerous subdivisions within these areas used to further balance stock conservation and harvest allocation considerations (Figure 3-1).

The following description of the fisheries and fishing communities is organized around these areas and is derived from the *Review*.

3.4.4 U.S./Canada Border to Cape Falcon, Oregon

Ports between the U.S./Canada border and Cape Falcon, Oregon include Neah Bay, La Push, Westport, Ilwaco, and Astoria (Figure 3-1). This management zone is the furthest north of all salmon areas under the Council jurisdiction. Fisheries management in this area is guided by ESA consultation standards for LCR natural tule, Lower Columbia River Wild, and Snake River wild fall Chinook.

3.4.4.1 Stocks on Which the Fisheries Rely

Fisheries in this Council management zone are heavily dependent on the production of Tule fall Chinook and coho from Columbia River hatcheries which can comprise over half of the catch for each species in a typical year. Other stocks that in aggregate contribute a significant portion of the remaining catch include Columbia River summer and "bright" fall Chinook, Fraser River Chinook, Puget Sound Chinook and coho, and Washington and Oregon coast coho. In some years, Sacramento River fall Chinook can also comprise a moderate portion of this catch. In recent years, the fisheries in this area have been constrained by the impact limits on ESA listed natural Tule Chinook and coho from the lower Columbia River.

3.4.4.2 Non-Indian Commercial Fisheries

In 2010, about 51 percent (638,000 pounds) of Chinook landed in the non-Indian ocean salmon troll fishery occurred at ports between the U.S./Canada Border to Cape Falcon, compared to 1,256,000 pounds in the entire Council area in 2010 (from Table IV-6, IV-7, IV-8 in the *Review*), a 29 percent increase from the 2001-2009 average (493,700 pounds) in this area (Table 3-7). About 63 percent (402,000 pounds) of Chinook landed by the commercial troll ocean fishery in this area were made at Westport.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

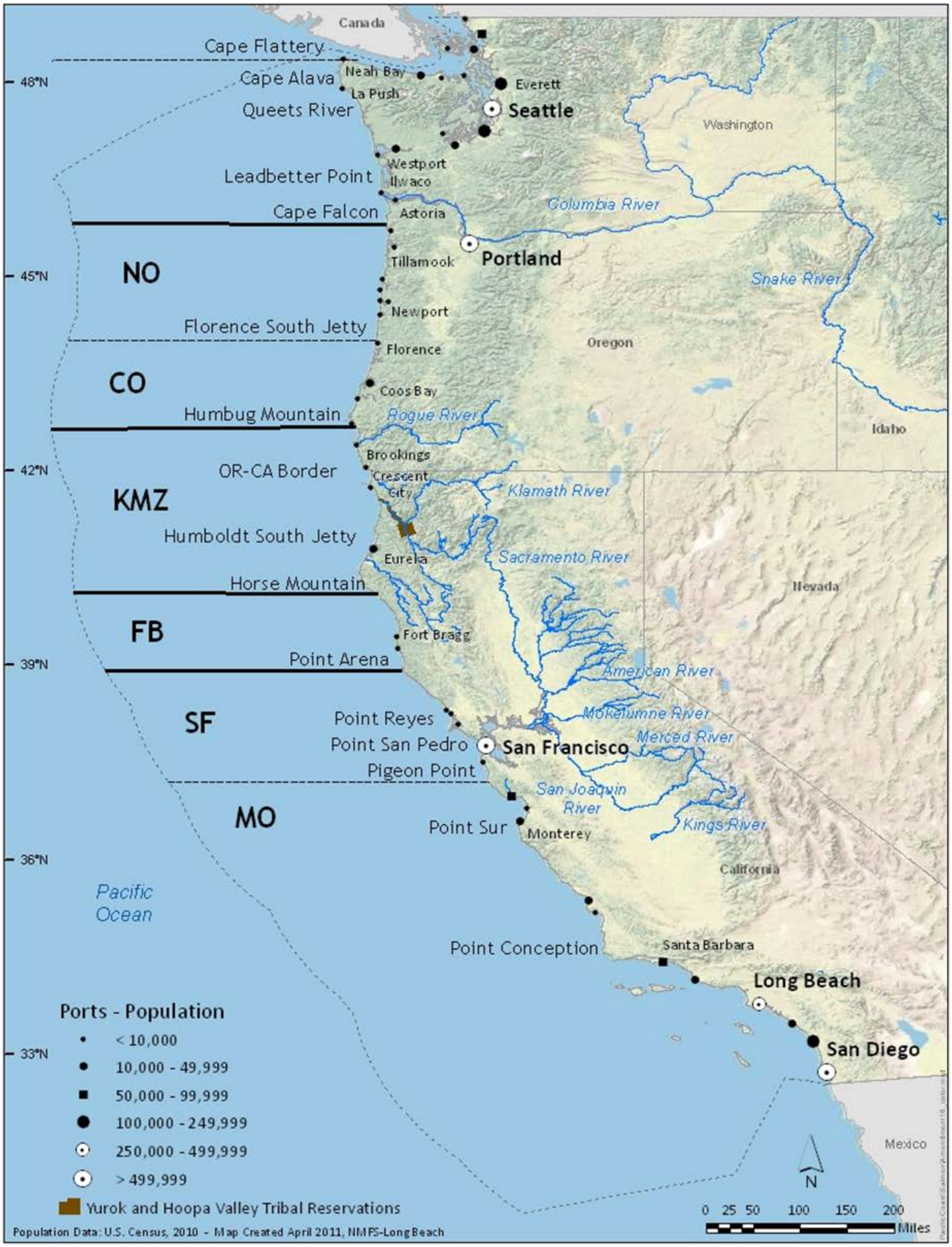


Figure 3-1. Map of West Coast ocean salmon fishery management areas.

Table 3-7. Pounds of Chinook and coho salmon landed by the commercial troll ocean fishery by port area.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Management Zones/Ports	Chinook			Coho		
	2010	2009	Average (2001-2009)	2010	2009	Average (2001-2009)
U.S./Canada Border to Cape Falcon	**638,000**	**158,000**	**493,700**	**22,000**	**179,00**	**70,300**
Neah Bay	48,000	31,000	158,200	1,000	29,000	7,100
La Push	62,000	25,000	45,700	2,000	34,000	8,400
Westport	402,000	92,000	147,600	12,000	54,000	21,000
Ilwaco	10,000	3,000	20,100	1,000	14,000	6,700
Astoria	116,000	7,000	122,100	6,000	48,000	26,700

The number of Chinook and coho salmon landed by commercial troll salmon fishing by catch area is reported below (Table 3-8; from Tables A-1, A-6, and A-11 in the *Review*). Ilwaco had the least amount (2 percent) of Chinook caught in this management zone.

Table 3-8. Number of Chinook and coho landed by commercial troll fishermen by catch area.

Management Zones/Ports	Chinook			Coho		
	2010	2009	Average (2001-2009)	2010	2009	Average (2001-2009)
U.S./Canada Border to Cape Falcon	**56,200**	**13,000**	**34,700**	**3,100**	**32,700**	**12,900**
Neah Bay	4,100	1,200	10,300	100	600	700
La Push	5,900	2,700	4,500	200	7,200	2,000
Westport	34,200	8,100	12,200	1,700	10,100	3,300
Ilwaco	900	300	1,200	150	2,300	1,100
Astoria	11,100	700	7,500	1,000	12,700	6,100

3.4.4.3 Recreational Ocean Fisheries

About 68 percent of Chinook (38,700 fish) were landed north of Cape Falcon in 2010, compared with Council-area recreational fisheries (56,500 Chinook), which represented a 45 percent increase from the 2001-2009 average in this area (26,600 Chinook) (Table 3-9; from Tables A-5, A-10, A-18 in the *Review*).

Table 3-9. Estimated number of Chinook landed by port area between the U.S./Canada border and Cape Falcon in the ocean recreational fishery.

Management Zones/Ports	Chinook			Coho		
	2010	2009	Average (2001-2009)	2010	2009	Average (2001-2009)
U.S./Canada Border to Cape Falcon	**38,700**	**13,300**	**26,600**	**42,400**	**157,900**	**109,400**
Neah Bay	3,300	2,400	2,900	3,700	13,300	13,100
La Push	1,200	700	1,300	1,200	6,900	2,900
Westport	27,000	5,000	15,500	12,600	53,900	29,000
Ilwaco	5,400	4,200	5,000	18,800	64,400	46,500
Astoria	1,800	1,000	1,800	6,100	19,400	17,900

North of Cape Falcon recreational fisheries accounted for about 50 percent (91,100 trips) of all recreational trips in Council-area recreational fisheries (182,900 total trips) in 2010 (Table 3-10; from Tables IV-11, IV-12, IV-13 in the *Review*). About 69 percent of total recreational trips in this area were on private boats (62,900 trips), substantially greater than charter boat trips in 2010 (28,200 trips). In 2010, most charter trips in this area originated from Westport (18,400 trips). The number of private trips in 2010 was similar for Westport (20,000 trips) and Ilwaco (20,100 trips).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-10. Estimated number of angler trips in the recreational ocean fisheries.

Management Zones/Ports	Charter Boat Trips 2010	Charter Boat Trips Average (2001-2009)	Private Boat Trips 2010	Private Boat Trips Average (2001-2009)
U.S./Canada Border to Cape Falcon	**28,200**	**34,500**	**62,900**	**68,100**
Neah Bay	400	1,100	11,100	15,100
La Push	600	500	3,200	3,400
Westport	18,400	20,000	20,000	15,500
Ilwaco	7,000	10,100	20,100	23,200
Astoria	1,800	2,700	8,500	10,900

3.4.4.4 Tribal Ocean 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 are discussed in detail in Appendix B to the EIS prepared for Amendment 14 (PFMC 1999to the Salmon FMP.

3.4.4.5 Inside Fisheries

Non-Indian commercial fisheries operate in Puget Sound (sein and gillnet) Grays Harbor, Willapa Bay, and the lower Columbia River (gillnet). Tribal fisheries operate in Puget Sound, Washington coastal rivers from Grays Harbor north, and the mid-Columbia River; these include commercial (gillnet, and dipnet), and ceremonial and subsistence (all gear types) fisheries. Recreational fisheries occur in nearly all inside waters

3.4.5 Cape Falcon to Humbug Mountain, Oregon

The major ports between Cape Falcon and Humbug Mountain include Tillamook, Newport, and Coos Bay (Figure 3-1). This area covers the majority of the Oregon waters.

3.4.5.1 Stocks on Which the Fisheries Rely

Fisheries between Cape Falcon and Humbug Mountain, Oregon catch a mix of stocks, which varies from year to year in response to the status of individual stocks and environmental conditions. Southern Oregon Coast Chinook, Central Valley, and Klamath River fall Chinook stocks contribute substantially to these fisheries. Chinook stocks from the Columbia River and northern Oregon coast are minor contributors to fisheries in this area. Coho stocks contributing to fisheries are primarily Oregon Production Index (OPI) area stocks.

3.4.5.2 Commercial Fisheries

Oregon port areas between Cape Falcon and Humbug Mountain include Tillamook, Newport, and Coos Bay; these ports are major contributors to Chinook landings in Council-area fisheries. In 2010, about 28 percent of total pounds of Chinook landed (347,000 pounds) in the ocean salmon troll fishery occurred at Oregon ports between Cape Falcon and Humbug Mountain, compared to 1,256,000 pounds landed by commercial troll fishermen in the entire Council area (Table 3-11; from Table IV-6, IV-7, IV-8 in the *Review*). This was an 83 percent decline from the 2001-2007 average (2,040,000 pounds) in this area. About 53 percent of total pounds of Chinook landed by the commercial troll ocean fishery between Cape Falcon and Humbug Mountain were made at Newport (185,000 pounds). Coho landings were large between Cape Falcon and Humbug Mountain until 1992, when stock declines and subsequent regulatory actions eliminated most coho fisheries south of Cape Falcon. Some mortality on coho still occurs as

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

bycatch in Chinook directed fisheries. In the Chinook directed fisheries (non-coho retention) incidental coho mortality estimates are accounted for. Mortality estimates include both drop-off and hook-and-release of coho encountered.

Table 3-11. Pounds of Chinook landed by the commercial troll ocean fishery in ports from Cape Falcon to Humbug Mountain.

	Chinook			Coho		
Management Zones/Ports	2010	2007	Average (2001-2007)	2010	2007	Average (2001-2007)
Cape Falcon to Humbug Mountain	**347,000**	**345,000**	**2,040,000**	**1,000**	**61,000**	**17,000**
Tillamook	40,000	37,000	167,700	1,000	34,000	13,000
Newport	185,000	76,000	1,028,000	0	13,000	2,100
Coos Bay	122,000	232,000	844,000	0	14,000	2,000

The number of Chinook landed by commercial troll salmon fishing by catch area is reported below (Table 3-12; from Tables A-1, A-6, and A-11 in the *Review*). Tillamook reported the least amount (13 percent) of Chinook caught in this management zone.

Table 3-12. Number of Chinook and coho landed by commercial troll fishermen landed in ports from Cape Falcon and Humbug Mountain.

	Chinook			Coho		
Management Zones/Ports	2010	2007	Average (2001-2007)	2010	2007	Average, (2001-2007)
Cape Falcon to Humbug Mountain	**27,400**	**29,900**	**200,000**	**0**	**5,500**	**800**
Tillamook	3,600	4,200	19,300	0	1,300	200
Newport	12,400	4,100	93,400	0	1,900	300
Coos Bay	11,400	21,700	87,300	0	2,400	300

3.4.5.3 Recreational Fisheries

About four percent (2,300 fish) of the 56,500 Chinook harvested in all Council-area recreational fisheries was landed in this management zone in 2010. This catch represented a 90 percent decline from the 2001-2007 average in this area (23,400 Chinook). A quota fishery for marked coho was allowed between Cape Falcon and Humbug Mountain in 2010. About 22 percent (12,100 fish) of the 54,700 coho harvested in Council-area recreational fisheries were landed in this area in 2010 (Table 3-13; from Tables A-5, A-10, A-18 in the *Review*).

Table 3-13. Estimated number of Chinook and coho landed in ports from Cape Falcon to Humbug Mountain.

	Chinook			Coho		
Management Zones/Ports	2010	2007	Average (2001-2007)	2010	2007	Average (2001-2007)
Cape Falcon to Humbug Mountain	**2,300**	**3,300**	**23,400**	**12,100**	**40,700**	**37,500**
Tillamook	800	1,400	4,700	3,400	12,600	9,800
Newport	800	500	6,800	7,800	15,400	16,800
Coos Bay	700	1,400	11,800	900	12,700	10,900

Oregon recreational effort in Tillamook, Newport, and Coos Bay port areas accounted for about 20 percent of all recreational trips (37,100), compared with 182,900 trips in Council-area recreational fisheries in 2010 (Table 3-14; from Tables IV-11, IV-12, IV-13 in the *Review*). About 91 percent of total recreational trips in this area were on private boats in 2010 (33,900 trips), substantially more than charter boat trips (3,300 trips). In 2010 and on average, most charter trips originated in Newport whereas most private trips use Tillamook. While Newport is an important center for charter fishing, recreational fishing on private boats is important at all three port areas between Cape Falcon and Humbug Mountain.

Table 3-14. Estimated number of angler trips in the recreational ocean fisheries between Cape Falcon and Humbug Mountain.

Management Zones/Ports	Charter Boat Trips		Private Boat Trips	
	2010	Average (2001-2007)	2010	Average (2001-2007)
Cape Falcon to Humbug Mountain	**3,300**	**11,900**	**33,900**	**63,100**
Tillamook	400	1,500	13,100	19,600
Newport	2,800	7,500	12,200	16,100
Coos Bay	100	3,000	8,600	27,400

3.4.5.4 Inside Fisheries

Recreational fisheries occur in most coastal Oregon basins. The only tribal fishery along the Oregon coast is conducted and regulated by the Siletz Tribe, which allows no more than 200 Chinook or coho annually (USPL 96-340 1980). There are no commercial fisheries in Oregon coastal basins.

3.4.6 Humbug Mountain, Oregon to Horse Mountain, California (KMZ)

The KMZ covers waters in southern Oregon and northern California around the mouth of the Klamath River (Figure 3-1). A substantial and important component of allocation issues in this area are harvest needs and treaty rights of Klamath River tribes and sport fisheries. Major ports in the KMZ include Brookings, Oregon and Crescent City and Eureka, California. Coho retention is prohibited off California (NMFS ESA consultation standard for SONCC and CCC coho ESUs, NMFS 1999).

3.4.6.1 Stocks on Which the Fisheries Rely

The KMZ was created to focus management on KRFC because ocean fishery impacts have predominantly occurred in this area. Other major contributors to the harvest in this area include SRFC and southern Oregon coast Chinook stocks. Occasionally, recreational coho fisheries occur in the Oregon portion of the KMZ concurrent with fisheries to the north. Coho stocks present in this area are primarily OPI 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; NMFS 1999).

3.4.6.2 Commercial Fishery

The KMZ accounts for a small proportion of Council-area commercial landings. In 2010, only about 4 percent (47,000 Chinook) of Council-area commercial Chinook landings (1,256,000 Chinook) were made at two major ports in this zone (Table 3-15; from Tables IV-6, IV-7, IV-8 in the *Review*), an 84 percent decline from the 2001-2007 average (288,900 Chinook). No commercial landings were made in Crescent City in 2010. Landings in Eureka were from catch areas farther south.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-15. Pounds of Chinook and coho salmon landed in the commercial troll fishery by port area in 2010.

	Chinook			Coho		
Management Zones/Ports	2010	2007	Average (2001-2007)	2010	2007	Average (2001-2007)
Humbug Mountain to Horse Mountain	**47,000**	**213,000**	**288,900**	**0**	**3,000**	**400**
Brookings	43,000	98,000	165,900	0	3,000	400
Crescent City	0	34,000	66,000	0	0	0
Eureka	4,000	81,000	57,000	0	0	0

The number of Chinook landed by commercial troll salmon fishing by catch area is reported below (Table 3-16; from Tables A-1, A-6, and A-11 in the *Review*). Both Eureka and Crescent City have no reports of Chinook caught in these areas, as there were no open seasons in the California portion of the KMZ.

Table 3-16. Number of Chinook landed by commercial troll fishermen in the ports between Humbug Mountain and Horse Mountain.

Management Zones/Ports	2010	2007	Average (2001-2007)
Humbug Mountain to Horse Mountain	**900**	**12,900**	**10,500**
Brookings	900	4,100	4,400
Crescent City	0	2,400	1,300
Eureka	0	6,400	4,700

3.4.6.3 Recreational Fishery

In 2010, the KMZ accounted for a small portion of recreational landings; about 3 percent (1,500 fish) of total Chinook landings were made in this area, compared to total Council-area Chinook recreational landings (56,500 fish). The amount of fish landed in 2010 represented a 93 percent decline compared with the 2001-2007 average in this area (21,900 Chinook) (Table 3-17; from Tables A-5, A-10, and A-18 in the *Review*). Although open, no recreational landings were made in Crescent City in 2010.

Table 3-17. Number of Chinook landed in the recreational ocean fishery in the ports between Humbug Mountain and Horse Mountain.

Management Zones/Ports	2010	2007	Average (2001-2007)
Humbug Mountain to Horse Mountain	**1,500**	**22,000**	**25,100**
Brookings	800	3,100	5,700
Crescent City	0	900	1,200
Eureka	700	18,000	15,000

About 6 percent (10,200 trips) of all recreational trips occurred in the KMZ in 2010, compared to total Council-area recreational trips (182,900), and 96 percent of these trips were made on private vessels (9,800 trips) (Table 3-18; from Tables IV-11, IV-12, IV-13 in the *Review*). In 2010, the number of charter trips in Brookings and Eureka (400 trips) accounted for less than one percent, compared with the total Council-area wide charter trips (44,600).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-18. Number of estimated trips in the recreational ocean salmon fishery.

Management Zones/Ports	Charter Boat Trips 2010	Charter Boat Trips Average (2001-2007)	Private Boat Trips 2010	Private Boat Trips Average (2001-2007)
Humbug Mountain to Horse Mountain	**400**	**1,700**	**9,800**	**34,700**
Brookings	100	400	5,900	15,800
Crescent City	0	0	200	3,400
Eureka	300	1,300	3,700	15,500

3.4.6.4 Inside Fisheries

Recreational fisheries occur in most coastal basins. Tribal commercial, ceremonial and subsistence fisheries occur in the Klamath Basin. Commercial fisheries are conducted by the Yurok and Hoopa Valley tribes in the Klamath Basins in their respective reservations. The Yurok, Hoopa Valley, Kurok and Resighini Rancheria tribes also conduct important, but minor ceremonial and subsistence fisheries in their usual and accustomed fishing areas. The Karuk tribal dipnet fisheries and fishing conducted by members of the Resighini Rancheria are conducted under state regulations (15 CCR §7.50(b)(91.1)), and are subject to the same season and bag limit restrictions as the in-river non-Indian recreational fisheries. There are no non-Indian commercial fisheries in this area.

3.4.7 South of Horse Mountain, California

Although this area extends as far south as the United States southern border, ocean salmon fishing generally occurs only as far south as Point Conception, California due to spatial limits in the ocean abundance of salmon stocks southward. Major port areas in this area include Fort Bragg, San Francisco, and Monterey, California (Figure 3-1). This Section also presents estimates for the area South of Point Arena, California, which includes San Francisco and Monterey port areas. The area from south of Horse Mountain to Point Arena exclusively includes the port in Fort Bragg.

3.4.7.1 Stocks on Which the Fisheries Rely

Central Valley Chinook stocks are important throughout this area, particularly south of Fort Bragg near Point Arena. Southern Oregon Chinook stocks contribute to fisheries in the northern portion of this area. KRFC, California Coastal Chinook, and Sacramento River winter run Chinook are also landed in this area, and conservation concerns for these stocks often have substantial effects on ocean harvest management measures. Coho retention is prohibited off California (NMFS ESA consultation standard for SONCC and CCC coho ESUs; NMFS 1999).

3.4.7.2 Commercial Fisheries

Only 18 percent of total pounds landed in the Council-area commercial troll fishery occurred in California ports in 2010 (228,000 pounds). Ninety eight percent of the California landings were in ports south of Horse Mountain (223,000 pounds) (Table 3-19; from Table IV-6, IV-7, and IV-8 in the *Review*). For the area south of Horse Mountain, the 2010 landings of Chinook (223,000 pounds) represented a 94 percent decline, compared with the 2001-2007 average (3,727,000 pounds). Coho retention in commercial fisheries south of the Oregon/California border has not been allowed since 1993 to reduce impacts on OCN and other depressed and ESA-listed coho stocks; therefore, coho estimates are not presented in this Section.

In 2010, 82 percent of pounds of salmon landed by the California commercial troll ocean fishery occurred in Fort Bragg (187,000 pounds). This was an 81 percent decline compared to the 2001-2007 average in Fort Bragg (996,000 pounds). Opportunity in Fort Bragg was reduced starting in 1990 to reduce impacts on KRFC. In 2010, Monterey and San Francisco landings were reduced primarily due to measures designed to protect SRFC. In 2010, as a result of SRFC failing to meet the lower end of the FMP

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

conservation objective goal range (spawner escapement of 122,000 to 180,000 SRFC) for three consecutive years (2007-2009), an “overfishing concern” under the FMP was triggered for the stock and NMFS notified the Council that the stock was “overfished.” Landings in San Francisco historically were substantially more than landings at Fort Bragg, especially in recent past years.

Table 3-19. Pounds of Chinook landed in the commercial troll ocean salmon fishery by port area in California.

Management Zones/Ports	2010	2007	Average (2001-2007)
South of Horse Mountain	**223,000**	**1,410,000**	**3,727,000**
Fort Bragg	187,000	357,000	996,000
San Francisco	16,000	888,000	2,156,000
Monterey	20,000	165,000	575,900
South of Point Arena (San Francisco and Monterey	**36,000**	**1,053,000**	**2,732,000**

The number of Chinook landed in the commercial troll salmon fishery by catch area is presented below (Table 3-20; from Tables A-1, A-6, and A-11 in the *Review*). San Francisco reported the least amount of Chinook caught in this management zone.

Table 3-20. Number of Chinook landed by commercial troll fishery by catch area.

Management Zones/Ports	2010	2007	Average (2001-2007)
South of Horse Mountain	**15,100**	**105,400**	**290,400**
Fort Bragg	12,600	16,100	72,800
San Francisco	1,100	75,300	167,700
Monterey	1,400	14,000	49,900
South of Point Arena (San Francisco and Monterey)	**2,500**	**89,300**	**217,600**

3.4.7.3 Recreational Fisheries

Fort Bragg, San Francisco, and Monterey represented 25 percent (14,000 fish) of the Council-area recreational Chinook landings (56,500 fish) in 2010, an 87 percent decline compared with the 2001-2007 average (110,100 Chinook) (Table 3-21).

Table 3-21. Number of Chinook landed south of Horse Mountain.

Management Zones/Ports	2010	2007	Average (2001-2007)
South of Horse Mountain	**14,000**	**28,800**	**110,100**
Fort Bragg	1,700	5,800	19,800
San Francisco	5,900	16,800	65,500
Monterey	6,300	6,300	24,800
South of Point Arena (San Francisco and Monterey)	**12,300**	**23,100**	**90,300**

The number of recreational trips in California is typically greater in the area south of Horse Mountain, although trips have steadily decreased coast-wide. In 2010, 29 percent of recreational trips south of Horse Mountain were made by charter vessels (12,900 trips) (Table 3-22; from Tables IV-11, IV-12, and IV-13 in the *Review*). In 2010, charter trips were most common in San Francisco (7,500 trips), while private recreational trips were most common in Monterey (15,100 trips). Recreational trips made south of Horse Mountain represented 24 percent (44,500 trips) of all trips made coast-wide (182,900 trips), a 48 percent decline from the number of recreational trips made in this area in 2007 (85,400 trips).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-22. Number of Recreational Chinook trips.

Management Zones/Ports	Charter Boat Trips 2010	Charter Boat Trips Average (2001-2007)	Private Boat Trips 2010	Private Boat Trips Average (2001-2007)
South of Horse Mountain	**12,900**	**64,200**	**31,600**	**77,400**
Fort Bragg	1,800	8,600	4,900	17,000
San Francisco	7,500	42,300	11,600	32,300
Monterey	3,600	13,200	15,100	28,100
South of Point Arena (San Francisco and Monterey)	**11,100**	**55,600**	**26,700**	**60,400**

3.4.7.4 Inside Fisheries

Recreational salmon fisheries occur in most large California coastal basins and in the Sacramento River Basin. There are no non-Indian commercial or tribal fisheries in this area.

3.4.8 Catch, Effort and Economic Impact Data for Ocean Salmon Fisheries

Catch and effort data for 2010 and average landings and effort during 2000-2007 or 2000-2009 were used to describe and compare commercial troll and recreational ocean salmon fisheries off Washington, Oregon, and California. In 2010, catch per unit of effort (CPUE) was highest in fisheries from the U.S./Canada border to Cape Falcon in the treaty commercial troll ocean salmon fisheries (35 Chinook per fishing day) (Tables 3-23 and 3-24; from Table I-5 in the 2010 *Review;* CPUE calculated manually based on table contents). The Chinook CPUEs in the recent year have declined substantially compared to the recent past average CPUEs except for the North of Cape Falcon (non-treaty) zone for both commercial and recreational fisheries. Non-treaty troll catch was limited in 2010 by landing limits and possession limits. The estimates of Chinook dressed pounds were taken from Tables IV-6, IV-7, and IV-8 in the *Review.*

During the 2000s, average Chinook effort and landings were highest from Horse Mountain south to the U.S. border, before widespread fishery closures in that area during 2008 and 2009. The least average commercial troll catch and effort during the 2000s occurred from Humbug Mountain to Horse Mountain.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-23. Commercial troll ocean salmon fishing effort and number of Chinook and coho landed by management area.

Management area	In 2010				Average[47]			
	No. of days fished	No. of Chinook landed	Chinook CPUE	No. of Coho landed	No. of days fished	No. of Chinook landed	Chinook CPUE	No. of coho landed
U.S./Canada Border to Cape Falcon (treaty)	1,000	33,400	35.1	11,500	600	30,500	50.8	34,800
U.S./Canada Border to Cape Falcon (non-treaty)	3,100	56,200	18.3	3,100	2,000	31,500	15.8	13,800
Cape Falcon to Humbug Mountain	3,500	27,400	7.9	0	8,500	169,600	20.0	1,100
Humbug Mountain to Horse Mountain	200	900	4.8	0	700	14,500	20.7	0
Horse Mountain south to U.S. Border	2,000	15,100	7.6	0	14,500	293,400	20.2	0

Table 3-24. Recreational ocean salmon fishing effort and catch of Chinook and coho landed by management area.

Management Zones	In 2010				Average[48]			
	No. of angler trips	No. of Chinook landed	No. of coho landed	Chinook CPUE (Chinook/trip)	No. of angler trips	No. of Chinook landed	No. of coho landed	Chinook CPUE (Chinook/trip)
U.S./Canada border to Cape Falcon (non-treaty)	91,200	38,700	42,400	0.42	99,000	21,900	98,400	0.22
Cape Falcon to Humbug Mountain	37,100	2,300	12,100	0.06	75,500	22,300	37,100	0.30
Humbug Mountain to Horse Mountain	10,200	1,500	100	0.15	32,600	21,500	1,000	0.66
Horse Mountain south to U.S. Border	44,500	14,000	100	0.32	132,500	103,700	700	0.78

Coastal community and state personal income impacts of the non-Indian commercial troll and recreational ocean salmon fishery were compared coast-wide (Table 3-25; from Tables IV-16, IV-17, and IV-18 in the *Review*). Economic impact estimate averages in the 2000s indicate the most economic impact occurred in ports south of Horse Mountain ($12,800,000 in San Francisco alone), while the least impact occurred in ports from Humbug Mountain to Horse Mountain.

[47] Averages include years 2003-2009 north of Cape Falcon (treaty and non-treaty), and years 2003-2007 south of Cape Falcon to exclude years of widespread fishery closures off California in 2008 and 2009.
[48] Averages include years 2003-2009 north of Cape Falcon, and years 2003-2007 south of Cape Falcon to exclude years of widespread fishery closures off California in 2008 and 2009.

Table 3-25. Coastal community and personal income impacts (in real, inflation-adjusted 2010 dollars) of the commercial troll and recreational ocean salmon fishery for major port areas[49].

	Ocean Commercial Troll		Ocean Recreational	
Management Areas or Ports	**2010**	**Average**	**2010**	**Average**
U.S./Canada Border to Cape Falcon	**$5,593,000**	**$2,391,000**	**$7,412,000**	**$8,731,000**
Neah Bay	319,000	528,700	428,000	672,300
La Push	502,000	229,600	214,000	198,700
Westport	3,792,000	854,900	4,183,000	4,331,200
Ilwaco	82,000	130,800	2,001,000	2,708,100
Astoria	898,000	647,900	586,000	821,000
Cape Falcon to Humbug Mountain	**2,449,000**	**8,962,000**	**1,666,000**	**3,918,000**
Tillamook	260,000	781,100	522,000	902,400
Newport	1,304,000	4,320,400	819,000	1,595,400
Coos Bay	885,000	3,860,600	325,000	1,420,300
Humbug Mountain to Horse Mountain	**383,000**	**1,580,100**	**424,000**	**1,537,600**
Crescent City	0	401,000	8,000	136,700
Eureka	34,000	350,700	185,000	776,000
Brookings	349,000	828,400	220,000	624,900
South of Horse Mountain	**1,977,000**	**21,363,000**	**3,037,000**	**11,904,000**
Fort Bragg	1,689,000	5,288,100	410,000	1,723,000
San Francisco	135,000	12,799,700	1,540,000	7,311,100
Monterey	153,000	3,274,700	1,087,000	2,869,900

Non-Indian ocean troll exvessel revenue information is presented in Table 3-26 (from Tables IV-16, IV-17, IV-18, IV-2, IV-3, and IV-4 in the *Review*). Except for Washington, the income impacts for 2010 were lower than average (2001-2010) for both California and Oregon.

Table 3-26. Estimates of ex-vessel value (in real dollars) and state personal income impacts both in thousands of real (inflation adjusted, 2010) dollars for the Non-Indian ocean troll Chinook and coho salmon fishery.

	California		Oregon		Washington	
Year or Period	Ex-vessel value	Income impact	Ex-vessel value	Income impact	Ex-vessel value	Income impact
2001	$5,832	$14,477	$5,769	$12,615	$468	$1,056
2002	9,350	24,705	6,482	14,347	911	2,191
2003	14,338	35,939	8,501	17,648	1,167	2,784
2004	20,483	37,573	11,353	17,183	1,356	2,588
2005	14,303	26,064	9,418	14,429	1,428	2,570
2006	5,739	9,693	2,897	4,126	1,121	1,870
2007	8,235	13,910	2,941	4,206	993	1,663
2008	0	0	504	691	723	1,167
2009	0	0	348	537	1,181	1,981
2010	1,246	2,090	2,790	3,968	3,115	4,904
Average (2001-2010)	$7,953	$16,445	$5,100	$8,975	$1,246	$2,277

The number of recreational trips and the resulting state personal income impact are listed in Table 3-27 (from Tables IV-11, IV-12, IV-13, IV-16, IV-17, and IV-18 in the *Review*). The income impacts for the year 2010 have remained below the average (2001-2010) for all states.

[49] Averages include the years 2001-2009 north of Cape Falcon, and 2001-2007 south of Cape Falcon.

Table 3-27. Ocean recreational trips (in thousands) and resulting state personal income impacts (in thousands of real 2010 dollars)

Year or Period	California				Oregon				Washington			
	Charter boat trips	Private boat trips	Total trips	Income impact	Charter boat trips	Private boat trips	Total trips	Income impact	Charter boat trips	Private boat trips	Total trips	Income impact
2001	69.9	95.2	165.1	$14,330	18.2	102.4	120.6	$7,699	41.2	72.4	113.6	$11,932
2002	86.6	123.4	210.1	18,008	15.7	91.9	107.6	6,805	37.0	57.4	94.4	10,429
2003	59.4	75.3	134.6	11,908	23.4	121.1	144.5	9,416	44.5	75.5	120.0	12,793
2004	97.7	121.0	218.7	19,469	21.1	124.6	145.7	9,189	36.5	73.1	109.5	10,920
2005	69.1	103.0	172.1	14,571	9.9	66.1	76.0	4,653	31.7	58.9	90.6	9,306
2006	44.9	81.6	126.5	10,151	8.0	54.4	62.3	3,799	24.5	39.1	63.6	6,951
2007	31.4	74.5	105.9	7,909	11.4	76.9	88.3	5,395	26.7	45.9	72.7	7,712
2008	0.1	0.3	0.4	30	1.9	28.5	30.4	1,607	14.2	22.2	36.4	4,011
2009	0.6	4.7	5.4	310	12.6	71.9	84.5	5,377	29.4	69.5	98.9	9,229
2010	13.1	35.6	48.8	3,515	5.0	48.3	53.3	3,033	26.5	54.4	80.8	7,976
Average (2001-2010)	47.3	71.5	118.8	$10,020	12.7	78.6	91.3	$5,697	31.2	56.8	88.0	$9,126

3.4.9 Klamath River Fisheries

Data on Klamath River Chinook salmon harvest in river tribal and non-tribal recreational fisheries are available at: http://www.pcouncil.org/salmon/salbluebook/salbluebook.html.

3.4.9.1 Tribal Fisheries

The Klamath and Trinity Rivers are considered a lifeline to tribal groups such as the Yurok and Hoopa Valley Tribe. Salmon are not only integral to the health and wellness of tribal members, but also serve important purposes during cultural and religious ceremonies that are deeply rooted in tradition and belief, including in storytelling and the traditional fishing, processing, and cooking of salmon. Tribes have a spiritual connection to their homelands and ceremonies, and salmon are a vital part of their identity and subsistence as a culture. Ensuring the sustainability of salmon is extremely important to tribes.

In 2010, a total of 32,400 Chinook salmon were harvested by the Yurok and Hoopa Valley reservation Indian gillnet fishermen, of which 94 percent were fall-run fish (30,400 Chinook). During 2004-2009, the tribal gillnet fishermen harvested an average of 26,200 Chinook salmon annually, which includes an average of 5,500 spring-run fish and an average of 20,600 fall-run fish annually (Table 3-28; from Table B-5 in the *Review*). The average value of a commercial caught KRFC is worth about $45 per fish to the tribal fisherman (Yurok Tribe report 2006).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 3-28. Yurok and Hoopa Valley tribal fishery harvest of spring and fall-run Chinook salmon in the Klamath and Trinity River Basin.

Year or Period	Spring-run	Fall-Run	Subsistence	Total
2004	8,700	26,000	19,400	34,700
2005	7,300	8,100	12,300	15,400
2006	4,400	10,700	15,100	15,100
2007	5,800	27,600	10,000	33,400
2008	3,400	22,900	13,800	26,300
2009	3,600	28,600	16,400	32,100
2010	2,000	30,400	16,900	32,400
Average (2004-2009)	**5,500**	**20,600**	**14,500**	**26,200**

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

4.0 ANALYSIS OF ALTERNATIVES

The alternatives considered in this EA address five issues:

1. Stock classification
2. SDC
3. OFL/ABC/ACL frameworks
4. AMs
5. *De minimis* fishing provisions

Alternatives for each of these issues will be analyzed to determine if there are significant effects on the environment, and assessed for the relative effects among the alternatives.

Most of the Alternatives considered in this EA will only affect administrative functions and not biological or socioeconomic environments. For example, the classification and SDC alternatives do not affect how many fish of a particular stock are harvested, merely how they are categorized and reported in status updates. AM alternatives largely designate existing FMP provisions, and otherwise dictate administrative responses to stock status in the unlikely event that ACL alternatives do not affect harvest when they should have. Only those alternatives that affect harvest control rules, specifically conservation objectives (based on SDC), ACLs, and *de minimis* fishing provisions, have the potential to result in allowable harvest that is different than under status quo management. This in turn has the potential to affect fish resources (e.g., numbers of fish spawning), protected resources, and socioeconomic (e.g., numbers of fish sold) environments.

4.1 Analysis of Environmental Impacts on Fish Resources

4.1.1 Effects on Target Species from Stock Classification Alternatives

Stock classification issues can be divided into three components:

1. Determining if stocks are in the fishery or not in the fishery.
2. Formation of stock complexes and indentifying indicator stocks.
3. Application of the international exception for ACLs to stocks or stock complexes managed under an international agreement.

4.1.1.1 Direct and Indirect Impacts

Stock classification is generally an administrative exercise that is descriptive in nature and does not directly impact target species. The status Quo Alternative 1 would have no significant impacts on target species; all stocks currently in the FMP are managed for MSY or an MSY proxy, ensuring the long term productivity of those stocks are maintained. Alternatives 2 and 3, and FPA 4 result in stocks no longer being in the fishery (Canadian stocks, Mid-Columbia spring and Upper Columbia River fall Chinook, and Puget Sound pink salmon). Classifying Mid-Columbia River Spring and Columbia River fall Chinook, and Fraser and Puget Sound pink salmon as ECs or omitting them from the FMP would not substantively change fishery management as these stocks are currently excepted from the FMP overfishing criteria due to low impacts in Council-area fisheries. The basis for the current treatment of these stocks is that changes to Council-area management would have negligible effect on stock status. Therefore, removing these stocks from Council management authority would have no significant impacts to these stocks. Other stocks that are currently excepted from the FMP overfishing criteria because of low impacts in Council-area fisheries could became subject to actions associated with SDC triggers for overfishing, overfished, etc. These indirect impacts to Council-area fisheries and other target stocks would be negligible since such actions would be unlikely to significantly affect Council-area fisheries; only fisheries that have substantive impacts on a stock would likely be affected by changes in stock status. Under all Alternatives, including status quo Alternative 1, these stocks would still be managed by the

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

relevant agencies currently responsible for maintaining their status; therefore, no change in impacts to target species and no significant impacts to target species would be expected under any of the Classification Alternatives.

The formation of stock complexes would not result in any changes to Council-area fishery management as the complexes being proposed reflect current management practices. Under the status quo stock classification Alternative, KRFC and SRFC currently function as indicator stocks for ocean Chinook fishery management south of Cape Falcon because of a lack of information for other stocks. Stocks in the FNMC and Mid-C Sp Chinook complexes are currently exempt from FMP overfishing criteria due to their low impacts in Council-area fisheries. The FNMC stocks are generally subject to management under the PST, and the Mid-C Sp is proposed as either an EC or, under FPA 4, for omission from the FMP. Describing these stocks as a complex would not change the manner in which these stocks were managed relative to the status quo Alternative, and no significant impacts would result from formation of stocks complexes.

Application of the international exception for ACLs would allow stocks subject to the PST to continue under that management authority. Stocks that are not proposed to have the international exception applied are currently not managed under the PST, and therefore no change in management for those stocks and no significant impacts to Council-managed stocks would result from the International Exception Alternatives, including the status quo Alternative.

Stock classification alternatives would not have direct impacts on target species. Under the status quo Alternative, all stocks are managed to meet MSY or MSY proxy conservation objectives, either through the Council process or other authorities where fisheries intercept the stocks (e.g., PSC, freshwater fisheries), and significant negative impacts are not expected. Management of the stocks and constraints on the fisheries would not change relative to status quo because the stock classification Alternatives do not propose changes to conservation objectives; stocks subject to the PST would continue to be managed as such; ESA-listed stocks would continue to have their management deferred to consultation standards; and hatchery stocks would not constrain fisheries. Revising or forming new stock complexes would not change the indicator stocks currently used to manage fisheries. Therefore, no significant impacts to target species would be expected from any of the Classification alternatives.

4.1.2 Effects on Target Species from SDC Alternatives

Categorizing stock status according to SDC is generally an administrative exercise that is descriptive in nature. Changing the criteria, therefore, will not directly affect target species; however, there may be some indirect effects associated with Council actions to SDC triggers. For example, when overfishing is identified, the Council is required to take action to end overfishing immediately. If SDC would result in more timely detection and identification of overfishing, management actions to prevent stocks from becoming overfished could be implemented sooner, increasing the probability of achieving MSY in the long-term.

4.1.2.1 Overfishing

To evaluate the effects of the overfishing SDC alternatives on target species, annual exploitation rates from 1983 to 1986-forward for SRFC, KRFC, Columbia River summer Chinook, Washington Coastal coho, and Puget Sound coho were judged against the SDC in order to retrospectively determine the relative frequency of years that each stock would have been designated as subjected to overfishing. The analysis used the best currently available estimate of F_{MSY} for each of these stocks in making this determination; if a direct estimate of F_{MSY} was unavailable, the proxy values of 0.78 for Chinook was used (see Appendix C). F_{MSY} for Puget Sound coho represent the normal exploitation rates used in the FMP conservation objectives. F_{MSY} for Washington Coastal coho were based on the PSC maximum

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

allowed exploitation rate of F=0.65, which was more conservative than the estimates obtained from stock recruitment data used in Coho FRAM, except for Quillayute fall coho, which had an F_{MSY} estimate of 0.59 (Appendix E). Status quo overfishing was assumed to be the result of triggering an overfishing concern where elimination of fishing mortality in any one of those years would have resulted in not triggering an overfishing concern. The analysis assumes that the stocks were managed to achieve conservation and management objectives in place at the time, and that exploitation rates were not adjusted to reflect how stocks might have been managed had updated estimates of F_{MSY}, alternative SDC, or other alternative management requirements been in place (e.g., ACLs, rebuilding measures).

Results: Based on the comparison of historical exploitation rates to F_{MSY}, it appears that many stocks experienced exploitation rates exceeding F_{MSY} (FPA 2 overfishing SDC) frequently prior to the mid-early 1990's. Since that time, overfishing has not been observed for the stocks analyzed (Table 4-1). The lower exploitation rates observed since the mid 1990's were largely the result of ocean fishery constraints for ESA-listed stocks, adoption of exploitation rate management for PST stocks, constraints in Canadian fisheries to address stock depression for several Canadian stocks, and management constraints on KRFC. The assessment of effects assumes that management under the overfishing SDC FPA 2 would have similar frequencies of overfishing determinations as those observed since the late-1990s (after the most recent ESA listings). Compared to the status quo Alternative, it is expected that overfishing would be determined less frequently, in fact rarely, under FPA 2 (Table 4-1). This is because the status quo Alternative depends on abundance, influenced by environmental factors, and is more likely to result in a determination of overfishing than FPA 2, which is based on F alone.

With respect to target species, FPA 2 overfishing SDC should have indirect positive effects compared with the status quo Alternative because the SDC are more objective than the status quo Alternative and criteria are assessed annually rather than only after the stock is determined to be overfished. As a result, management actions would be more responsive, and overfishing would end sooner; however, based on the results in Table 4-1 since the mid-1990's, the need for such actions would be expected only rarely.

For Washington coast coho, an additional comparison is presented to illustrate the difference in the choice of MFMT between Appendix E estimates (best available science) and F=0.65 (FPA 5, consistent with PST). For Quillayute fall coho, the Appendix E MFMT value (F=0.59) would have resulted in two additional overfishing determinations than FPA 5 MFMT (1991 and 1993). For Grays Harbor, Queets, and Hoh coho, the Appendix E MFMT values (F=0.69, 0.68, and 0.69) would have resulted in one (1993), one (1992), and two (1991, 1997) fewer overfishing determinations, respectively. However, in recent years there would have been no differences in overfishing determinations for the Washington coastal stocks, which reflect the foreseeable future.

The difference in frequency of overfishing determinations between the FPA 2 and the status quo Alternative would have positive, but negligible, impacts to target species; therefore, impacts on target species from FPA 2 overfishing SDC would not be significant.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-1. Retrospective analysis of overfishing occurrences based on status determination criteria alternatives for select stocks. Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the Alternatives.

SRFC: F_{MSY} =	0.78	Rel Freq. OF'ing
Alt 1-Status Quo: S(t,t-1,t-2)<122,000&C+S>122,000		7.4%
FPA 2: F(t) > F_{MSY}		22.2%
KRFC: F_{MSY} =	0.72	
Alt 1-Status Quo: S(t,t-1,t-2)<35,000&C+S>35,000		17.4%
Alt 1b-Status Quo: S(t,t-1,t-2)<S_{MSY}		13.0%
FPA 2: F(t) > F_{MSY}		4.0%
CRSu: S_{MSY} =	0.75	
Alt 1-Status Quo: S(t,t-1,t-2)<37,041&C+S>37,041		0.0%
FPA 2: F(t) > F_{MSY}		0.0%
Grays Harbor Coho: F_{MSY} =	0.65	
Alt 1-Status Quo: S(t,t-1,t-2)<35,400&C+S>35,400		8.0%
Alt 2: F(t) > F_{MSY}=0.69		8.7%
FPA 2: F(t) > F_{MSY}		13.0%
Queets Coho: F_{MSY} =	0.65	
Alt 1-Status Quo: S(t,t-1,t-2)<5,800&C+S>5,800		20.0%
Alt 2: F(t) > F_{MSY}=0.68		21.7%
FPA 2: F(t) > F_{MSY}		26.1%
Hoh Coho: F_{MSY} =	0.65	
Alt 1-Status Quo: S(t,t-1,t-2)<2,000&C+S>2,000		0.0%
Alt 2: F(t) > F_{MSY}=0.69		21.7%
FPA 2: F(t) > F_{MSY}		30.4%
Quillayute Fall Coho: F_{MSY} =	0.65	
Alt 1-Status Quo: S(t,t-1,t-2)<6,300&C+S>6,300		0.0%
Alt 2: F(t) > F_{MSY}=0.59		17.4%
FPA 2: F(t) > F_{MSY}=0.65		8.7%
Strait JDF coho: F_{MSY} =	0.60	
Alt 1-Status Quo: S(t,t-1,t-2)<14,800&C+S>14,800		33.3%
FPA 2: F(t) > F_{MSY}		13.0%
Skagit coho: F_{MSY} =	0.60	
Alt 1-Status Quo: S(t,t-1,t-2)<30,000&C+S>30,000		14.3%
FPA 2: F(t) > F_{MSY}		21.7%
Hood Canal coho: F_{MSY} =	0.65	
Alt 1-Status Quo: S(t,t-1,t-2)<21,500&C+S>21,500		0.0%
FPA 2: F(t) > F_{MSY}		34.8%
Stilliguamish coho: F_{MSY} =	0.50	
Alt 1-Status Quo: S(t,t-1,t-2)<17,000&C+S>17,000		9.5%
FPA 2: F(t) > F_{MSY}		43.5%
Snohomish coho: S_{MSY} =	0.60	
Alt 1-Status Quo: S(t,t-1,t-2)<70,000&C+S>70,000		9.5%
FPA 2: F(t) > F_{MSY}		34.8%
Year	1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009	

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

4.1.2.2 Overfished

To evaluate the effects of the overfished SDC alternatives on target species, annual spawning escapements from 1970-forward (STT 2011a) for six Chinook and nine coho stocks were judged against the SDC in order to retrospectively determine the relative frequency of years that each stock would have been designated as overfished. In making this determination, Alternatives 2 through 4 were based on the best currently available estimate of S_{MSY}; FPA 5 used either the best available estimate or a more conservative management objective for SMSY, as adopted by the Council, and Alternative 1 (status quo) used the current conservation objective value, or if a range, the low end of the range. The analysis assumes that the stocks were managed to achieve conservation and management objectives in place at the time, and that spawning escapements were not adjusted to reflect how stocks might have been managed had updated estimates of S_{MSY}, alternative SDC, or other alternative management requirements been in place (e.g., ACLs, rebuilding measures).

<u>Chinook</u>: the Chinook stocks assessed include:

- SRFC,
- KRFC,
- Columbia River summer,
- Hoh fall,
- Queets spring/summer, and
- Quillayute summer.

All of the Chinook stocks analyzed would be in the fishery under all classification Alternatives, and KRFC, SRFC, and Hoh fall Chinook would serve as indicator stocks for the SONC, CVF, and FNMC complexes, respectively. The three FNM Chinook stocks are not all-inclusive, but represent the range of results that could be expected from other FNMC Chinook complex stocks.

The bases of Chinook S_{MSY} used for this analysis were as follows:

- SRFC: S_{MSY} corresponding to the lower end of the current conservation objective range of 122,000-180,000, and adopted by the Council as S_{MSY}.
- KRFC: an S_{MSY} estimate of 40,700 natural area adult spawners (STT 2005).
- Columbia River summer Chinook: an S_{MSY} estimate of 12,143 (CTC 1999).
- Hoh fall and Quillayute summer Chinook: S_{MSY} estimates of 1,200 and 1,200, respectively (Cooney 1984).
- Queets spring/summer Chinook: an S_{MSY} estimate of 700 as listed in the Salmon FMP (PFMC 2007).

<u>Coho</u>: The Coho stocks assessed include:

- Grays Harbor,
- Queets,
- Hoh,
- Quillayute,
- Strait of Juan de Fuca,
- Skagit,
- Hood Canal,
- Stillaguamish, and
- Snohomish.

All of the coho stocks would be in the fishery under all classification Alternatives.

The bases of Coho S_{MSY} and S_{MSP} used for this analysis were as follows:

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- Grays Harbor: A direct estimate of S_{MSY} was not available for Grays Harbor coho, but the FMP conservation objective is based on an estimate of S_{MSP}. Therefore, S_{MSY} for Grays Harbor coho was calculated using the following relationship: $S_{MSY} = S_{MSP} \times F_{MSY}$. F_{MSY} for Grays Harbor coho was estimated at 0.69 (Appendix E), resulting in an S_{MSY} estimate of 24,436.
- Hoh: an estimate of S_{MSY} derived from the stock recruitment analysis in Appendix E. The status quo conservation alert criteria use the lower end of the range of S_{MSY} estimates identified in the current FMP (Lestelle et al. 1984).
- Queets and Quillayute: The lower end of the range of S_{MSY} estimates identified in the current FMP (Lestelle et al. 1984), and adopted by the Council as S_{MSY}.
- Puget Sound stocks: S_{MSY} estimates derived from the allowable normal exploitation rate applied to the normal/low preseason abundance breakpoint.

Results: The results of the analysis indicate that for most stocks, overfished status would have occurred periodically, and that the stocks would have remained depressed for a few years before rebuilding (Tables 4-2, 4-3, 4-4). Three periods of general stock depression were observed in the analysis: one in the early 1980's, one in the early 1990's, and one in the mid-2000's. The duration of stock depression was generally ranged from three to six years. While the pattern was not observed in all stocks, it was prevalent enough to suggest that cyclical, broad-scale changes in environmental conditions likely underlie these periods of stock depression, e.g., shifts in ocean productivity regimes or extended droughts. The analysis of effects assumes that management under the overfished SDC Alternatives would have similar frequencies and durations of overfished determinations as those observed since the late-1990s (see Section 4.2.1 of this EA).

The Alternatives based on multi-year means or consecutive years would have less frequent overfished determinations than those based on single a year for a given MSST percentage of S_{MSY}. They also would tend to start later and end no earlier than the annual Alternatives, meaning the duration of the overfished status would generally be longer for the multi-year Alternatives. Annual Alternatives also exhibited more of a tendency for short (single year) determinations to occur, as expected, due to the natural variability of salmon abundance. This feature of annual Alternatives would necessitate frequent assessments, which may not be completed before the stock rebuilds. If the cause of such frequent determinations was natural variability in population abundance, the determination would not represent a real risk to the capacity of the stock to produce MSY on a continuing basis.

In terms of the relative frequency of overfished determinations, status quo (Alternative 1) was most similar to FPA 5 and Alternative 4b (Figure 4-1). Ranking the Alternatives by the relative frequency of overfished determinations indicates that Alternative 4 had the lowest frequency, followed by Alternative 3, then Alternative 2, then FPA 5, then Alternative 1, then Alternatives 4b, 3b, and 2b with the highest frequency.

Effects on target species would reflect these ranks, with Alternative 4 having the greatest risk of negative effects to target species; Alternative 2b would have the least risk to target species; however, the difference in risk to target species between Alternatives 2b and 4 should be negligible if Alternative 4 accurately reflects abundance from which salmon stocks can recover to MSY levels without reduction in the long-term stock reproductive potential. Based on the patterns observed in Tables 4-2, 4-3, and 4-4, it appears that this is the case, since most stocks have had 3-year (or longer) mean spawning escapements less than $0.5*S_{MSY}$ and have subsequently recovered. The NS1Gs also recommend $0.5*S_{MSY}$ as an appropriate reference point for overfished SDC, particularly given the high productivity and short life-cycle of salmon. Use of the multi-year mean also helps ensure that overfished determinations represent more than natural variation in stock abundance, and thus reduces potential negative effects on the socioeconomic environments. The most appropriate metric for lognormally distributed abundance data is the geometric

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

mean, not the arithmetic mean; therefore, Alternatives 3 and 3b, and FPA 5, are better suited to assessing salmon abundance status than Alternatives 4 and 4b. The geometric mean is currently used in other aspects of salmon assessment and management, including the ongoing status reviews of all ESA-listed species being conducted by NMFS.

The determination of stock status would not have significant effects on target species or fisheries since there are no required actions associated with the overfished determination that would automatically change conservation objectives or control rules. In the event of an overfished determination, the Council will direct the STT to propose a rebuilding plan which could include temporary changes in the control rule designed to help rebuild the stock.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-2. Retrospective analysis of overfished and rebuilt (R) occurrences based on status determination criteria alternatives for select Chinook stocks. Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the alternatives. (Page 1 of 2)

SRFC: S_{MSY} =	122,000																																									Rel Freq. OF'd
Alt 1-Status Quo: S(t,t-1,t-2)<122,000																											R															5.3%
Alt 2: S(t) < 0.5*S_{MSY}																																										2.5%
Alt 2b: S(t) < 0.75*S_{MSY}																											R															10.0%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																																										0.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																																										2.6%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																																										0.0%
Alt 4b: 3-Yr Average < 0.75*S_{MSY}																																										2.6%
FPA 5 (3b): 3-Yr GeoMean < 0.75*S_{MSY}																																										**2.6%**
KRFC: S_{MSY} =	40,700																																									
Alt 1-Status QuoS(t,t-1,t-2)<35,000																		R									R												R			30.0%
Alt 1b: S(t,t-1,t-2)<S_{MSY}																		R									R												R			30.0%
Alt 2: S(t) < 0.5*S_{MSY}																		R									R					R										15.6%
Alt 2b: S(t) < 0.75*S_{MSY}																		R									R					R							R			34.4%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																											R															10.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																			R								R														R	30.0%
Alt 3c: 3-Yr GeoMean < 0.86*S_{MSY}																			R								R						R								R	40.0%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																											R															6.7%
Alt 4b: 3-Yr average < 0.75*S_{MSY}																		R									R														R	30.0%
FPA 5 (3b): 3-Yr GeoMean < 0.75*S_{MSY}																			R								R														R	**30.0%**
CRSu: S_{MSY} =	12,143																																									
Alt 1: S(t,t-1,t-2)<S_{MSY}																R																										3.4%
Alt 2: S(t) < 0.5*S_{MSY}																																										0.0%
Alt 2b: S(t) < 0.75*S_{MSY}																R											R															9.7%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																																										0.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																																										0.0%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																																										0.0%
Alt 4b: 3-Yr Average < 0.75*S_{MSY}																																										0.0%
FPA 5 (3): 3-Yr GeoMean < 0.5*S_{MSY}																																										**0.0%**
Year		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	

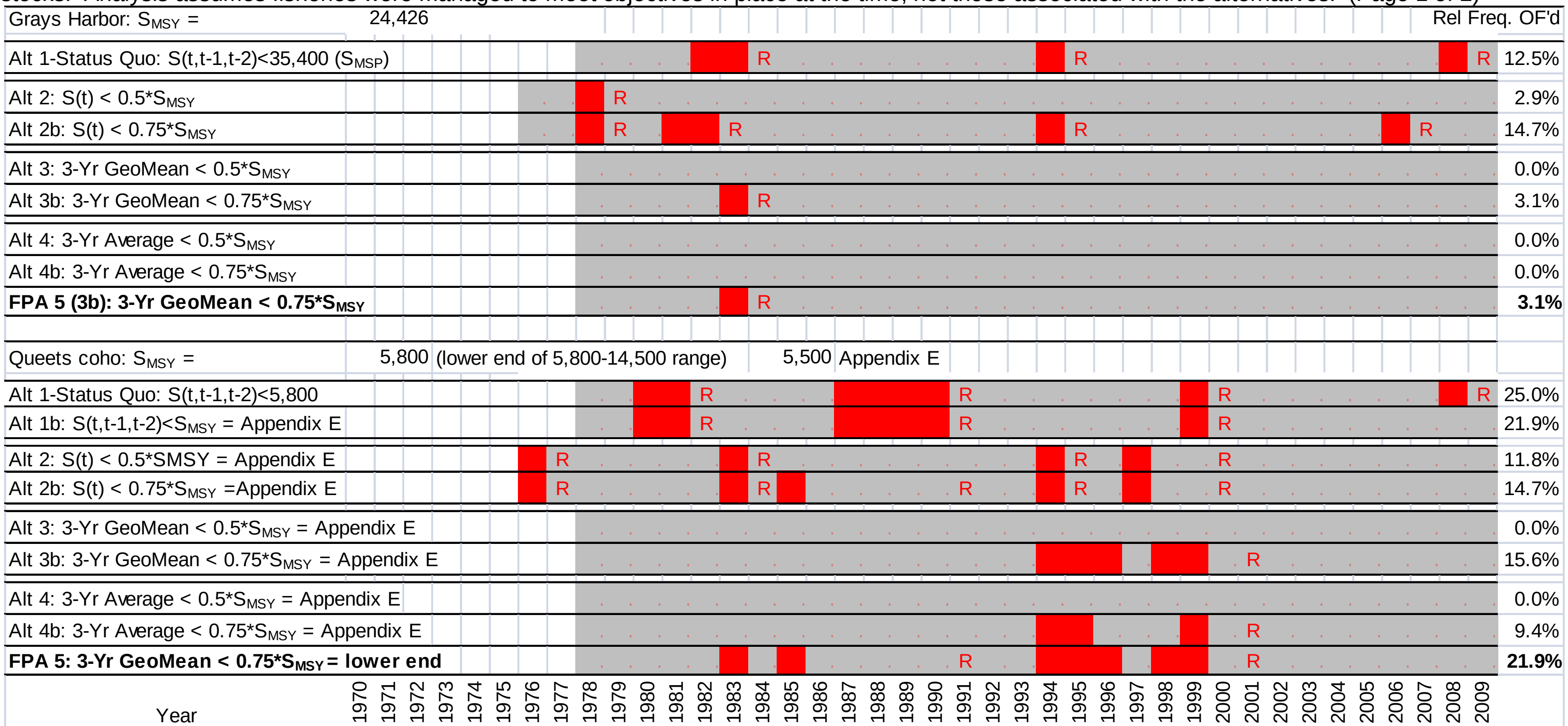
F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-2. Retrospective analysis of overfished and rebuilt (R) occurrences based on status determination criteria alternatives for select Chinook stocks. Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the alternatives. (Page 2 of 2)

Hoh Fall: S_{MSY} =	1,200																																									Rel Freq. OF'd
Alt 1: S(t,t-1,t-2)<S_{MSY}																																										0.0%
Alt 2: S(t) < 0.5*S_{MSY}																																										0.0%
Alt 2b: S(t) < 0.75*S_{MSY}																																										0.0%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																																										0.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																																										0.0%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																																										0.0%
Alt 4b: 3-Yr Average < 0.75*S_{MSY}																																										0.0%
FPA 5 (3): 3-Yr GeoMean < 0.5*S_{MSY}																																										**0.0%**
Queets Spring/Summer: S_{MSY} =	700																																									
Alt 1: S(t,t-1,t-2)<S_{MSY}																																		R								25.0%
Alt 2: S(t) < 0.5*S_{MSY}																																		R								15.2%
Alt 2b: S(t) < 0.75*S_{MSY}									R																R									R								32.4%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																																										9.4%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																																										34.4%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																																										6.3%
Alt 4b: 3-Yr Average < 0.75*S_{MSY}																																										34.4%
FPA 5 (3): 3-Yr GeoMean < 0.5*S_{MSY}																																										**9.4%**
Quillayute Summer: S_{MSY} =	1,200																																									
Alt 1: S(t,t-1,t-2)<S_{MSY}																				R																						31.3%
Alt 2: S(t) < 0.5*S_{MSY}																				R																						11.8%
Alt 2b: S(t) < 0.75*S_{MSY}																				R										R			R									35.3%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																					R																					3.1%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																					R																					28.1%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																				R																						3.1%
Alt 4b: 3-Yr Average < 0.75*S_{MSY}																				R																						28.1%
FPA 5 (3): 3-Yr GeoMean < 0.5*S_{MSY}																					R																					**3.1%**
Year		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-3. Retrospective analysis of overfished and rebuilt (R) occurrences based on status determination criteria alternatives for Washington Coastal coho stocks. Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the alternatives. (Page 1 of 2)



F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-3. Retrospective analysis of overfished and rebuilt (R) occurrences based on status determination criteria alternatives for Washington Coastal coho stocks. Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the alternatives. (Page 2 of 2)

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Hoh: S_{MSY} = 3,500 (midpoint of 2,000-5,000 range) 2,520 Appendix E																																									
Alt 1-Status Quo: S(t,t-1,t-2)<2,000																																									0.0%
Alt 1b: S(t,t-1,t-2)<S_{MSY} = Appendix E										R												R																		R	9.4%
Alt 2: S(t) < 0.5*S_{MSY} = Appendix E																										R															2.9%
Alt 2b: S(t) < 0.75*S_{MSY} =Appendix E													R													R			R									R			17.6%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY} = Appendix E																																									0.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY} = Appendix E																											R														3.1%
Alt 4: 3-Yr Average < 0.5*S_{MSY} = Appendix E																																									0.0%
Alt 4b: 3-Yr Average < 0.75*S_{MSY} = Appendix E																																									0.0%
FPA 5 (3b): 3-Yr GeoMean < 0.75*S_{MSY} = Appendix E																											R														**3.1%**
Quillayute: S_{MSY} = 6,300 (lower end of 6,300-15,800 range) 5,873 Appendix E																																									
Alt 1-Status Quo: S(t,t-1,t-2)<6,300																																									0.0%
Alt 1b: S(t,t-1,t-2)<S_{MSY} = Appendix E																																									0.0%
Alt 2: S(t) < 0.5*S_{MSY} = Appendix E															R																										2.9%
Alt 2b: S(t) < 0.75*S_{MSY} =Appendix E									R						R																										11.8%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY} = Appendix E																																									0.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY} = Appendix E																																									0.0%
Alt 4: 3-Yr Average < 0.5*S_{MSY} = Appendix E																																									0.0%
Alt 4b: 3-Yr Average < 0.75*S_{MSY} = Appendix E																																									0.0%
FPA 5: 3-Yr GeoMean < 0.75*S_{MSY} = lower end																																									**0.0%**

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-4. Retrospective analysis of overfished and rebuilt (R) occurrences based on status determination criteria alternatives for Puget Sound coho stocks. Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the alternatives. (Page 1 of 2)

Stock / Alternative	S_{MSY}	Low S_{MSY}	% of S_{MSY}	Rel Freq. OF'd
Strait JDF: S_{MSY} =	10,978	7,007 (low S_{MSY} [a/])	64% S_{MSY}	
Alt 1: $S(t,t-1,t-2)<S_{MSY}$				25.9%
Alt 2: $S(t) < 0.5*S_{MSY}$				10.3%
Alt 2b: $S(t) < 0.75*S_{MSY}$				24.1%
Alt 3: 3-Yr GeoMean < $0.5*S_{MSY}$				0.0%
Alt 3b: 3-Yr GeoMean < $0.75*S_{MSY}$				22.2%
Alt 4: 3-Yr Average < $0.5*S_{MSY}$				0.0%
Alt 4b: 3-Yr Average < $0.75*S_{MSY}$				18.5%
FPA 5: 3-Yr GeoMean < Low S_{MSY}				**3.7%**
Skagit: S_{MSY} =	25,000	14,857 (low S_{MSY} [a/])	59% S_{MSY}	
Alt 1: $S(t,t-1,t-2)<S_{MSY}$				18.5%
Alt 2: $S(t) < 0.5*S_{MSY}$				17.2%
Alt 2b: $S(t) < 0.75*S_{MSY}$				37.9%
Alt 3: 3-Yr GeoMean < $0.5*S_{MSY}$				7.4%
Alt 3b: 3-Yr GeoMean < $0.75*S_{MSY}$				33.3%
Alt 4: 3-Yr Average < $0.5*S_{MSY}$				7.4%
Alt 4b: 3-Yr Average < $0.75*S_{MSY}$				29.6%
FPA 5: 3-Yr GeoMean < Low S_{MSY}				**22.2%**
Hood Canal: S_{MSY} =	14,350	10,750 (low S_{MSY} [a/])	75% S_{MSY}	
Alt 1: $S(t,t-1,t-2)<S_{MSY}$				0.0%
Alt 2: $S(t) < 0.5*S_{MSY}$				3.4%
Alt 2b: $S(t) < 0.75*S_{MSY}$				3.4%
Alt 3: 3-Yr GeoMean < $0.5*S_{MSY}$				0.0%
Alt 3b: 3-Yr GeoMean < $0.75*S_{MSY}$				3.7%
Alt 4: 3-Yr Average < $0.5*S_{MSY}$				0.0%
Alt 4b: 3-Yr Average < $0.75*S_{MSY}$				0.0%
FPA 5 (3b): 3-Yr GeoMean < $0.75*S_{MSY}$				**3.7%**

Year: 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-4. Retrospective analysis of overfished occurrances based on overfished status determination criteria alternatives for Puget Sound coho stocks. Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the alternatives. (Page 2 of 2)

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Stilliguamish: S_{MSY} =	10,000				6,100 (low S_{MSY} [a/])					61% S_{MSY}																															
Alt 1: S(t,t-1,t-2)<S_{MSY}																																									0.0%
Alt 2: S(t) < 0.5*S_{MSY}																																									0.0%
Alt 2b: S(t) < 0.75*S_{MSY}																				■	R	■	R							■	R										8.1%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																																									0.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																																									0.0%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																																									0.0%
Alt 4b: 3-Yr Average < 0.75*S_{MSY}																																									0.0%
FPA 5: 3-Yr GeoMean < Low S_{MSY}																																									**0.0%**
Snohomish: S_{MSY} =	50,000				31,000 (low S_{MSY} [a/])					62% S_{MSY}																															
Alt 1: S(t,t-1,t-2)<S_{MSY}																																									0.0%
Alt 2: S(t) < 0.5*S_{MSY}																																									0.0%
Alt 2b: S(t) < 0.75*S_{MSY}												■	R																										■	R	5.4%
Alt 3: 3-Yr GeoMean < 0.5*S_{MSY}																																									0.0%
Alt 3b: 3-Yr GeoMean < 0.75*S_{MSY}																																									0.0%
Alt 4: 3-Yr Average < 0.5*S_{MSY}																																									0.0%
Alt 4b: 3-Yr Average < 0.75*S_{MSY}																																									0.0%
FPA 5: 3-Yr GeoMean < Low S_{MSY}																																									**0.0%**

a/ Low MSY refers to the spawning escapement associated with the low/critical abundance break-point multiplied by the low exploitation rate as represneted in the FMP conservation objective matrix of allowable exploitation rates (i.e., Comprehensive Coho Agreement). This represents S_{MSY} at low stock specific productivity levels.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

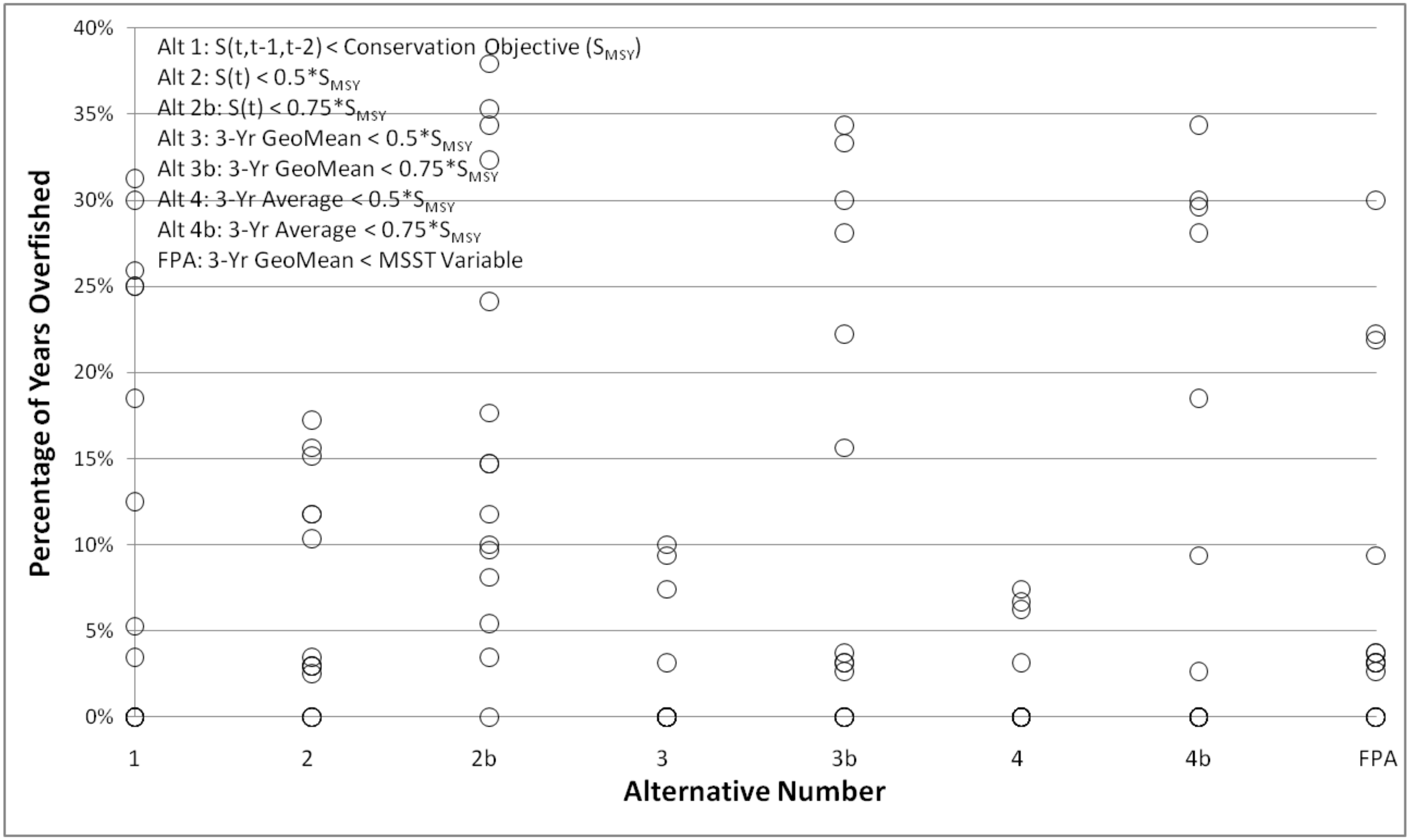


Figure 4-1. Relative frequency of overfished occurrences for status determination criteria alternatives for various Chinook and coho stocks presented in Tables 4-2, 4-3, and 4-4.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

4.1.2.3 Approaching Overfished

The analysis of environmental effects on target species from the approaching overfished SDC alternatives would follow the same pattern as the overfished SDC alternatives in terms of expected frequency and relative differences between alternatives. Similarly, there would be no significant effects on target species or fisheries since there are no required actions associated with the approaching overfished determination that would change conservation objectives or control rules.

4.1.2.4 Rebuilt

To evaluate the effects of the rebuilt SDC alternatives on target species, annual spawning escapements from 1986-forward (STT 2011a) for six Chinook and nine coho stocks were judged against the SDC in order to retrospectively determine the year in which rebuilding would have been achieved given the corresponding overfished SDC. In making this determination, the same assumptions made under the Overfished analysis were used.

Results: Rebuilt status would be achieved at about the same time for all single-year SDC alternatives, usually the year following the overfished status determination, and almost always within three years (Tables 4-2, 4-3, and 4-4). The results were similar for multi-year SDC alternatives, although the rebuilt status was generally achieved two years after the Overfished status ended. These rapid rebuilding times are indicative of the relatively high productivity and resilience of salmon populations and because from one year to the next, spawning returns are largely independent of each other, relying on separate broods.

The status quo Alternative showed rebuilding occurring the year after the overfished status ended, as expected, since there was no difference between the overfished and rebuilt reference points (Tables 4-2, 4-3, and 4-4). The other single-year SDC alternatives (2, and 2b) would usually result in rebuilt status the year after the overfished status ended, but not always. Rebuilt alternatives relying on achieving a multi-year mean (3, 3b, 4, 4b, and FPA 5) would most often be rebuilt two years after the overfished status ended, but occasionally up to four or five years. The longer rebuilding period compared to single year SDC Alternatives would be expected because the criteria was intended to require multiple broods contribute to the rebuilt status. However, there was evidence that one strong return year could compel rebuilt status across all Alternatives. This was exemplified by the 1995 return year of KRFC, which would have resulted in rebuilt status for all Alternatives, regardless of when the overfished status ended.

Impacts to target species from the multi-year SDC Alternatives could have a beneficial effect compared to single year Alternatives if a rebuilding plan was adopted that changed the conservation objective or control rule because a longer rebuilding period could increase the genetic diversity of the population by ensuring that more than one strong brood contributes to the rebuilt population. However, there are no requirements to change conservation objectives or control rules during a rebuilding period, and to assume that action would be speculative; therefore, no significant effects from the rebuilt criteria Alternatives would be expected absent such a rebuilding plan.

4.1.3 Effects on Target Species from ACL Framework Alternatives

The ACL framework alternatives are based on establishing limits on F (F_{ABC}/F_{ACL}), as a percentage of F_{MSY}. Therefore, an analysis similar to that presented in Section 4.1.2.1 for overfishing SDC was used to assess impacts to the environment.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

ACL Alternatives only affect target stocks for which ACL provisions of the MSA are applicable (Section 2.3). For the Salmon FMP these currently are SRFC and KRFC, indicator stocks for the CVF and SONC Chinook complexes, respectively.

4.1.3.1 Direct and Indirect Effects

To evaluate the effects of the ACL alternatives on target species, annual exploitation rates for SRFC and KRFC were judged against the ACL in order to retrospectively determine the relative frequency of years that each stock would have exceeded the ACL. The analysis used the best currently available estimate of F_{MSY} for each of these stocks in making this determination; for SRFC a direct estimate of F_{MSY} was unavailable, and the proxy value of 0.78 for Chinook was used (Appendix C). The analysis assumes that the stocks were managed to achieve conservation and management objectives in place at the time, and that exploitation rates were not adjusted to reflect how stocks might have been managed had updated estimates of F_{MSY}, alternative SDC, or other alternative management requirements been in place (e.g., rebuilding measures).

Results: Based on the comparison of historical catch to C_{ACL} (Alternative 2), it appears that SRFC experienced excessive exploitation rates frequently prior to the mid-early 1990's. Since that time, catch exceeding C_{ACL} was observed only once, in 2004 (Table 4-5). The lower catch rates observed since the mid 1990's are largely the result of ocean fishery constraints for ESA-listed stocks and management constraints on KRFC. Catch exceeding C_{ACL} for KRFC was observed only once, in 1990.

Assuming future frequency of exceeding ACLs would be similar to those since the mid-1990s in the retrospective analysis (Table 4-5), the impacts to salmon populations compared to status quo would be essentially the same as overfishing SDC FPA 2 (Section 4.2.1 of this EA), which was determined to not be significant. The difference between the overfishing SDC FPA 2 and the ACL Alternatives illustrates the effect of including the uncertainty tiers in the ABC control rule. There is no detectable difference for KRFC, and there would be a slightly greater chance of constraining harvest of SRFC under the ACL alternatives.

The analysis for S_{ACL} (FPA 3 and Alternative 3b) is parallel to that of C_{ACL}. The S-based alternative would require a full run-reconstruction analysis to estimate annual exploitation rates, which would include estimates of S and C; therefore, there would be no advantage of one alternative over the other with respect to assessing compliance with the ACL. The results of the analysis for S_{ACL} for the FPA 3 and Alternative 3b are identical relative to the probability of failing to achieve C_{ACL}, and no significant impacts would be expected (Table 4-5).

Alternatives 2, and 3b, and FPA 3 for ACLs could have direct positive effects compared to the status quo Alternative because it would limit exploitation rates on SRFC to something (10 percent) less than F_{MSY}. Compared to the status quo Alternative, application of any of the ACL alternatives would reduce the risk of overfishing by limiting fishing so that escapement levels that account for scientific uncertainty with respect to overfishing rates would be targeted. However, because the expected frequency limiting fisheries to comply with the ACL is extremely low based on historical fishing levels, any long-term impacts to the stocks would not be significant.

For this analysis, comparison to the status quo Alternative assumes no action in the existing SDC framework (i.e., Alternative 1 SDC, status quo). As a result of this assumption, the analysis of effects from implementing an ACL framework differs from the analysis of overfishing SDC Alternative 2 only by a matter of degree because both actions propose to use exploitation rates to limit impacts to stocks, one at F_{MSY} and one incorporating into the determination of ACL a buffered level of F_{MSY} (F_{ABC}).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Additionally, the ACL control rules proposed for KRFC are nearly identical to the current F limit in the FMP conservation objective. Assuming the more conservative management framework is maintained, there would be small effects to target species associated with the proposed ACL Alternatives for KRFC.

Table 4-5. Retrospective analysis of ACL compliance for C- and S-based alternatives for SRFC and KRFC (indicator stocks for CVF and SONC Chinook complexes, respectively). Analysis assumes fisheries were managed to meet objectives in place at the time, not those associated with the alternatives.

		Rel Freq. > ACL
SRFC: F_{ABC} =	0.70	
Alt 1-Status Quo: S(t,t-1,t-2)<122,000&C+S>122,000		8.3%
Alt 2, 3b, and FPA 3: C(t) > C_{ACL}; S(t) < S_{ACL}		51.9%
KRFC: F_{ABC} =	0.68	
Alt 1-Status Quo: S(t,t-1,t-2)<35,000&C+S>35,000		0.0%
Alt 1b-Status Quo: S(t,t-1,t-2)<S_{MSY}		0.0%
Alt 2, 3b, and FPA 3: C(t) > C_{ACL}; S(t) < S_{ACL}		4.0%
Year	1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009	

4.1.4 Effects on Target Species from Accountability Measures

Most of the AMs considered are administrative in nature and do not directly impact target species. For example, AM alternatives, if triggered, require reevaluation of the ACL framework without requiring any actions that would change fishery impacts on salmon populations. Some AMs such as in-season action authority facilitate administration of fishery regulations, while others require such things as notification of status, development of assessments. One currently required action in the FMP that could be classified as an AM requires closing Council-area fisheries if a stock is projected to not meet its conservation objective, triggering an overfishing concern.

Status Quo Alternative 1 would retain the conservation alert action for stocks not excepted from the provision (e.g., KRFC *de minimis* fishing provision). Based on the current salmon FMP, the conservation alert action would be required only for SRFC. The conservation alert action directly affects salmon populations south of Cape Falcon by substantively reducing harvest rates in ocean fisheries in some years. These effects would be a benefit to the target population (SRFC). The effects to other stocks would depend on their status in the year of the conservation alert. If other targets stocks are also depressed, they may benefit from the protections provided through the conservation alert. If stocks are relatively healthy and expected to exceed their S_{MSY} escapement levels, the protections would provide negligible benefits to the target stocks, but could allow for higher harvest rates in other fisheries.

Alternative 2 and FPA 3 would remove the required action under a conservation alert, and therefore, harvest of SRFC (and other stocks in a mixed-stock ocean fishery) could occur when SRFC are projected to fall short of their spawning escapement conservation objective. However, based on *de minimis* fishing alternatives (Sections 2.5 and 4.1.5 of this EA), by definition, any fishing impacts occurring at stock abundance that would trigger a conservation alert would have no effect on long-term productivity of the stock. Therefore, effects on target species under AM Alternative 2 and FPA 3 are not expected to be significant. There would be no difference in the effects on target species between Alternative 2 and FPA 3.

4.1.5 Effects on Target Species from *De minimis* Fishing Alternatives

De minimis fishing provisions are intended to allow harvest at low stock abundance in exchange for reduced future production; however, by definition, *de minimis* means lacking significance or importance.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Therefore, the effects on target species from the alternatives should not be significant. Any harvest strategy that reduces abundance to less than S_{MSY} will, nonetheless, increase risks of negative population effects. Because SRFC and KRFC are indicator stocks for the CVF and SONC complexes, the risks associated with those stocks could potentially affect risk to the other component stocks within the complex. The potential negative effects were analyzed as follows:

- Risk of overfishing: A quantitative risk assessment was not available, so risk from the alternative *de minimis* fishing alternatives will be ranked qualitatively.
- Risk of becoming overfished: The initial criterion will be a probability greater than 50 percent of falling below MSST for any given abundance projection. Alternatives will be ranked qualitatively.
- Risk of low abundance to non-indicator stocks within complexes. Alternatives will be ranked qualitatively.

4.1.5.1 Direct Effects: Risk of Overfishing

The risk of overfishing when stock abundance is at levels that would trigger *de minimis* fishing provisions is low for all the Alternatives, including the status quo Alternative, because the allowable exploitation rates are much lower than $F_{MSY.}$ There would be slight but negligible differences among the Alternatives.

Alternatives 1 (Status Quo), 2b, 3b, and 5 for KRFC implement a harvest control rule with a lower spawning escapement objective (35,000 natural area adult spawners) compared to Alternatives 2, 3, 4, and FPA 6 (40,700; S_{MSY}). The higher escapement objective increases the interval between the conservation objective control rule and MFMT at moderate abundance levels and at higher abundance levels reduces the range of stock abundance subject to the ACL (F_{ABC} limit) (Figure 2-3). This decreases the probability that variation between projected and actual exploitation rates will result in F exceeding MFMT. Therefore, the risk of overfishing for KRFC would decrease under Alternatives 2, 3, 4, and FPA 6 relative to Status Quo Alternative 1 (and 2b, 3b, and 5); however, based on historical and expected exploitation rates, the likelihood of overfishing under Status Quo Alternative 1 is very low (see Section 4.1.2.1 above). Therefore, no significant effects on target species are expected from implementing any of the *de minimis* fishing Alternatives relative to the risks from overfishing.

4.1.5.2 Direct Effects: Risk of Becoming Overfished

The risk of negative impacts among the Alternatives increases as the harvest thresholds become lower. Thus, in general Alternative 3 has greater risk with a lower threshold at MSST than Alternative 2 with a threshold at the midpoint between S_{MSY} and MSST. Alternative 4 would have still greater risk, and like Alternative 5 and FPA 6, allow exploitation at stock sizes less than MSST, which further increases the risk to long-term stock productivity.

Status Quo Alternative 1: The risk of becoming overfished is variable among stocks with different *de minimis* fishery provisions. Allowable *de minimis* exploitation rates specified in this alternative do not result in the expected long-term stock abundance falling below MSST more than 50 percent of the time for either SRFC or KRFC, but for KRFC would, at abundances levels near MSST, allow fishing mortality to reduce abundance below MSST more than 50 percent of the time. For KRFC, the risk of becoming overfished under this Alternative is the greatest among the Alternatives. Risk of becoming overfished is lowest for SRFC since the allowable exploitation rate is zero at abundance levels less than $S_{MSY.}$

Alternative 2: Allowable exploitation rates are zero at abundance levels greater than the MSST. *De minimis* fishing, as described for Alternative 2, would result in a spawner abundance being higher than the MSST more than 50 percent of the time, assuming unbiased assessments and abundance greater than the

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

MSST in the absence of fishing. The risk of becoming overfished ranks second lowest for SRFC and lowest for KRFC among the Alternatives.

Alternative 2b: Lowering the annual spawning escapement objective for KRFC from 40,700 to 35,000 natural area adult spawners reduces the interval between the annual management objective and MSST. This increases the probability that variation between projected and actual spawning escapement will result in S, or a multi-year mean of S, falling below MSST and the stock being declared overfished. The risk of becoming overfished would increase for KRFC relative to Alternative 2.

Alternative 3: At low stock abundance (i.e., at abundance levels resulting in exploitation rates in the range of $0 < F < 0.25$), the allowable exploitation rate is specified at a level resulting in an expected spawner abundance greater than or equal to the MSST. For years in which abundance is low, and fishery regulations result in an expected spawner escapement equal to the MSST, the realized spawner escapement would be expected to be at the MSST with a probability of 50 percent, assuming assessments are unbiased and abundance is greater than the MSST in the absence of fishing. The risk of becoming overfished ranks third lowest for SRFC and second lowest for KRFC among the Alternatives.

Alternative 3b: Same comments as Alternative 2b; the risk of becoming overfished would increase for KRFC relative to Alternative 3.

Alternative 4: At abundance levels resulting in exploitation rates in the range of $0 < F < 0.25$, the allowable exploitation rate is specified at a level resulting in an expected spawner escapement greater than or equal to 0.5*MSST. For years in which abundance is low, and fisheries regulations result in an expected spawner abundance between MSST and 0.5*MSST, the realized spawner abundance would be expected to be below the MSST with a probability greater than 50 percent, assuming assessments are unbiased. The risk of becoming overfished ranks fourth lowest for SRFC and third lowest for KRFC among the Alternatives.

Alternative 5: At stock abundance where the allowable *de minimis* rate is $F \leq 0.25$, the allowable exploitation rate is specified at a level resulting in an expected spawner abundance greater than MSST. At lower abundance levels where $F < 0.25$, and fishery regulations result in an expected spawner abundance less than or equal to the MSST, the expected spawner abundance could be below the MSST with a probability of 50 percent, assuming assessments are unbiased and abundance is greater than the MSST in the absence of fishing. The risk of becoming overfished ranks highest for SRFC and KRFC among the Alternatives.

Final Preferred Alternative: At abundance levels resulting in exploitation rates in the range of $10 < F < 0.25$, the allowable exploitation rate results in an expected spawner escapement greater than or equal to 0.45*MSST. The risk of becoming overfished ranks fifth lowest for SRFC and fourth lowest for KRFC among the Alternatives.

Alternatives that allow exploitation at *de minimis* rates ($F \leq 0.25$) would have no significant direct effects on the target stocks. In addition to the analysis in this EA, this conclusion is supported by the analysis in the EA for Amendment 15 (PFMC and NMFS 2007), which is incorporated by reference into this EA.

4.1.5.3 Indirect Effects on CVF Complex Stocks

De minimis fishing Alternatives 1 (status quo), 2, 3, 4, 5, and FPA 6 for SRFC depicted in Figure 4-2a and 4-2b are based on Council adopted values for SMSY = 122,000 and MSST = 0.75*S_{MSY}. Alternatives 2, 3, 4, 5, and FPA 6 allow for some level of fishing when abundance is lower than $S_{MSY.}$ Alternative 2

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

would allow *de minimis* fishing down to spawner abundance levels observed in prior years for SRFC. Alternative 3 would allow *de minimis* fisheries resulting in an expected spawner level lower than all observed escapement estimates for SRFC, with the exception of 2009. Only Alternatives 4, 5, and FPA 6 would allow *de minimis* fishing at spawner abundance levels not yet observed for SRFC.

The productivity of the SRFC stock is likely sufficient for some level of *de minimis* fisheries. While a SRFC-specific spawner-recruit analysis has not been performed, estimates of the Ricker α parameter (a measure of stock productivity in terms of recruits per spawner at low spawner abundance) for other Chinook stocks suggest high productivity at low stock sizes (Appendix C). Furthermore, the *de minimis* fishing rate of 0.25, developed for KRFC in Amendment 15, is likely to be appropriate for SRFC. The estimate of F_{MSY} for KRFC of 0.72 is lower than the proxy F_{MSY} level of 0.78 used for SRFC, which suggests similar levels of productivity at low stock sizes for these two stocks.

Available evidence suggests that SRFC are heavily subsidized by hatchery production (Barnett-Johnson et al. 2007). Hatchery stocks can be highly productive and are generally able to support very high exploitation rates. A key concern for this stock is whether *de minimis* fisheries would allow for adequate escapement to meet hatchery egg take goals. The minimum aggregate number of hatchery spawners necessary to meet egg take goals at the three Basin hatcheries is estimated to be 22,000 adults (PFMC 2011d). Using the 2006-2010 average proportion of adult SRFC escapement to hatcheries (mean ratio of hatchery SRFC escapement to total SRFC escapement = 0.31), and the hatchery escapement goal of 22,000, a total SRFC escapement of approximately 71,000 adults would be needed to achieve Basin egg take goals. Only Alternatives 1 and 2 specify an exploitation rate of zero at spawner levels greater than 71,000 (assuming S_{MSY} = 122,000 and MSST = $0.5*S_{MSY}$). However, it should be noted that in 2009, when SRFC escapement was the lowest on record, and hatchery escapement was approximately 17,500 adults, egg take goals were met at each of the Basin hatcheries (PFMC 2011a).

Concerns also exist over other Central Valley Chinook stocks with spawner abundance that co-varies with SRFC. In particular, San Joaquin River fall Chinook (SJFC) have consistently exhibited spawner abundances of 10 percent or less than SRFC over the past 20 years (mean ratio of SJFC to SRFC = 0.04 between 1990 and 2009; PFMC 2011a). If SRFC spawner levels are allowed to be fished to low levels as a result of *de minimis* fisheries, the abundance of San Joaquin fall Chinook could be reduced to extremely low levels. For example, Alternative 4 and FPA 6 (and potentially Alternative 5) *de minimis* provisions allow fishing down to a SRFC spawner abundance level of 30,500, which would result in an expected SJFC abundance of $30{,}500 \times 0.04 = 1{,}220$ spawners, given the average ratio of SJFC to SRFC over the last 20 years. While this is a low abundance of SJFC spawners, escapement levels below 1,220 have been observed in previous years, and egg take have been supplemented through transfer from other Central Valley hatchery facilities.

The indirect effects on hatchery egg take from the *de minimis* fishing Alternatives are not significant because of the ability to mitigate shortfalls through egg transfers from other facilities.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

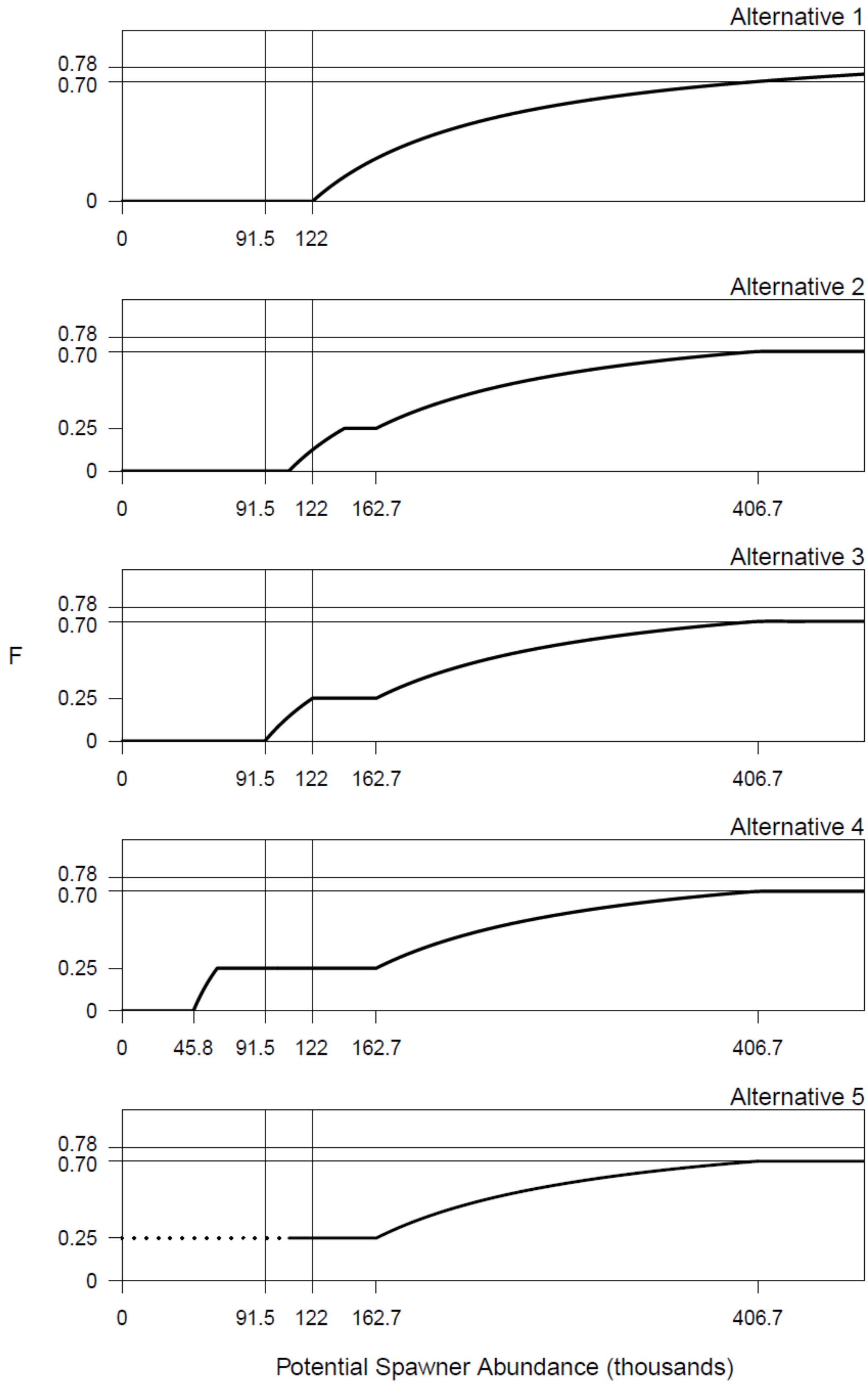


Figure 4-2a. *De minimis* fishing Alternatives 1-5 for Sacramento River fall Chinook.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

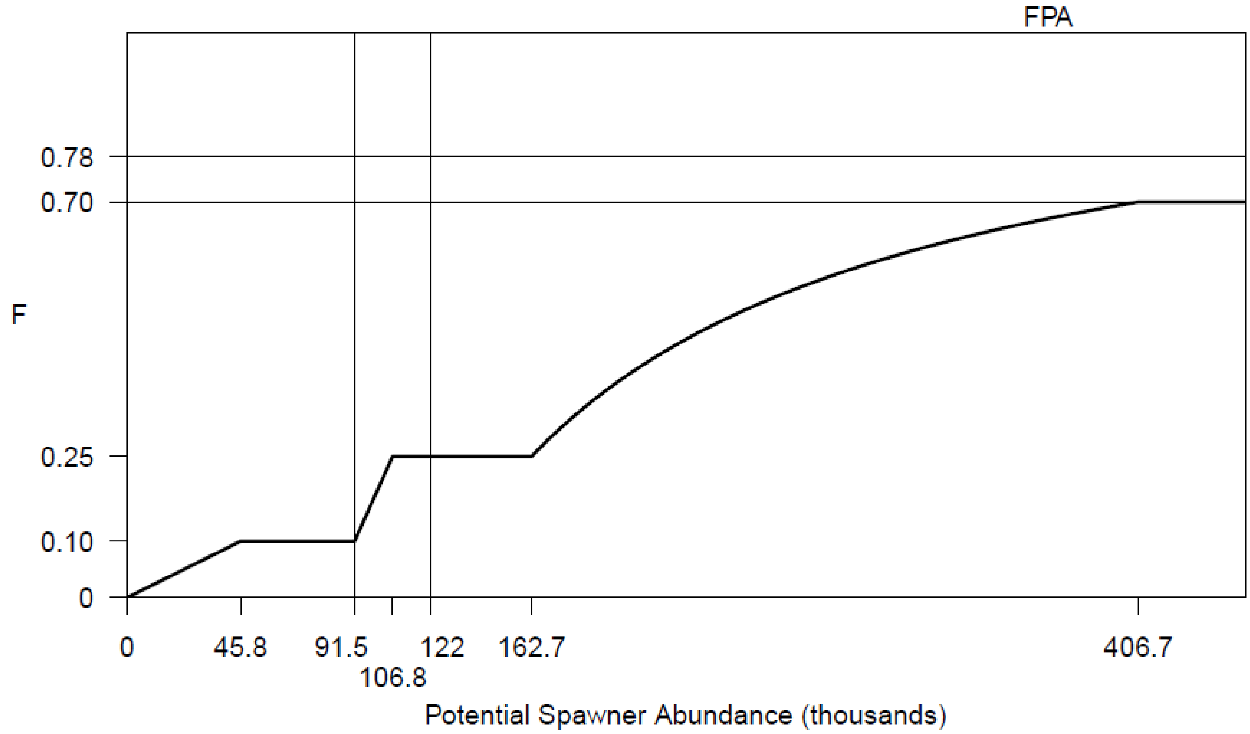


Figure 4-2b. *De minimis* fishing Final Preferred Alternative for Sacramento River fall Chinook

4.1.5.4 Indirect Effects on SONC Complex Stocks

Amendment 15 to the salmon FMP established *de minimis* fishing provisions for KRFC (FR 73-9960). The top panel of Figure 4-3a displays the current KRFC F-based control rule including the Amendment 15 *de minimis* fishing provisions (Status Quo Alternative 1). For abundance less than 30,000, the allowable exploitation rate of 0.25 is denoted by a dotted line. The dotted line in this figure is meant to portray the exploitation rate as a maximum rate, with an expectation that rates would likely be lower. Amendment 15 states that if the projected natural-area escapement associated with a 10 percent age-4 ocean exploitation rate (0.25 total exploitation rate, approximately) is less than 22,000, the Council should further reduce the allowable exploitation rate. NMFS (2007)interprets this as requiring the exploitation rate to decline from 0.25 as abundance declines below approximately 30,000. The exact nature of how F should be reduced as abundance decreases below 30,000 is not articulated.

Alternatives 2, 3, 4, 5, and FPA 6, displayed graphically in Figures 4-3a, 4-3b, and 4-3c, share many of the attributes of the Status Quo Alternative 1 F-based control rule with some exceptions. First, for the status quo control rule, the exploitation rate is capped at a maximum level of 0.67. For Alternatives 2, 3, 4, 5 and FPA 6 the maximum allowable exploitation rate is capped at the F_{ABC} level of 0.68. Second, for exploitation rates between the maximum rate and the 0.25 *de minimis* rate, the status quo Alternative 1 and Alternative 5 (and 2b and 3b) specify an exploitation rate that would result in 35,000 natural-area adult spawners. For Alternatives 2, 3, 4, and FPA 6 exploitation rates in this range are specified to result in S_{MSY} = 40,700 natural area adult spawners. Finally, Alternatives 1 and 5 do not specify how exploitation rates will decrease as abundance declines. Alternatives 2, 2b, 3,3b, 4 and FPA 6 prescribe target exploitation rates as a function of potential spawner abundance, as described in Section 2.5.1.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

In Amendment 15, a focal concern was the risk level associated with KRFC substocks crossing abundance thresholds considered crucial for genetic integrity. Analysis in the Amendment 15 EA identified a natural area adult spawner abundance of 22,000 as a benchmark that would help provide assurance that the long-term productivity of KRFC would not be jeopardized. In part this benchmark was developed based on the aggregate number of KRFC spawners necessary to reduce the probability that spawning abundance in the Salmon, Scott, and Shasta Rivers would not drop below the genetic threshold of 720 adults in each tributary. The analysis of *de minimis* fishery alternatives from Amendment 15 (PFMC and NMFS 2007; incorporated by reference) included a range of alternatives that encompasses the range of alternatives considered in this EA, and found no significant impacts to Klamath subbasin stocks.

Alternatives 2 and 2b specify an exploitation rate of zero at a spawner level greater than 22,000. Alternatives 3 and 3b specify that exploitation rate will be zero at a level slightly lower than 22,000 spawners. Alternative 4 specifies $F > 0$ for abundance levels greater than approximately 10,000. Alternatives 1, 5, and FPA 6 do not specify a zero exploitation rate spawner level. Under low abundance conditions, Alternatives 1, 4, 5, and FPA 6 allow fishing that could reduce spawner abundance to levels never before observed for KRFC, and well below escapement levels deemed necessary for the genetic integrity of key substocks. FPA 6 mitigates this effect by providing a defined structure for the maximum allowed exploitation rate below MSST (less then $F=0.10$) and including language for implementing *de minimis* fisheries that weighs year specific circumstances against longer-term risks. Allowable *de minimis* exploitation rates at levels below MSST are intended to provide incidental impacts, such as hook and release mortality, fall fishing impacts already incurred, minimal tribal needs, etc. The indirect effects from Alternatives 1, 4, and 5 on Klamath Basin Chinook subpopulations could be significant. The indirect effects from Alternatives 2, 2b, 3, 3b, and FPA 6 (because of mitigating factors) are unlikely to be significant.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

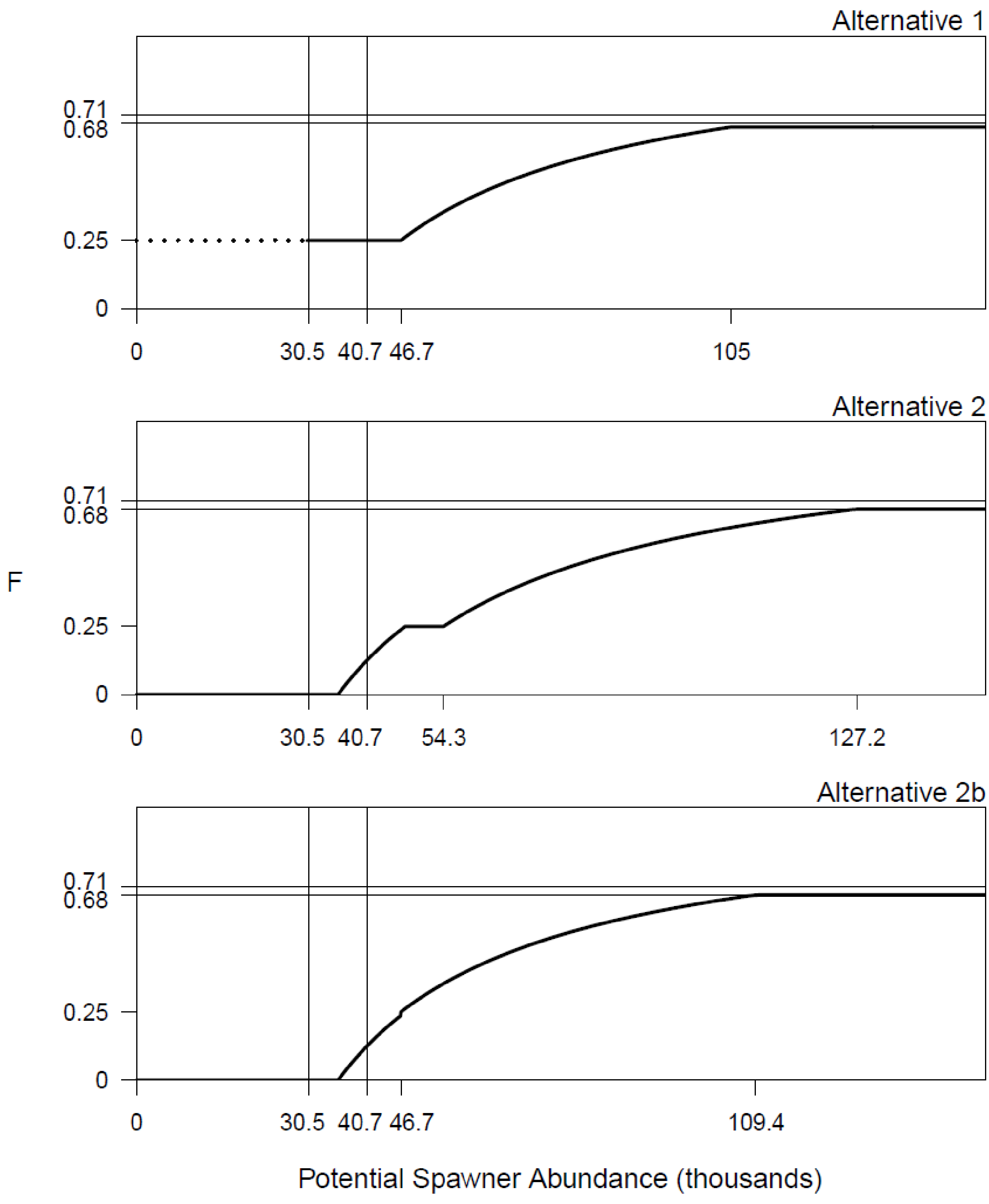
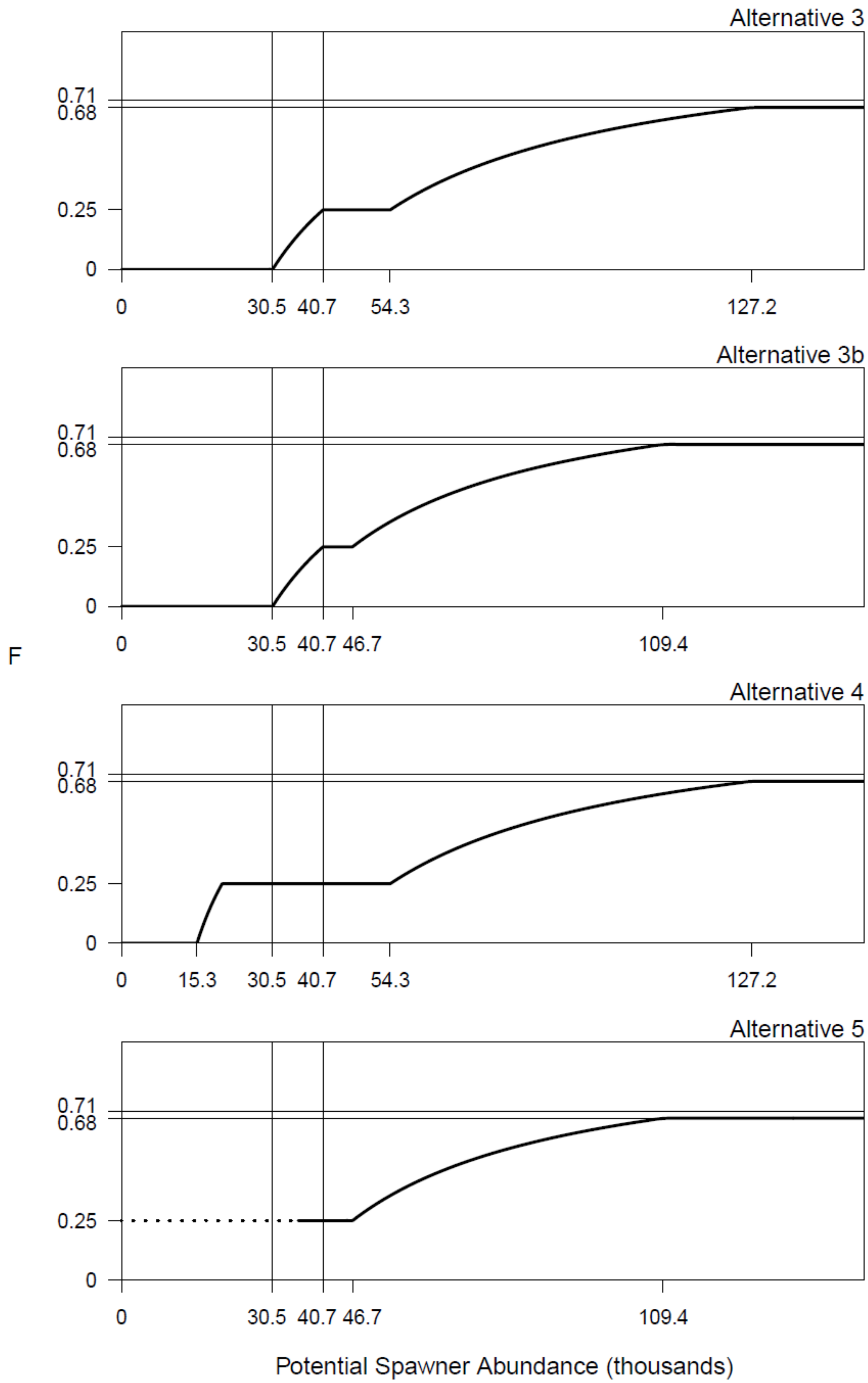


Figure 4-3a. *De minimis* fishing Alternatives 1 (status quo), 2 and 2b for Klamath River fall Chinook.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria



F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Figure 4-3b. *De minimis* fishing Alternatives3, 3b, 4, and 5 for Klamath River fall Chinook.

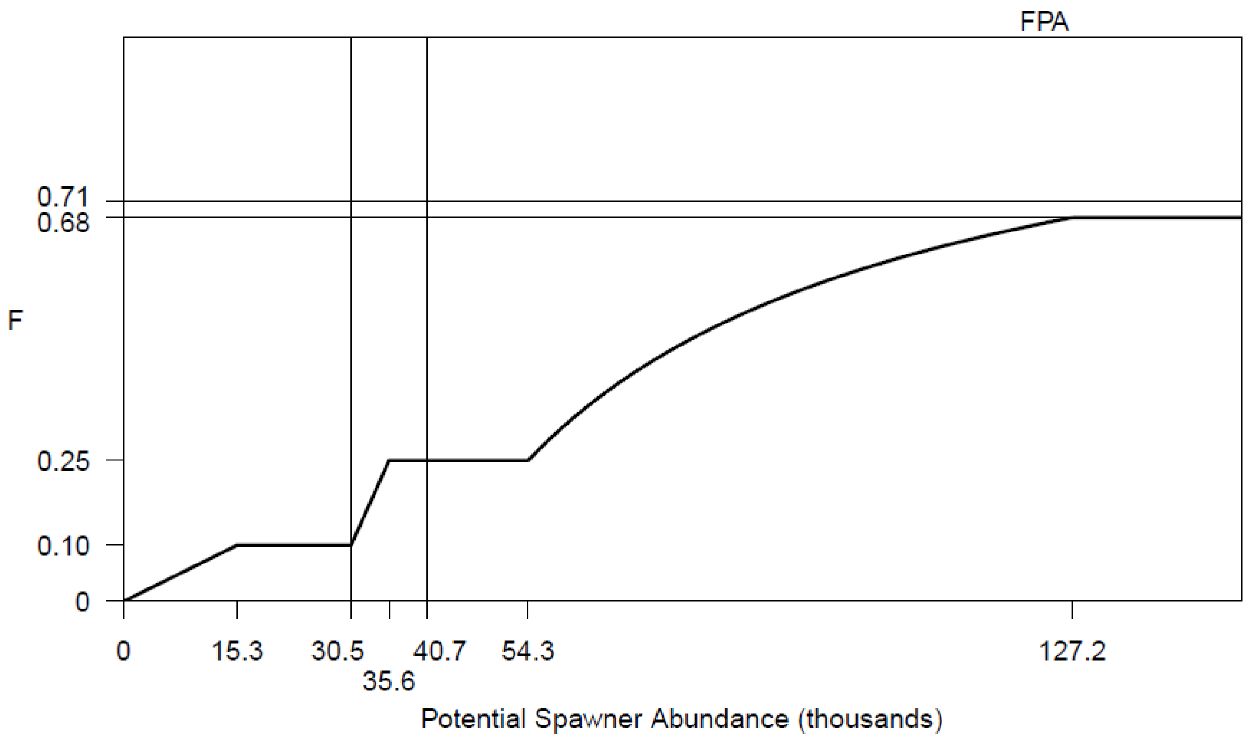


Figure 4-3c. *De minimis* fishing Final Preferred Alternative for Klamath River fall Chinook.

4.1.6 Effects on Non-Target Species

The current implementation of the status quo salmon management framework was found to have no significant impact on non-target fish species (PFMC 2011c). The Alternatives considered in this EA are not expected to result in substantial changes to ocean salmon fisheries 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 would change. Therefore, the Alternatives considered in this EA, including the FPAs, are not expected to have significant impacts, or significantly different impacts from the status quo alternative, on non-target species such as groundfish, Pacific halibut, highly migratory species, and coastal pelagic species, and there are no discernable differences between the effects of the Alternatives on these resources.

4.1.7 Effects on ESA-listed Chinook and Coho Stocks

The current implementation of the status quo salmon management framework was found to have no significant impact on ESA-listed salmon stocks (PFMC 2011c). Chinook and coho salmon stocks listed under the ESA that are currently in the fishery would remain in the fishery under all Alternatives considered in this EA. Furthermore, all management of ESA-listed stocks would continue to be deferred to ESA consultation standards or recovery plans, and new measures such as ACLs are not proposed. Therefore, the Alternatives considered in this EA, including the FPAs, are not expected to have significant impacts, or significantly different impacts from the status quo Alternative, on ESA-listed

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Chinook or coho salmon stocks, and there are no discernable differences between the effects of the Alternatives on these resources.

4.1.8 Effects on Hatchery Produced Salmon Stocks

Hatchery-produced salmon stocks and those listed under the ESA that are currently in the fishery would remain in the fishery under all Alternatives considered in this EA. Additional management constraints such as ACL are neither proposed nor necessary; therefore, the Alternatives considered in this EA, including the FPAs, are not expected to have significantly different impacts from the status quo Alternative on hatchery-produced or ESA-listed salmon stocks, and there are no discernable differences between the effects of the Alternatives on these resources.

4.2 Analysis of Environmental Impacts on Protected Resources

4.2.1 Direct and Indirect Effects

The commercial salmon troll fisheries off the coasts of Washington, Oregon, and California are classified as Category III fisheries, indicating a remote or no likelihood of causing incidental mortality or serious injury to marine mammals (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. ESA-listed 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). There is no record of any mortality or serious injury to ESA-listed Guadalupe fur seals (76 FR 73912).

The Alternatives considered in this EA are not expected to result in substantial changes to ocean salmon fisheries in terms of season length, areas, depth, bag limits, etc. Nor is there any new information to suggest that the nature of interactions between pinnipeds in ocean salmon fisheries has changed. Therefore, the impacts from the Alternatives, including the FPAs, 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.

No sea turtles have been reported taken by the ocean salmon fisheries off Washington, Oregon, or California, and NMFS has determined that commercial fishing by Pacific Coast salmon fisheries would pose a negligible threat to Pacific turtle species. NMFS previously concluded that Pacific Coast salmon fisheries would have no effect to ESA-listed North American green sturgeon (NMFS 2007b) or Pacific eulachon (NMFS 2010b). NMFS also considered the effects of the salmon fisheries on ESA-listed Puget Sound/Georgia Basin Rockfish species and concluded that the fisheries were not likely to jeopardize any of those species (NMFS 2010b).

The NMFS BO on Southern Resident killer whale Distinct Population Segment (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 Chinook 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. The Alternatives

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

considered in this EA would have no direct or indirect effects on management or abundance of Puget Sound Chinook as those stocks are ESA-listed (see Section 4.1.7 above), and other U.S. Chinook stocks are a minor component of total Puget Sound Chinook abundance; therefore it is unlikely that the Alternatives, including the FPAs, would have any significant impacts to Southern Resident killer whales.

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 the Alternatives analyzed in this EA are not expected to result in changes to those encounter rates. 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.

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.

4.3 Analysis of Environmental Impacts on Habitat, Biodiversity, and Ecosystem Function

4.3.1 Direct and Indirect Effects

Salmon fisheries potentially affect ecosystem function by the reduction of predators on lower trophic levels, reduction of prey available to higher trophic levels, and reduction of nutrients delivered to freshwater and terrestrial ecosystems from salmon carcasses. 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. Effects from the Alternatives on higher trophic level predators such as sea lions and killer whales are not likely to be significant (see section 4.2.1 above). Transport of marine nutrients to freshwater systems should increase slightly in most years in the Klamath Basin as a result if managing for 40,700 natural area spawners under the proposed *de minimis* fishing control rule rather than 35,000 under status quo. In some years slightly less transport may occur in Central Valley basins as a result of the SRFC *de minimis* control rule; however, effects from the Alternatives on nutrient transport are not likely to differ significantly from historical levels as only minor modifications to control rules are being considered.

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). 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, and significant impacts are not anticipated.

Classification Alternative 3 proposes classifying mid-Columbia spring and Columbia upper river fall Chinook, Puget Sound pink salmon as ECs, and Alternative 2 proposes omitting mid-Columbia spring Chinook and Puget Sound pink salmon from the FMP. Stock Classification FPA 4 proposes omitting mid-Columbia spring Chinook from the FMP. EFH is currently designated for these stocks under the Status Quo Alternative; however, stocks that are not in the fishery may not have EFH designations.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Designation of EFH, in accordance with Section 303(a)(7) of the Magnuson-Stevens Act, does not in and of itself have any direct environmental or socioeconomic impacts. However, EFH designation could result in indirect environmental and/or socioeconomic impacts.

Whether EFH protections for mid-Columbia spring are lost or diminished under Stock Classification Alternatives 2, 3, or FPA 4 depends on the basin-specific circumstances. There are three potential scenarios:

1. In sub-basins where these Chinook salmon co-occur with other Chinook or ESA-listed Chinook salmon, EFH designations would remain intact and there would be no change in the EFH consultation requirements or the species covered by these consultations;
2. In sub-basins where these Chinook salmon co-occur with coho salmon, but not other Chinook salmon, EFH designations would remain intact, consultation requirements will remain in effect, but NMFS conservation recommendations would apply only to coho salmon;
3. In sub-basins where these Chinook salmon are the only salmon with currently described EFH, EFH descriptions would be removed and EFH consultations would no longer occur.

Most EFH areas are described as such for both coho and Chinook; however, there are a few that are only described as Chinook EFH. These areas are limited to mid-Columbia River spring Chinook. If the stocks that occupy such areas are not classified as in the fishery, the EFH description could be revoked. Specific basins affected would be the Walla Walla, Umatilla, Upper Deschutes, Lower Crooked, Upper and Lower John Day, and North Fork and Middle Fork John Day rivers (NMFS 2010c).

Another consideration in this matter is the range overlap of ESA-listed steelhead and the conservation benefits of ESA Section 7 consultations. Except for the lower Crooked River and Upper Deschutes where experimental reintroduction efforts are underway, all of the affected mid-Columbia sub-basins are also occupied by ESA-listed steelhead, and most have critical habitat designated. The ranges of steelhead and Chinook salmon overlap, but are not completely coincident. Federal actions in these areas are subject to the consultation requirements of ESA Section 7 which, like the MSA EFH provisions, are also designed to protect habitat. As with the EFH consultations for coho salmon, some incidental protection for Chinook salmon habitats from ESA consultations on steelhead would be expected, but the conservation measures would not target Chinook habitats or life stages. As a result, some erosion of regulatory capabilities to protect Chinook salmon habitat in these sub-basins would be expected with the loss of EFH descriptions.

If the Puget Sound pink stock was designated as an EC (Alternative 3) or removed from the fishery (Alternative 2), the associated EFH description would no longer apply. However, EFH for Puget Sound Chinook and coho would remain, which includes all of the sub-basins occupied by Puget Sound pinks. Conservation recommendations for EFH would no longer consider the specific needs of pink salmon, but would be diminished only to the degree that the habitat needs and associated conservations for Chinook and coho salmon differ. Since Puget Sound Chinook salmon are also ESA-listed, habitat protections are also provided through ESA Section 7 consultations related to critical habitat.

Indirect impacts to target species from Classification Alternatives 2, 3, and FPA 4 that would result in no longer designating EFH for mid-Columbia spring Chinook salmon would be negligible because of overlap with other EFH designations and critical habitat designations. Only two basins would be left without either EFH or Critical habitat designations, and both of these areas have no current Chinook

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

distribution. Therefore, the effects on salmon EFH from classification Alternatives 2, 3, and FPA 4 would not be significant.

4.4 Analysis of Economic Impacts

This section contains the economic analysis of the alternatives proposed for Amendment 16 on the issues of stock classifications, status determination criteria, ACLs, accountability measures, and *de minimis* provisions. Results of the economic analyses are also presented as tables in this section.

Quantifying economic changes for this proposed amendment is complex due to many uncertainties surrounding the salmon fisheries. Quantitative impacts to personal income could not be established due to scarce or unavailable quantitative information. Therefore, economic impacts and significance were inferred and described qualitatively for most of the alternatives, except for the *de minimis* alternatives, which was analyzed quantitatively. For these alternatives, the ex-vessel revenues from commercial salmon catch and recreational trips (for both ocean and river tribal/non-tribal fisheries) for the 2002 to 2010 fishing years were summed and then compared across the various *de minimis* alternatives. In addition, a summed or cumulative value is presented because the purpose of this analysis was to identify the near-term impacts rather than impacts in a single year.

The catch and trip data used in the analysis of the alternatives for the *de minimis* and MSST alternatives were generated retrospectively under the various proposed Amendment 16 alternatives for 2002-2010 (see Appendix H: *Economic Data Appendix* for detailed methodology and data). The analysis describes the actual forecast catch and effort, representing the Status Quo Alternative, and potential changes in forecast catch and effort representing implementation of the other Alternatives, that would have resulted in years 2002-2010 if the FMP at the time reflected provisions contained in Amendment 16 alternatives. Data for the ocean commercial Chinook harvest, ocean recreational trips, river tribal, and river non-tribal recreational harvest was forecast using the same models used by the STT during the PFMC preseason management process to estimate total Chinook catch and ocean recreational activities. The harvest and trips estimates were generated for the years 2002-2010 under the three MSST conventions (MSST=0.50*S_{MSY}; 0.75*S_{MSY}; and 0.86*S_{MSY}) and eight Amendment 16 *de minimis* fishing Alternatives (Alternative 1 (Status Quo), Alternative 2, Alternative 2b, Alternative 3, Alternative 3b, Alternative 4, Alternative 5, and FPA 6) and for four management zones (Cape Falcon-Humbug Mt., Humbug Mt.-Horse Mt., Horse Mt.-Pt. Arena, and South of Pt. Arena). Ex-vessel revenues were generated for the harvest forecasts for the Amendment 16 Alternatives by using the annual average prices (inflation adjusted 2010 real dollar) and pounds of salmon landed (Chinook numbers multiplied by average weight in pounds per Chinook).[50] The performance of each Alternative (in percent term) is compared with the Status Quo Alternative.[51]

The analysis of the economic effects of the alternatives for stock classification, status determination criteria annual catch limits, and accountability measures are largely linked to the biological effects of the alternatives. The analysis is theoretical and qualitative due to lack of historical data and a model that would be able to generate new sets of information for the potential outcomes of the proposed alternatives. Biological impacts are reflected in catch, which is the foundation for the economic impacts. There is an

[50] The data on the statewide seasonal average weight and average price are from *Salmon Annual Review 2010* (Tables D-1, D-2, and D-3 are for the average weights for Chinook and Tables IV-2, IV-3, and IV-4 are for seasonal average prices). The average price and weights of Chinook from California and Oregon for 2002 to 2010 were used in the analysis, as the four management zones falls under these states.

[51] In this section, the effect of status quo alternative is not discussed per se. However, the status quo alternatives are represented by the baseline environmental and economic conditions for the U.S. West Coast salmon fishery in Chapter 3.

inverse relationship between the biological effects and economic impacts whenever catches fall below the conservation objectives or S_{MSY}, i.e., there could be more revenue in the short term when continuing to fish on a stock at low abundance, but doing so creates a risk in the long term of declining stock productivity and, thus, declining revenue. Generally, potential positive economic effects are reflected in increased producer and consumer surpluses resulting in the short-term from increased catch/exploitation of stocks with low abundance, despite that doing so may contribute to unsustainable stock sizes and, thus, an unsustainable fishery; or, in the long-term by fishing on stocks that are managed at sustainable levels. Negative economic effects are reflected in low producer and consumer surpluses often due to reduced harvests as a result of low stock sizes in the long-term, lower catch, and higher prices.

4.4.1 Stock Classification

The Stock Classification Status Quo Alternative is represented by the recent year average commercial revenue and recreational effort estimates presented in Section 3.4 of this EA. Stock classification Alternatives 2, 3, and FPA 4 do not have significant biological impacts to management unit species or on the biological environment, and, therefore, would not result in significant economic impacts (Table 4-5).

4.4.2 Status Determination Criteria – Overfishing

Note: For overfishing SDC, Alternative 1 is the Status Quo and Alternative 2 is F>MFMT in one year, with MFMT = F_{MSY}.; overfishing SDC proposed under other suites of SDC Alternatives (3, 3b, 3c, 4, 4b, and FPA 5 for overfished) are identical to Alternative 2 (Table 2-7).

Implementation of the SDC Overfishing Status Quo Alternative is represented by the recent year average commercial revenue and recreational effort estimates presented in Section 3.4 of this EA. From the analysis of biological effects of Overfishing SDC Alternatives 2-5, the overall assumed economic impact is not significant. Most stocks experienced exploitation rates exceeding F_{MSY} (i.e., overfishing under Alternatives 2-5 SDC) frequently prior to the mid-early 1990's; however, since that time, no overfishing events were observed (Table 4-1). The assessment of effects on the biological environment assumes that management under the overfishing SDC Alternatives 2-5 would have similar frequencies of overfishing determinations as those observed since the late-1990s. It is expected that an overfishing status determination would occur less frequently or rarely under Alternatives 2-5, compared to the Status Quo Overfishing Alternative (see Section 4.1.2.1 for explanation). Alternatives 2-5 for overfishing SDC should have direct positive biological effects to stocks and on the biological environment, given that they are more objective than the Status Quo Alternative for making an overfishing status determination and the criteria are assessed on an annual basis rather than only after the stock is determined to be overfished under the status quo (i.e., currently defined as three consecutive years below the conservation objective). As a result, management actions would be more responsive to end overfishing sooner (i.e., addressed each year). However, due to the expected rare occurrence of overfishing, the effects would not be significant.

A quantitative assessment of the net change in the harvest due to the proposed Amendment 16 alternatives for overfishing SDC is not available due to the lack of data available at this time. However, it is inferred that the corresponding economic effect of Alternatives 2-5 for the overfishing SDC should have long-term positive economic effects, in terms of increased consumer and producer surplus, because Alternatives 2-5 will provide a more objective and measurable SDC for ensuring the fishery is designed each year to harvest stocks at levels less than F_{MSY} and to identify when overfishing has occurred in a more timely manner than under the status quo. Generally, potential positive economic effects are reflected in increased producer and consumer surpluses resulting in the short-term from increased catch/exploitation of stocks with low abundance, despite that doing so may contribute to unsustainable stock sizes and, thus, an unsustainable fishery; or, in the long-term by fishing on stocks that are managed at sustainable levels.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Negative economic effects are reflected in low producer and consumer surpluses often due to reduced harvests as a result of low stock sizes in the long term, lower catch, and higher prices. Although salmon abundance is greatly affected by factors other than fishing, preventing overfishing and identifying and responding to it quickly if it occurs allows fishery managers to contribute to ensuring more sustainable population levels, and thus, more sustainable harvest levels, assuming favorable environmental conditions. The short-term economic effects of Alternatives 2-5 could be negative compared to the status quo if exploitation or harvest rates and access to production in excess of F_{MSY} are constrained, which would result in the reduction of consumer and producer surpluses. However, fishing in excess of F_{MSY} would constitute overfishing and is therefore not authorized under the MSA. Also, for KRFC, the current control rule already prevents harvest above $F_{MSY.}$ Regardless, such constraints have not occurred even under the status quo since the mid-1990's and are not expected to occur in the foreseeable future.

4.4.3 Status Determination Criteria – Overfished

In this analysis, for all of the alternatives including status quo, the primary direct economic effect[52] of an overfished determination is that it may result in a reduction in ex-vessel values in the fishery, if there are lower harvest levels required for rebuilding the stock under a rebuilding plan, and if there are market-driven forces resulting from the overfished determination. In this latter situation, consumer demand for the available harvest could be reduced because some consumers are reluctant to purchase a fish species with an "overfished" status determination (as occurred with the 2010 SRFC overfished designation which caused the Monterey Bay Aquarium Seafood Watch program to change its rating of California and Oregon commercially caught Chinook salmon from "Good Alternative" to "Avoid"). Therefore, price could be depressed and producer surplus reduced. Aside from the overfished determination and associated rebuilding regulations, if the stock is at a low abundance, harvests may naturally be lower because the costs to fishermen to go fishing outweigh the benefits they would derive (i.e., fishermen may choose not to go fishing because of low availability). In the long term, the indirect economic effect of rebuilt stocks would likely result in higher consumer and producer surpluses from the higher harvest levels sustained by more abundant stocks. However, the indirect biological effects of a stock at low abundance and determined overfished potentially include reduced long-term reproductive potential of the stock, foregone opportunity to harvest more abundant stocks in the mixed stock fishery due to the additional fishery controls enacted because of the overfished stock (e.g., the recent ocean salmon fishery closures in 2008 and 2009 off California due to continued low returns of SRFC), and potential listing of the stock under the ESA if abundance declined to such low levels warranting ESA listing. This sort of qualitative analysis, which is based on expected changes in ex-vessel value, long term stock productivity, etc. and derived from biological effects of an alternative, evidence some degree of tradeoff between short-term and long term biological and economic impact across all alternatives.

The determination of stock status is a reaction to other forces in the environment and does not directly affect the availability of salmon or constrain fisheries, therefore the determination would not have significant direct economic effects since there are no required actions associated with the overfished determination that would automatically change conservation objectives or harvest control rules. However, in the event of an overfished determination, the Council would direct the STT to propose a rebuilding plan, which could include temporary changes in the control rule designed to help rebuild the stock. Therefore, SDC that are likely to have more frequent overfished determinations are more likely to have indirect economic effects, such as fishery constraints or those consumer reactions like those described above

[52] Direct effect is in terms of direct impact on harvest level; indirect effect could be the resulting ripple effects on other sectors of the economy or a long term effect positive or negative.

In terms of the relative frequency of overfished determinations, the Alternative 1(status quo) was most similar to FPA 5and Alternative 4b (3-year arithmetic mean < $0.75*S_{MSY}$). Ranking the alternatives by the relative frequency of overfished determinations indicates that Alternative 4 had the lowest frequency, followed by (in order) Alternative 3, Alternative 2, FPA 5, and Alternative 1, then Alternatives 4b, 3b, and 2b with the highest frequency (Section 4.1.2.2). Because Alternative 4 would result in an overfished determination least often, it would have the fewest negative short-term economic effects (e.g., management measures to constrain harvest would not be implemented as often when the stock was at low abundances). However, it could pose the greatest risk of negative biological effects (e.g., risk the sustainability of the stock in the long-term), and thus, it would have long term negative economic effects if the stocks were not managed sustainably. In the short term, Alternative 2b would have the greatest negative economic effects because stocks would be determined to be overfished with the greatest frequency (i.e., based on a single year below $0.75*S_{MSY}$). As mentioned above, with each overfished determination there is potential for lower producer and consumer surpluses (i.e., negative economic effect), and there is also higher administrative costs (e.g., monitoring, enforcement, developing and implementing regulations for a rebuilding plan). With regard to the biological environment, Alternative 2b would have the least risk to stocks because measures would be implemented to restrict harvest and to rebuild to S_{MSY} sooner and more frequently than the other alternatives.

Table 4-6 under the status quo alternative provides a comparison of commercial ex-vessel value under SDC Alternatives 3, 3b, and 3c. There was no difference between Alternatives 3 and 3b, and the difference amounts to less than a 2 percent between Alternatives 3 and 3c, which is not significant. FPA 3 is essentially a combination of Alternatives 3 and 3b, so again, no significant impacts from FPA 3 would be expected.

4.4.4 Status Determination Criteria – Approaching Overfished

The biological effects from the approaching overfished SDC alternatives would be similar to the overfished SDC alternatives for expected frequency and relative differences between all of the alternatives (Table 4-12). There would be no significant biological effects on stocks of the determination since there are no additional required actions (other than reporting) associated with the approaching overfished determination that would change conservation objectives or control rules (i.e., overfishing must be ended, if occurring, in such circumstances but this is required anytime overfishing is determined for a stock). In cases where a stock shows signs of a significant drop or declining trend in biomass, the Council routinely considers whether more conservative approaches are warranted in designing harvest levels in the fishery. Constraining fisheries to prevent a stock from becoming overfished would have positive biological effects on the stock in the short term if further biomass decline was successfully prevented as a result of the action. Also, constraining harvest could possibly contribute to a less prolonged overfished condition if that occurred despite actions to prevent it, and it could help the stock rebuild quicker in the long-term. However, negative economic effects (i.e., lower producer and consumer surpluses) could occur in the short-term as a result of reduced harvest levels on the stock, as well as constrained harvest of other healthy stocks in the mixed stock fishery. The magnitude of economic effects would be similar to that of an overfished determination, but likely short lived. This is because an approaching overfished determination normally ends after one year with either the stock becoming overfished or rebounding. Thus, there are also no significant economic effects.

4.4.5 Status Determination Criteria – Rebuilt

The 3-year mean alternatives (3, 3b, 3c, 4, 4b, and FPA 5) would have more positive effects on the biological environment than the single year alternatives (status quo alternative, Alternative 2, and 2b), as

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

a longer rebuilding period could reduce allowable exploitation rates that would allow for more spawners and increase the genetic diversity of the rebuilt population. In the long-term, this contributes to more sustainable population levels (positive biological effect), which leads to more stable (positive) economic impacts in terms of a sustained harvests. In the short-term, the biological impacts for the 3-year mean alternatives are also positive, but the economic effects could be negative. Because of the potential constrained harvest during a longer rebuilding period under the 3-year mean alternatives, there would be short-term negative economic effects in terms of lower producer and consumer surpluses during that time due to lower harvest. In contrast, during a shorter rebuilding period under the single year alternatives, harvest would likely also be constrained for a shorter time, thereby providing more positive short-term economic effects, i.e., higher producer and consumer surpluses, than under the 3-year mean alternatives. .Currently, under the Status Quo Alternative, stocks have been determined rebuilt after one year of achieving S_{MSY} as a default, although for some stocks multiple year criteria has been used as part of the rebuilding plan (e.g., KRFC 2007-2010). Therefore, except in those special circumstances, the effects of the Status Quo Alternative default criterion are similar to the single year SDC rebuilt alternatives.

4.4.6 ACL Framework Alternatives

Under that Status Quo Alternative, there are no ACLs, ABCs, and associated reference points in the ACL framework. Economic impacts from the Status Quo Alternative are represented by the recent year average commercial revenue and recreational effort estimates presented in Section 3.4 of this EA. Alternative 3b is nearly identical to FPA 3 except that for Alternative 1 F≤0.33 (a component of the conservation objective) and for Alternative 3 $F_{ACL} \leq 0.32$. Alternative 3b is also nearly identical to Status Quo Alternative 1 except that the KRFC spawning escapement objective in 3b would be 35,000 natural area adult spawners, which is below S_{MSY}, and therefore inconsistent with the MSA to manage based on MSY. For KRFC, managing the stock at a level below S_{MSY} could have negative biological effects to the long-term abundance of the stock and put it at risk of not maintaining MSY on an ongoing basis. In the short-term, there could be positive economic impacts from potential increased harvest, in terms of higher producer and consumer surplus than under Alternative 2 and 3. However, in the long-term, there could be negative economic effects from reduced producer and consumer surplus resulting from long-term potential reduction in stock size. .There are no differences in environmental effects between Alternative 2 and FPA 3, as they are identical except in their unit of measure – Alternative 2 is based on *catch* in numbers of fish, and FPA 3 is based on *spawners* in numbers of fish. In a simplified model, catch and spawners are complementary components of total abundance (N) (i.e., N = C+S) and are calculated as C=N*F and S= N*(1-F).

Assuming that the future frequency of exceeding ACLs would be similar to exceeding F_{MSY} since the mid-1990s (i.e., rare occurrences Table 4-5), there would be little difference between the Status Quo Alternative (or Alternative 3b) and Alternatives 2 and FPA 3. In terms of biological and economic effects, the analysis of ALC Alternatives 2 and FPA 3 would be essentially the same as for SDC overfishing Alternative 2 since the effect of both ACL and overfishing SDC is to limit exploitation rate to something below F_{MSY}. Therefore, economic impacts from ACL Alternatives 2, 3b, or FPA 3 would not be significant.

4.4.7 Accountability Measures (AMs)

Status Quo Alternative 1 for AMs does not identify any measures as AMs, hence it does not meet the purpose and need of the proposed action; however, measures identified in the current FMP would be affected by the other AM Alternatives. In particular, the action required under a Conservation Alert to close Council area fisheries affecting SRFC if the stock was forecast to have fewer than 122,000 spawners would be eliminated under AM Alternatives 2, 3b, and FPA 3. This would result in potential

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

negative short- and long-term biological effects (reduced stock size) and short-term positive economic effects (i.e., higher catches or revenues, but at the cost of reduced stock sizes). However, implementation of Alternatives for *de minimis* fishing provisions for SRFC would also result in similar effects even if the conservation alert action was retained (see section 4.4.8). The potential negative biological effects would be offset by potential positive biological effects of ensuring fisheries are managed consistent with the requirement for ACLs to prevent overfishing and to address non-compliance with the ACL. There would be no difference in the effects between Alternative 2 and FPA 3 and none of the economic impacts are expected to be significant since they are largely preventive or corrective measures and administrative in nature, many of which are also currently being implemented in association with other management thresholds (e.g., quotas and conservation objectives).

Economic impacts from the Status Quo Alternative are represented by the recent year average commercial revenue and recreational effort estimates presented in Section 3.4 of this EA.

4.4.8 *De minimis* Provisions

The economic impacts from the Status Quo Alternative are represented by the recent year average of the commercial revenue and recreational effort estimates presented in Section 3.4 of this EA. Under the Status Quo Alternative, most stocks have mechanisms to allow some type of *de minimis* fishing in years where the conservation objective may not be met. SRFC is currently the only stock that must either comply with the conservation alert provision resulting in fishery closures or require an emergency rule to implement fisheries. For example, in 2008, the fishery off California and part of Oregon was closed because SRFC was in low abundance, and in 2009 the fishery was greatly restricted. With respect to the economic effect of *de minimis* alternative provisions for SRFC, Alternatives 2 to 6 should provide short-term positive economic effects compared to the Status Quo Alternative 1 because complete fishery closures owing to low abundance of SRFC should become less frequent. The risk of overfishing when stock abundance is at levels that would trigger *de minimis* fishing provisions is low for all the Alternatives because the allowable exploitation rates are much lower than $F_{MSY.}$ There would be slight, but negligible differences among the Alternatives. However, these Alternatives may have long term negative economic effects because SRFC could become overfished more frequently, which could lead to more restrictions on future fisheries. For KRFC, Alternatives 2, 4, and FPA 6 may have a short-term negative economic effect on harvest because these alternatives specify a spawner escapement goal of S_{MSY} = 40,700, as opposed to the status quo spawner escapement floor of 35,000. This change results in a lower allowable exploitation rate for potential spawner abundances between 46,700 and 122,000, as explained in this EA (Sect. 4.1.5). However, as described in the preceding section, managing for an S_{MSY} of 40,700 compared to 35,000 should increase production over the long term and yield positive economic effects.

Further evaluation of the proposed *de minimis* control rule alternatives is made quantitatively by comparing an undiscounted cumulative total ex-vessel revenues and recreational trips from 2002 to 2010 across alternatives by MSST convention and management zones (Tables 4-6 to 4-13). Alternative 5 yielded the highest cumulative ocean commercial ex-vessel value(Table 4-6) and highest percent changes (Table 4-7) compared to other alternatives (including the status quo alternative) for all MSST conventions and management zones except for South of Point Arena (MSST=0.86*S_{MSY}). The FPA 6 provided positive economic impacts for all areas, similar to *de minimis* Alternatives 3 and 4, but less than Alternative 5 (Table 4-7).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-6. Cumulative Ex-vessel Sales (in 2010 real dollars) of Commercial Fishery Chinook Catch (Sep t-1 through Aug t) Under Different Alternatives by MSST Convention and Management Zones.

MSST Conventions and Management Zones	Alternative 1 (Status Quo)	Alternative 2	Alternative 2b	Alternative 3	Alternative 3b	Alternative 4	Alternative 5	FPA 6
MSST = 0.50 * S_{MSY}								
Falcon-Hum	$37,685,955	$39,025,767	$39,814,882	$39,025,767	$39,814,882	$40,896,622	**$41,685,738**	-
Hum-Horse	3,909,596	4,128,988	4,128,988	4,128,988	4,128,988	**4,172,304**	**4,172,304**	-
Horse-Arena	16,614,345	17,367,702	18,136,071	17,367,702	**18,136,071**	17,367,702	**18,136,071**	-
So. Arena	45,177,476	45,470,460	**45,512,433**	45,470,460	**45,512,433**	45,470,460	**45,512,433**	-
MSST = 0.75 * S_{MSY}								
Falcon-Hum	37,685,955	36,393,876	37,182,991	39,025,767	39,814,882	40,896,622	**41,685,738**	39,025,767
Hum-Horse	3,909,596	3,909,596	3,909,596	4,128,988	4,128,988	**4,172,304**	**4,172,304**	4,128,988
Horse-Arena	16,614,345	15,440,495	16,208,863	17,367,702	**18,136,071**	17,367,702	**18,136,071**	17,367,702
So. Arena	45,177,476	44,875,965	44,917,937	45,470,460	**45,512,433**	45,470,460	**45,512,433**	45,470,460
MSST = 0.86 * S_{MSY}								
Falcon-Hum	**37,481,197**	34,208,686	34,997,801	35,729,353	36,518,468	36,692,082	**37,481,197**	-
Hum-Horse	**3,105,962**	**3,105,962**	**3,105,962**	**3,105,962**	**3,105,962**	**3,105,962**	**3,105,962**	-
Horse-Arena	**16,597,621**	15,423,771	16,192,139	15,423,771	16,192,139	15,829,253	**16,597,621**	-
So. Arena	44,960,061	42,720,029	42,762,002	45,123,850	**45,165,823**	44,918,089	44,960,061	-

Note: The alternatives that have the highest cumulative value(s) are highlighted in bold.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-7. Percent Changes in Cumulative Ex-Vessel Revenues (Real 2010 dollar) from Ocean Commercial Catches during 2002 to 2010 for each Alternative as Compared to the Status Quo (Alternative 1) by MSST Convention and Management Zones.

MSST Conventions	Management Zones	Alternative 2	Alternative 2b	Alternative 3	Alternative 3b	Alternative 4	Alternative 5	FPA 6
MSST = 0.50 * S_{MSY}	Falcon-Hum	3.56%	5.65%	3.56%	5.65%	8.52%	**10.61%**	-
	Hum-Horse	5.61	5.61	5.61	5.61	6.72	**6.72**	-
	Horse-Arena	4.53	**9.16**	4.53	**9.16**	4.53	**9.16**	-
	So. Arena	0.65	**0.74**	0.65	**0.74**	0.65	**0.74**	-
MSST = 0.75 * S_{MSY}	Falcon-Hum	-3.43	-1.33	3.56	5.65	8.52	**10.61**	3.56
	Hum-Horse	0.00	0.00	5.61	5.61	**6.72**	**6.72**	5.61
	Horse-Arena	-7.07	-2.44	4.53	**9.16**	4.53	**9.16**	4.53
	So. Arena	-0.67	-0.57	0.65	**0.74**	0.65	**0.74**	0.65
MSST = 0.86 * S_{MSY}	Falcon-Hum	-8.73	-6.63	-4.67	-2.57	-2.11	**0.00**	-
	Hum-Horse	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	-
	Horse-Arena	-7.07	-2.44	-7.07	-2.44	-4.63	**0.00**	-
	So. Arena	-4.98	-4.89	0.36	**0.46**	-0.09	0.00	-

Ocean recreational trips were summed during 2002-2010 and compared across the *de minimis* fishing provision alternatives, as there was no direct way to attach dollar values to the recreational trips, unlike the commercial catches. However, there are economic activities associated with recreational fishing and the alternative with the highest cumulative number of trips would also have the highest economic impact. Compared to the status quo (Alternative 1) and other alternatives, Alternative 5 yielded the highest ocean recreational trips for all MSST conventions and management zones (Table 4-8). The percent changes in ocean recreational trips for Alternative 5 relative to the status quo alternative are non-negative (i.e., some positive and some with no change), and they range from zero to 29 percent depending on the MSST convention and management zones (Table 4-9). FPA 6 provided positive economic impacts for all areas except for a small negative impact south of Pt. Arena; effects were more positive than *de minimis* Alternatives 2, 2b, 3, and 3b, but less than Alternatives 4 and 5 (Table 4-9).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-8. Cumulative Ocean Recreational Trips for *de minimis* fishing provision Alternatives by MSST Convention and Management Zone

MSST Convention and Management Zones	Alternative 1 (Status Quo)	Alternative 2	Alternative 2b	Alternative 3	Alternative 3b	Alternative 4	Alternative 5	FPA 6
*MSST = 0.50 * S_{MSY}*								
Falcon-Hum	543,132	481,018	481,018	540,429	540,429	**610,768**	**610,768**	-
Hum-Horse	367,254	379,688	389,124	391,028	400,464	433,590	**443,026**	-
Horse-Arena	172,197	176,575	176,575	197,423	197,423	**222,711**	**222,711**	-
So Arena	867,378	835,016	835,016	960,048	960,048	**1,047,704**	**1,047,704**	-
*MSST = 0.75 * S_{MSY}*								
Falcon-Hum	543,132	483,721	483,721	481,018	481,018	**610,768**	**610,768**	551,357
Hum-Horse	367,254	358,480	367,916	379,688	389,124	433,590	**443,026**	422,250
Horse-Arena	172,197	171,928	171,928	176,575	176,575	**222,711**	**222,711**	191,486
So Arena	867,378	805,811	805,811	835,016	835,016	**1,047,704**	**1,047,704**	847,016
*MSST = 0.86 * S_{MSY}*								
Falcon-Hum	**471,369**	411,958	411,958	411,958	411,958	**471,369**	**471,369**	-
Hum-Horse	**348,565**	307,566	317,002	318,630	328,066	339,129	**348,565**	-
Horse-Arena	**171,532**	150,684	150,684	150,684	150,684	**171,532**	**171,532**	-
So Arena	**867,378**	742,346	742,346	742,346	742,346	**867,378**	**867,378**	-

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-9. Percentage Changes in the Ocean Recreational Trips for *de minimis* fishing provision Alternatives Relative to the Status Quo (Alternative 1) by MSST Convention and Management Zones

MSST Convention and Management Zones	Alternative 2	Alternative 2b	Alternative 3	Alternative 3b	Alternative 4	Alternative 5	FPA 6
*MSST = 0.50 * S_{MSY}*							
Falcon-Hum	-11.44%	-11.44%	-0.50%	-0.50%	12.45%	**12.45%**	-
Hum-Horse	3.39	5.96	6.47	9.04	18.06	**20.63**	-
Horse-Arena	2.54	2.54	14.65	14.65	29.34	**29.34**	-
So Arena	-3.73	-3.73	10.68	10.68	20.79	**20.79**	-
*MSST = 0.75 * S_{MSY}*							
Falcon-Hum	-10.94	-10.94	-11.44	-11.44	12.45	**12.45**	1.51
Hum-Horse	-2.39	0.18	3.39	5.96	18.06	**20.63**	14.97
Horse-Arena	-0.16	-0.16	2.54	2.54	**29.34**	**29.34**	11.20
So Arena	-7.10	-7.10	-3.73	-3.73	**20.79**	**20.79**	-2.35
*MSST = 0.86 * S_{MSY}*							
Falcon-Hum	-12.60	-12.60	-12.60	-12.60	**0.00**	**0.00**	-
Hum-Horse	-11.76	-9.06	-8.59	-5.88	-2.71	**0.00**	-
Horse-Arena	-12.15	-12.15	-12.15	-12.15	**0.00**	**0.00**	-
So Arena	-14.41	-14.41	-14.41	-14.41	**0.00**	**0.00**	-

An economic analysis was also carried out for the KRFC river tribal and recreational harvests with the same set of MSST conventions and *de minimis* fishing alternatives. Recreational river harvest includes minor harvest by Kurok and Resighini Rancheria fishers, who are regulated by the state of California and must comply with season and bag limits of the non-Indian fiver recreational fishery. Alternative 5 had the highest cumulative ex-vessel values for the tribal river fisheries (Table 4-10). Relative to the Status Quo alternative, Alternative 5 yielded higher catch revenues by about 2.74 percent (for the MSST=0.50*S_{MSY} and MSST=0.75*S_{MSY} conventions) and 0.33% (for the MSST=0.86*S_{MSY} convention) during 2002 to 2010 (Table 4-11). FPA 6 had negative short-term economic effects, and was similar to Alternatives 3 and 4.

The Alternative 1(status quo) had higher cumulative values of recreational river catches compared to all other alternatives, and FPA 6 had lower cumulative values than all alternatives except Alternative 4

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

(Table 4-12). The percent change in the river recreational catches for each alternative compared to the status quo alternative is provided in Table 4-13.

Table 4-10. Cumulative Ex-Vessel Values (Real 2010 Dollars) of Tribal River Chinook Catches for *de minimis* fishing provision Alternatives and MSST Convention during 2002 to 2010.

Alternatives	Cumulative Ex-Vessel Values (2002 to 2010)		
	MSST = 0.50 * S_{MSY}	MSST = 0.75 * S_{MSY}	MSST = 0.86 * S_{MSY}
Alternative1	$14,993,919	$14,993,919	$12,632,589
Alternative 2	13,617,856	13,283,800	10,995,279
Alternative 2b	15,302,641	14,968,518	12,390,851
Alternative 3	13,679,303	13,617,856	11,093,921
Alternative 3b	15,364,088	15,302,641	12,489,492
Alternative 4	13,723,204	13,723,204	11,280,919
Alternative 5	**15,405,397**	**15,405,397**	**12,673,898**
FPA 6	-	13,634,497	-

Note: The alternative (s) with the highest dollar values are highlighted in bold.

Table 4-11 Percent Change in the Cumulative Ex-Vessel Values for *de minimis* fishing provision Alternatives as Compared to the Status Quo (Alternative 1) for the Tribal River Chinook Catches by MSST Convention.

	Percent Changes in Cumulative Ex-Vessel Values Compared to the Status Quo Alternative		
	MSST=0.50*S_{MSY}	MSST=0.75*S_{MSY}	MSST=0.86*S_{MSY}
Alternative 2	-9.18%	-11.41%	-12.96%
Alternative 2b	2.06	-0.17	-1.91
Alternative 3	-8.77	-9.18	-12.18
Alternative 3b	2.47	2.06	-1.13
Alternative 4	-8.47	-8.47	-10.70
Alternative 5	**2.74**	**2.74**	**0.33**
FPA 6	-	-9.07	-

Note: The alternative (s) with the highest percent changes are highlighted in bold.

Table 4-12 Cumulative Values (Real 2010 Dollars) of River Recreational Chinook Catches for *de minimis* fishing provision Alternatives and MSST Conventions during 2002 to 2010.

Alternatives	Cumulative Values of non-tribal River Recreational Catches (2002 to 2010)		
	MSST = 0.50 * S_{MSY}	MSST = 0.75 * S_{MSY}	MSST = 0.86 * S_{MSY}
Alternative1	**$7,046,020**	**$7,046,020**	**$4,692,873**
Alternative 2	4,384,937	5,127,474	3,448,342
Alternative 2b	5,891,714	6,634,117	4,665,838
Alternative 3	4,384,937	4,384,937	3,463,114
Alternative 3b	5,891,714	5,891,714	4,680,611
Alternative 4	3,839,978	3,839,978	2,930,417
Alternative 5	5,344,247	5,344,247	4,145,405
FPA 6	-	4,157,069	-

Note: The alternative (s) with the highest dollar values are highlighted in bold.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-13. Percent Change in the Cumulative Values (Real 2010 dollar) of River Recreational Catches for *de minimis* fishing provision Alternative as Compared to the Status Quo Alternative by MSST Convention during 2002 to 2010.

Alternatives	Percentage Changes in Cumulative Harvest Values of River Recreational Catches as Compared to Status Quo Alternative		
	MSST=0.50*S_{MSY}	MSST=0.75*S_{MSY}	MSST=0.86*S_{MSY}
Alternative 2	-37.77%	-27.23%	-26.52%
Alternative 2b	-16.38	-5.85	-0.58
Alternative 3	-37.77	-37.77	-26.20
Alternative 3b	-16.38	-16.38	-0.26
Alternative 4	-45.50	-45.50	-37.56
Alternative 5	-24.15	-24.15	-11.67
FPA 6	-	-41.00	-

Note: The Status Quo alternative fares better relative to other Amendment 16 Alternatives in terms of the non-tribal river recreational catches...

In summary, quantitative economic analyses of the Amendment 16 alternatives for *de minimis* fishing provisions were conducted on the ocean commercial, recreational, and river tribal, and river non-tribal fishing activities retrospectively over the recent past ten years. The analyses indicate that the Alternative 5 in general resulted in cumulatively higher ocean commercial ex-vessel revenues, ocean recreational trips, and river tribal catch revenues compared to the Status Quo Alternative (Alternative 1) and the rest of the other Amendment 16 alternatives for all MSST conventions and management zones with few exceptions. However, the Status Quo alternative resulted in more non-tribal river recreational catches. Thus, the economic effect from the Alternative 5 in general could potentially result in a long-term economic benefit in terms of higher catches and recreational values from salmon fisheries. The incremental changes from these Amendment 16 Alternatives, however, are economically insignificant for all cases.

4.4.9 Summary of Economic Effects

Economic effects were assessed primarily by considering the effects of the Alternatives on short- and long-term catch and effort in the ocean fisheries; therefore, effects to the biological environment that affected available harvest could be used to anticipate economic effects. Generally, short-term positive economic effects were correlated with short- or long-term negative biological effects, and long-term positive economic effects with long-term positive biological effects. Some of the economic analyses were qualitative and only characterized effects relative to the Status Quo and the other Alternatives, and some, such as possible consumer response to status determinations, were only speculative – based on recent events – and without any quantitative information. However, some quantitative information was available to assess economic effects of alternatives for *de minimis* fishing provisions.

Economic effects were expected from SDC, ACL, AM, and *de minimis* fishing Alternatives. The economic effects from all the alternatives, like the biological effects, were determined to be not significant (Table 4-14).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table 4-14. Summary of environmental effects of Alternatives.

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
Stock Classificatio	2.1	Tables 2-1, 2-2, 2-3 , 2-4, 2-5, and 2-6	Four *(1, 2, 3, and FPA 4)*	Stocks in the fishery or Ecosystem Components; Stock Complexes and indicator stocks; Stocks subject to the international exception to application of ACLs Alt. 1: COHO, CHINOOK, and PINK: status quo; all stocks in the fishery; no EC stocks, new stock complexes or international exceptions Alt. 2: COHO: no EC stocks; SONCC coho includes southern OCN component stocks; 12 international exceptions CHINOOK: Smith River as separate stock; mid-Columbia spring removed from fishery; no EC stocks; 3 new stock complexes (CVF, SONC, FNMC); 15 international exceptions PINK: remove Fraser Canadian stocks from the fishery; 1 international exception Alt. 3: COHO: no EC stocks; remove Canadian stocks from fishery; 10 international exceptions CHINOOK: Smith River as separate stock; Columbia fall and mid-Columbia spring as EC stocks; 2 Canadian stocks removed from the fishery; 4 new stock complexes (CVF, SONC, FNMC, Mid-Columbia spring); 12 international exceptions PINK: both are EC stocks; no international exceptions FPA 4: COHO: no EC stocks; SONCC coho includes southern OCN component s; two new stocks added – Willapa natural and Oregon coast hatchery, two Canadian stocks removed; 10 international exceptions CHINOOK: Smith River as separate stock; 2 Canadian stocks and mid-Columbia spring removed from fishery; no EC stocks; 3 new stock complexes (CVF, SONC, FNMC); 13 international exceptions PINK: remove Fraser Canadian stocks from the fishery; 1 international exception	Alt. 1: effects not significant; however, the lack of newly formed stock complexes is inconsistent with MSA and NS1Gs Alt. 2: Effects not significant Alt. 3: Effects not significant FPA 4: Effects not significant	Stock classification alternatives do not have significant changes or impacts on the affected biological environment and therefore no significant economic impacts.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
Status Determination Criteria (SDC)	2.2	2-7	Nine Suites (*1,2/2b, 3 3b/3c, 4/4b, and FPA 5*)	Different alternatives for the reference points, specified for each stock annually: <u>Overfishing</u> (postseason) Alt 1: Status Quo; no consistent criteria, based on assessment of overfishing concern. FPA 2: Based on the fishing mortality rate exceeding the maximum fishing mortality threshold, OR the annual catch exceeding the overfishing limit. <u>Approaching Overfished</u> (preseason) based on the MSST Alt. 1: status quo; based on 3 consecutive years of MSST= S_{MSY} Alt. 2/2b: based on single year of MSST = 0.5* S_{MSY} or 0.75*S_{MSY} (2b) FPA 3, Alts. 3b/3c: based on 3-year geometric mean of MSST =0.5*S_{MSY}, or 0.75*S_{MSY} (3b) or 0.86*S_{MSY} (for KRFC) (3c) Alt. 4/4b: based on 3-year arithmetic mean of MSST=0.5* S_{MSY} or 0.75*S_{MSY} (4b) Overfished (postseason) Alts. 1, 2, 2b, 3, 3b, 3c, 4, 4b: Same as approaching overfished Alternatives. FPA 5: Variable among stocks with Washington coastal coho, SRFC and KRFC like Alt 3b; Puget Sound coho MSST between Alt. 3 and 3b; other stocks like Alt. 3. <u>Rebuilt</u> (postseason) based on stock achieving S_{MSY}: Alt. 1/2/2b: status quo; one year>S_{MSY} FPA 3/3b/3c: 3-year geometric mean≥S_{MSY} Alt. 4/4b: 3-year arithmetic mean ≥S_{MSY}	Alt. 1: Overfished determinations less likely to occur compared to Alt. 2 Alt. 2: overfishing determination would rarely occur, so negligible impacts are expected. Overfished determinations more likely to occur compared to status quo, although it may not be indicative of a long-term trend. Alt. 3 (FPA): poses greatest risk of negative effects and Alt. 2 poses the least risk for overfished SDC. More accurately represents risk to reproductive potential. Decreased probability of overfished determinations when faced with a single weak year-class; decreased probability of rebuilt determinations when faced with a single strong year-class for weak stocks. Geometric mean is less sensitive to large values and more sensitive to low values; geometric mean is most appropriate and currently used for log-normal distributions, such as salmon abundances. Alt. 4: for overfished SDC provides the greatest risk of positive effects. Arithmetic mean is more sensitive to large values; less precautionary than using the geometric mean. Constraining fisheries to prevent a stock from becoming overfished has a positive effect. An overfished determination has no direct biological effects. Overall, the SDC alternatives could result in beneficial or positive impacts in the long-term, but not significant.	Overfishing: Economic effect of Alt. 2 for the overfishing SDC should have long-term positive economic effects in terms of harvest. Short-term economic effects could be negative compared to the status quo if exploitation or harvest rates and access to production in excess of F_{MSY} are constrained. Effects would not be significant due to rare occurrence. Overfished and Approaching Overfished: Alt. 4 would have the fewest negative short-term economic effects and long term negative economic effects in terms of harvest. Alt. 2b would have the greatest short-term negative economic effects in terms of harvest. Effects would not be significant because fishery closures are not required. Rebuilt: There would be short-term negative economic impacts from the 3-year geometric mean for Alt. 3 and 4 in terms of lower harvest and impact on price. Effects would not be significant because fishery closures are not required.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
Overfishing Limit (OFL), Acceptable Biological Catch (ABC), Annual Catch Limit (ACL), and Annual Catch Target (ACT)	2.3	2-10	Four (1, 2, FPA 3, 3b)	- Alt. 1: status quo; currently implemented; reference points of OFL, ABC, ACL, & ACT are not specified for any stock; stocks managed using tools such as quotas and time/area closures - Alt. 2: OFLs, ABLs, ACLs, & ACTs (as needed) are expressed in terms of catch (Consistent with NS1G); OFL and ABC are specified on the basis of stock-specific exploitation rates and abundances; ABC is buffered from the OFL by 5-10% to account for scientific uncertainty - FPA 3: OFLs, ABCs, ACLs, & ACTs (as needed) are expressed in terms of spawning escapement; OFL and ABC are specified on the basis of stock-specific exploitation rates and abundances; ABC is buffered from the OFL by 5-10% to account for scientific uncertainty; KRFC managed for 40,700 natural spawners (S_{MSY}); spawning escapement is the most commonly used metric - Alt. 3b: identical to Alt. 3 except KRFC is managed for 35,000 natural spawners; inconsistent with MSA	Alt. 1: not consistent with MSA and NS1Gs Alt. 2: most consistent with NS1Gs; most complicated to estimate and additional tools would need to be developed FPA 3: more conservative and protective of KRFC than Alt. 3b; would have long-term positive effects on KRFC, but not significant; generally consistent with NS1Gs, as guidelines allow for flexibility; most consistent with FMP objectives, salmon biology; current management structure; technically feasible For SRFC, there are direct positive effects with Alt. 2 & 3. For KRFC, the effect is small or negligible. Alt 3b: similar to status quo for KRFC, no significant effects.	Alt. 2 and FPA 3 for ACLs should have long-term positive effects because the ACL framework would help ensure the stock is exploited at levels that do not exceed F_{MSY}. Short-term effects are likely to be negative in terms of harvest. For KRFC, Alt. 2 and 3 may have a short-term negative economic effect due to decreased harvest, but would have long-term positive effects due to managing for MSY.
Accountability Measures (AMs)	2.4		Three *(1, 2, & FPA 3)*	- Alt. 1: inseason authority; mixed-stock quota monitoring, quota partitioning, and trading; gear/bag/size/trip limits; boundary modifications; landing restrictions; inseason monitoring and reporting requirements; SAFE document; conservation alert; postseason monitoring; overfishing concern assessment; notice to managers; methodology review - Alt. 2: Same as Alt. 1 except modification of conservation alerts to only require notice to managers; modification of overfishing concern renamed as abundance alert; possible adoption of an ACT; AMs occur when ACL is exceeded, such as notice to managers and reevaluation of ACLs and AMs - FPA 3: similar to Alt. 2 except that conservation alert and overfishing concern actions no longer considered AMs and no longer retained in FMP	AMs would have offsetting positive and negative effects; not significant Alt. 1: does not meet the purpose and need of the proposed action; not a viable alternative	The alternatives are expected to have some level of direct or indirect economic impacts (such as on harvest levels), but none of the accountability measures would have significant economic impacts since some effects are offsetting and AMs are generally preventive or corrective measures and mostly administrative in nature.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Topics/Issues for which Alternatives were Developed	EA Section(s)	Table(s)	No. of Alternatives	Alternatives	Biological Impacts	Economic Impacts
De minimis fishing provisions	2.5		Seven *(1, 2/2b, 3/3b, 4, 5 & FPA 6*	*De minimis* exploitation rates of 25% for SRFC and KRFC spawner escapement less than S_{MSY} Alt. 1: status quo; currently implemented for KRFC; *de minimis* fishing not defined for SRFC Alt. 2, 2b: F=0 at midpoint between S_{MSY} and MSST Alt. 3, 3b: F=0 at MSST Alt. 4: F=0 at 0.5*MSST Alt. 5: F< 0.25 below the midpoint between S_{MSY} and MSST (unstructured reduction) FPA 6: F≤0.25 at S_{MSY} until the midpoint of S_{MSY} and MSST; F≤0.10 at MSST until ½ of MSST; F=0 at S=0 Alts. 2b, 3b – similar to Alt. 2, 3 except that KRFC is managed for 35,000 natural spawners, rather than S_{MSY}	Alt. 1: managing for an annual target of 35,000 natural area adult KRFC spawners (less than S_{MSY}) is inconsistent with MSA and NS1Gs ; not consistent with NS8 because of lack of *de minimis* fishing for SRFC Alt. 2, 3, 4: would achieve OY Alt. 2b, 3b, 5: would not achieve OY; inconsistent with MSA and NS1Gs No significant impacts from *de minimis* alternatives, but long-term negative impacts to KRFC from Alts. 2b, 3b, and 5.	Alternatives 2-6 should provide short-term positive economic effects compared to the Status Quo Alternative. These alternatives may have long term negative economic effects because SRFC could become overfished more frequently, which could lead to more restrictions on future fisheries. For KRFC, Alternatives 2, 4, and FPA 6 may have a short-term negative economic effect on harvest, but would have a long-term positive effect because of managing for MSY. Alternative 5 yielded the highest cumulative ocean commercial ex-vessel value and recreational trips across all MSST conventions and management zones, However, Alt 5 has mixed results for river tribal and non-tribal recreational catches, i.e., Status quo fared better for non-tribal river recreational catches.

Note: NS = Not significant; Although there could be some positive or negative economic impacts associated to different amendment alternatives relative to status quo, the economic significance would be none or not significant, i.e., the value of change expected to be much less than $100 million to the case of the West Coast salmon fishing industry under PFMC.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

4.5 Cumulative Effects

Cumulative effects result from actions or events affecting the FMP regulatory framework that combine with effects from the proposed actions to impact the environment in ways not considered direct or indirect effects of the proposed actions, or affect the baseline environment against which the effects of proposed actions are assessed.

Actions that are reasonable to expect and would affect the FMP regulatory framework include:

- Changes in status of protected species: Additional species may be listed under the ESA or their status changed from threatened to endangered or vice-versa, or a population may recover to allow de-listing.
- Adding, removing, or changing the status of stocks in the fishery management unit: As additional information becomes available, stocks may be added or removed from the FMP, designated EC stocks, designated as indicator stocks for a stock complex, moved to another existing or new stock complex, or have the F_{ABC} uncertainty tier changed.
- Implementation of mark-selective fisheries: Increased implementation of mark-selective fisheries can provide more opportunity, especially for recreational fisheries, but can also be less efficient, especially for commercial fisheries.
- Change in the use of ocean areas: habitat protection measures (e.g., marine protected areas; MPAs) and offshore projects (e.g., wind and wave power, offshore aquaculture) limiting the area open to fisheries.

Events that are reasonable to expect and would affect the FMP regulatory environment include:

- Cyclical and ongoing climate change affecting stock productivity in the northeast Pacific: Cyclical events (El Niño southern Oscillation, Pacific decadal oscillation) and long-term climate change affects the relative productivity of different marine organisms with attendant ecosystem effects.
- Marketing strategies to promote certain fishery sectors: Marketing strategies can affect the consumer demand and price of commercial products such as wild caught and aquaculture salmon.
- Changes in aesthetic value of salmon can affect participation in habitat restoration activities.

4.5.1 Changes in Status of Protected Species

ESA consultation standards are frequently changed as new and better information is developed and ESU status' are reviewed. The effects to the FMP regulatory framework are generally either to shift management constraints to different stocks, or to change the level of constraint on a fishery. With respect to harvest, the effects are manifested as more or less opportunity while, effects on stocks put more or less pressure on other stocks. For example, if a new consultation standard for Lower Columbia River tule Chinook results in additional fishing opportunity in some years, it may be possible that Snake River wild Chinook, which have not constrained ocean fisheries in recent years, would experience higher exploitation rates and become the constraining stock in some fisheries. Biological effects are likely to be offsetting with regard to stocks, and economic effects could be either positive or negative depending on whether constraints are liberalized or become more conservative. Regardless, ESA is other applicable law, and the FMP regulatory framework will continue to accommodate changes to ESA consultation standards, which could result in adverse or beneficial impacts, but are not likely to be significant in either case.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

4.5.2 Adding, Removing, or Changing the Status of Stocks in the Fishery Management Unit

Adding stocks to the FMP or changing their status as part of a stock complex could result in effects similar to changes to ESA consultation standards such as shifting management constraints to different stocks, or to changing the level of constraint on a fishery. For example, Oregon Coastal Chinook are likely to have new stock specific conservation objectives established in the near future. This could lead to identifying a new indicator stock and possibly splitting the SONC Chinook stock complex into separate SO and NC components, with attendant changes in fishery constraints. Other effects could include applying *de minimis* control rule alternatives to Oregon Chinook stocks that have different specifications of MSST than SRFC and KRFC. If MSST for a stock is set at 0.5*S_{MSY} and the same *de minimis* control rule is applied as that used for SRFC and KRFC, the effects will be slightly different relative to allowable exploitation rates and realized spawners for a given abundance forecast than if MSST = 0.75*S_{MSY}. The specification of MSST as a percentage of S_{MSY} affects the potential spawner abundance at which expected realized spawning abundance would fall below MSST. For example, the realized spawner abundance (50 percent probability) would be below MSST when potential spawner abundance (pre-fishing) was less than S_{MSY} if MSST=0.75*S_{MSY}, but not until 0.6*S_{MSY} if MSST=0.5 S_{MSY} (i.e., above MSST), assuming assessments are unbiased. However, given the same pre-fishing potential spawners, the difference in realized spawners would be less pronounced (Figure 4-4). Therefore, the selection of MSST as a percentage of S_{MSY} affects the risk associated with *de minimis* Alternatives. However, the risks associated with *de minimis* fishing alternatives, regardless of MSST specification, would not be significant because of the low exploitation rates.

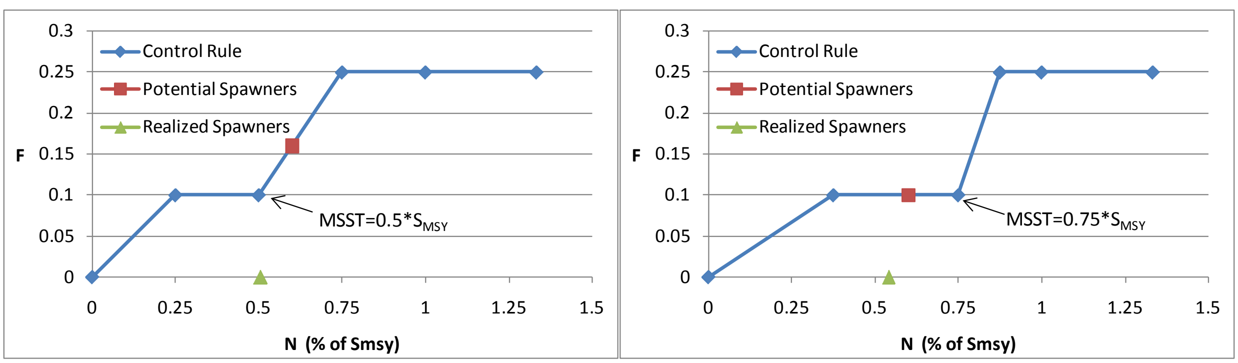


Figure 4-4. Difference in realized spawners given the same potential spawners under FPA 6 *de minimis* control rule based on different specifications of MSST.

4.5.3 Implementation of Mark-Selective Fisheries

Use of mark-selective ocean fisheries has increased since their introduction in 1999, and further use is being contemplated as means to access hatchery fish while remaining within constraints for stocks of concern, and as a way to possibly mitigate the effect of hatchery fish interacting with wild fish on the spawning grounds. Mark-selective fisheries have the potential to extend harvest opportunity, especially in recreational fisheries where generating angler trips is an important economic consideration, but also in commercial fisheries where constraints on coho impacts can limit access to more valuable Chinook allocations. Requiring mark-selective retention in commercial Chinook fisheries may allow additional access to more abundant, less constraining stocks, but it would also require more effort to attain quotas or to make trips profitable, reducing the efficiency of fishery operations. Expansion of ocean mark-selective fisheries could shift management constraints to other stocks, and change pressure on some stocks.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

4.5.4 Change in the Use of Ocean Areas

Changes in the uses of ocean areas such as establishing MPAs that restrict fishing activities or energy development that make fishing impractical in some areas would affect coastal communities near those use areas, and some net economic loss from fishing activities may result, particularly for the recreational sector which is not as mobile as the commercial sector. However, it is likely that some of the effects would be a shift in location of fishing activity, although if prime fishing areas are eliminated, the efficiency (profitability) of commercial fisheries could decline. Because stock distribution varies, this could also result in shifting fisheries impacts among stocks, but are not considered significant.

4.5.5 Cyclical and Ongoing Climate Change

Long-term climate change effects such as ocean acidification and rainfall patterns could affect trophic interactions and geographic distribution of salmon. These changes would in turn affect viability and structure of fisheries, and distribution and abundance of salmon stocks. Although the net effect of these changes is likely to be negative, some stocks or fisheries may benefit from the changing conditions and resulting shifts in distribution. However, while these potential effects are foreseeable, they are not likely to be significant in the near term. Cyclical changes, like those associated with El Niño events and the Pacific Decadal Oscillation would affect similar components of the environment as long-term climate change. Cyclical changes, while expected to be both positive and negative, are more likely to be noticeable in the short-term; however, because these events are part of the historical baseline, they are unlikely to be significant, and positive and negative impacts should average out over the long-term.

4.5.6 Marketing Strategies

Marketing strategies can affect exvessel value of the fishery. For example, in the 2000's promotion of wild caught salmon over pen-raised (aquaculture) salmon resulted in increased demand for wild caught salmon, and ex-vessel price increased from less than $2/lb in 2003 (nominal value) to around $5Y/lb in 2006 (nominal value) for Chinook, where it has remained since. These actions are difficult to anticipate, and effects like consumer awareness generally have a marginal effect on demand for specific products over the long term and are not expected to be significant.

4.5.7 Aesthetics

Salmon make up an important part of the social fabric for all communities where they are present. Residents and visitors of the western states desire to experience a healthy environment and share a social connection through the presence of salmon, similar to that of the tribes who depend upon the natural resources within their usual and accustomed areas. Adult salmon returning to spawn fulfill this need, and when the return of spawning adults is impaired, this experience is diminished. Residents, and particularly land-owners, on or near salmon bearing streams are more likely to participate in habitat restoration efforts if they feel an active connection to the salmon resource. Visitors to the region are also more likely to have a satisfactory experience if salmon are present. The proposed actions should result in greater long term average spawning escapement throughout the Klamath Basin and enhance the aesthetics of the region, resulting in positive environmental effects. The proposed actions should not reduce long-term average spawning escapement in any of the other regions of the affected environment.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

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. Overarching principles for fisheries management are found in the MSA's National Standards, which articulate a broad set of policies governing fisheries management. In crafting fisheries management regimes, the Councils and NMFS must balance their recommendations to meet these different national standards.

As discussed previously, the purpose of this action is to amend the salmon FMP to implement the 2009 revisions to the NS1Gs, which provide guidance on the implementation of the requirement for ACLs and other aspects of the 2006 amendments to the MSA. 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 proposed action is consistent with NS1Gs.

National Standard 2 requires the use of the best available scientific information. The Council's SSC reviewed the methods used to develop reference points for SDC and ACLs, and recommended their use to the Council. The SSC also reviewed the analysis of SDC and the economic analysis of *de minimis* fishing alternatives and provided comments to help inform the Council's policy choices on those issues. The models used to generate catch estimates under the *de minimis* fishing alternatives had been previously reviewed by the SSC and approved by the Council for management purposes. The FPAs in this EA comport with the SSC recommendations for use of the best available scientific information except for the selection of MFMT and S_{MSY} for Washington coastal coho, which did not use the methods recommended by the SSC. Reference points should be based on the best available science, but adopting more conservative values can provide a more precautionary and consistent management approach, as was the case for most Washington coastal coho reference points, and is consistent with National Standard 2. However, adopting less conservative values such as the Quillayute fall coho MFMT, which exceeds the best available estimate of F_{MSY}, is inconsistent with National Standard 2.

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. All alternatives in this EA meet this standard.

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 in this EA meet this standard.

National Standard 5 requires efficiency, where practicable, in the utilization of fishery resources. All alternatives in this EA meet this standard.

National Standard 6 requires conservation objectives and management measures to take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. All alternatives (including the FPAs) except for status quo account for scientific uncertainty in estimates of reference

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points and specify AMs that allow for inseason management of Council-area salmon fisheries to meet conservation objectives and preseason management objectives.

National Standard 7 requires that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication. All alternatives in this EA meet this standard.

National Standard 8 requires that conservation and management measures shall, consistent with the conservation requirements of the MSA, take into account the importance of fishery resources to fishing communities in order to “(A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.” 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 in this EA are expected to have no significant effects due to bycatch mortality on non-target species.

National Standard 10 requires, to the extent practicable, conservation and management measures to promote the safety of human life at sea. The Alternatives in this EA are not expected to have significant effects on season structure or other factors that would increase risks to salmon fishermen. The Council FPAs are consistent with Council Operating Procedure #16, Weather-related Adjustment to Salmon Fishery. All alternatives in this EA are consistent with National Standard 10.

The MSA permits a Council to comment on habitat impacts related to stocks under that Council’s authority. FPA 4 for stock classification removes mid-Columbia River spring Chinook from the FMP and Council authority, which may result in some areas currently identified as EFH loosing that designation. The Council will consider changing identification of salmon EFH, including that occupied by mid-Columbia River spring Chinook, as a result of its five year EFH review, which was concluded in April 2011. The Alternatives in this EA and expected impacts are consistent with the MSA requirements of identification and periodic review of EFH. There are no direct impacts to existing salmon EFH from the Alternatives considered in this EA.

5.2 Paperwork Reduction Act

The purposes of the Paperwork Reduction Act (PRA) are to minimize the burden of information collection by the Federal Government on the public; maximize the utility of any information thus collected; improve the quality of information used in Federal decision making, minimize the cost of collection, use and dissemination of such information; and improve accountability. The PRA requires Federal agencies to obtain clearance from the Office of Management and Budget before collecting information. This clearance requirement is triggered if certain conditions are met. “Collection of information” is defined broadly. In summary it means obtaining information from third parties or the public by or for an agency through a standardized method imposed on 10 or more persons. Collection of information need not be mandatory to meet the trigger definition. Even information collected by a third party, if at the behest of a Federal agency, may trigger the clearance requirement. Within NMFS the

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Office of the Chief Information Officer is responsible for PRA compliance. Obtaining clearance can take up to 9 months and is one aspect of NMFS review and approval of Council decisions.

The FPAs do not include collection of information from sources or of types not already present in the FMP and salmon regulations.

5.3 Marine Mammal Protection Act

The MMPA of 1972 is the principle Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the US Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the west coast, the Steller sea lion eastern stock, Guadalupe fur seal, and Southern sea otter California stock are listed as threatened under the ESA. The sperm whale (WA, OR, CA stock), humpback whale (WA, OR, CA, Mexico stock), blue whale eastern north Pacific stock, and Fin whale (WA, OR, CA stock) are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The commercial salmon troll fisheries off the west coast are classified as Category III fisheries, indicating a remote or no likelihood of causing incidental mortality or serious injury to marine mammals (75 FR 68468). Recreational salmon fisheries are assumed to have similar impacts as they use similar gear and techniques. The only depleted marine mammal with which the salmon fishery has known interaction is the Steller sea lion, however, interaction 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). The Alternatives considered in this EA, including the FPAs, are not expected to have significant impacts to marine mammals (see section 4.2 in this EA).

5.4 NEPA

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

5.5 Endangered Species Act (ESA)

This action does not directly affect any species listed under the ESA (see sections 4.1.7 and 4.2 of this EA); however, fisheries conducted according to the FMP do affect ESA listed species. The FMP, as amended by any of the alternatives described in this document, calls for managing fisheries to ensure that the standards set forth in biological opinions for listed salmon stocks are met. Thus, fisheries adopted under this FMP will meet the consultation standards for affected listed salmon stocks.

Council-managed fisheries also impact listed Southern Resident Killer Whales. Fisheries are managed consistent with the biological opinion for killer whales (NMFS, May 5, 2009). Effects on listed Puget Sound yelloweye rockfish, canary rockfish, and bocaccio and Pacific eulachon were addressed in a 2010 biological opinion (NMFS 2010b). The effects to ESA-listed North American green sturgeon were considered in a 2007 biological opinion (NMFS 2007b).

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

Table 5-1. NMFS' Endangered Species Act consultations and Section 4(d) determinations on ocean fisheries implemented under the Salmon FMP and their duration.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

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)

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

5.6 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. 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. The Proposed Action 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 Washington, Oregon, and California. This determination has been submitted to the responsible state agencies for review under section 307(c)(1) of the CZMA.

5.7 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. The proposed action does not directly affect any seabirds protected by the Migratory Bird Treaty Act (see section 4.1 of this EA).

5.8 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.

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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, effects of the proposed action and other alternatives have been developed in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

5.9 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 proposed action is not expected to affect minority and low-income communities, because it does not directly affect the manner in which fisheries are conducted; it modifies the framework for determining the annual salmon management measures and specifications with the goal of preventing overfishing and ensuring long-term stock productivity. Further, fisheries conducted under the FMP are not expected to disproportionally affect minority and low-income communities. West Coast Indian tribes are part of the Council's decision-making process on salmon management issues, and tribes with treaty rights to salmon, groundfish, or halibut have a seat on the Council. Available demographic data detailed in the Salmon FMP Amendment 14, Appendix B show that coastal counties where fishing communities are located are variable in terms of social indicators like income, employment, and race and ethnic composition. As a

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result, the alternatives are not expected to have notable effects on fishing communities in general, nor on minority and low income groups in particular.

5.10 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 frameworks and management measures implementing the framework. This process encourages states and tribes to institute complementary measures to manage fisheries under their jurisdiction that may affect federally managed stocks.

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

5.11 REGULATORY IMPACT REVIEW AND INITIAL REGULATORY FLEXIBILITY ANALYSIS

NMFS is proposing regulations to implement Amendment 16 to the Salmon FMP. Amendment 16 brings the Salmon FMP into compliance with revised NS1Gs, under the MSA as reauthorized in 2006, to end and prevent overfishing. This action proposes to revise the Salmon FMP under Amendment 16 to address new requirements of the Magnuson Stevens Fishery Conservation and Management Act as amended in 2007, and NS1Gs as revised in 2009, including implementation of ACLs and AMs.

In order to comply with EO 12866 and the Regulatory Flexibility Act (RFA), this document serves as a Regulatory Impact Review (RIR) and an Initial Regulatory Flexibility Analysis (IRFA) for Amendment 16 to Pacific Coast Salmon Plan. The RFA requires the agency to prepare and make available for public comment an IRFA that describes the impact of the proposed rule on small businesses, non-profit enterprises, local governments, and other small entities. The IRFA is to aid the agency in considering all reasonable regulatory alternatives that would minimize the economic impact on affected small entities. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. NMFS requires the preparation of an RIR for all regulatory actions of public interest.

This analysis is adapted from Final Draft Environmental Assessment and Regulatory Impact Review for Pacific Coast Salmon Plan Amendment 16: Classifying Stocks, Revising Status Determination Criteria, Establishing Annual Catch Limits and Accountability Measures and I Fishing Provisions (EA); prepared by The Ad Hoc Salmon Amendment Committee for The Pacific Fishery Management Council and National Marine Fisheries Service September 2011. This analysis also uses estimates developed by the Pacific Council in its Review of 2010 Ocean Salmon Fisheries (Review).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

5.11.1 Initial 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 EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. The EO 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, they should choose those approaches that maximize net benefits to society.

The RIR is designed to determine whether the proposed action could be considered a “significant regulatory action” according to EO 12866. EO 12866 defines a “significant regulatory action”, and requires agencies to provide analysis of the costs and benefits of such action and reasonable feasible alternatives. An action may be considered “significant” if it is expected to: 1) have an 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; 2) create a serious inconsistency or otherwise interfere with action taken or planned by another agency; 3) materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the EO.

The RIR analysis includes: a description of management objectives, a description of the fishery, statement of the problem, a description of each alternative considered in the analysis, and an economic analysis of the expected effects of each selected alternative relative to the no action alternative.

5.11.1.1 Description of the Management Objectives & Legal Authority

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) amended the MSA to include new requirements for ACLs, AMs, and other provisions regarding preventing and ending overfishing and rebuilding fisheries. On January 16, 2009, NMFS published a final rule (74 FR 3178) amending the NS1Gs to implement these new requirements. The Salmon FMP (PFMC 2007) establishes conservation and allocation guidelines for annual management. This framework allows the Council to develop measures responsive to stock status in a given year. Section 3 of the current Salmon FMP describes the conservation objectives for Salmon FMP stocks necessary to meet the dual MSA objectives of obtaining OY from a fishery while preventing overfishing. Each stock has a specific objective, generally designed to achieve MSY, maximum sustained production (MSP), or in some cases, an exploitation rate to serve as an MSY proxy. The Salmon FMP also specifies criteria to determine when overfishing may be occurring and when a stock may have become overfished. These conditions are referred to as a Conservation Alert and an Overfishing Concern, respectively. In addition, the Salmon FMP also specifies required actions when these conditions are triggered. The alternatives described in Section 2 are structured around the actions required when a Conservation Alert is triggered.

5.11.1.2 Statement of the Problem

This proposed action will bring the Salmon FMP into compliance with the MSA, as amended in 2007, and the revised NS1Gs, by developing and implementing ACLs and AMs to prevent overfishing on stocks in the fishery to which MSA Section 303(a)(15) applies, ensure “measurable and objective” SDC for stocks in the fishery, and define the control rules under which de minimis fishing opportunity would take place consistent with NS1.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

5.11.1.3 Description of the Fishery

Ocean salmon fisheries in Council waters harvest primarily Chinook and coho salmon, with small numbers of pink salmon harvested in odd-numbered years, by means of hook-and-line commercial and recreational fisheries. Such fisheries occur from the coastline to approximately 25 miles offshore from the U.S./Canada Border to approximately Point Conception in California. Major runs originate in Puget Sound, the Columbia River System extending into Idaho, the Klamath River, the Sacramento-San Joaquin River systems in California and coastal Oregon streams.

The Pacific Fishery Management Council's Review 2010 Ocean Salmon Fisheries (PFMC 2011a) provides the following economic snapshot of the 2010 fishery. Total 2010 exvessel value of the Council-managed non-Indian commercial salmon fishery was $7.15 million, which is the fifth lowest on record, but more than four times above its 2009 level of $1.5 million. California had its first commercial salmon fishery since 2007. The 2010 exvessel value of the commercial fishery was 28 percent below the 2005-2009 inflation-adjusted average of $10 million and 88 percent below the 1979 through 1990 inflation-adjusted average of $59.3 million. Based on Pacific Coast Fisheries Information Network (PacFIN) data, a total of 641 vessels participated in the non-tribal West Coast commercial salmon fishery in 2010. This is more than double the number that participated in 2009 (313), and nearly triple the number in 2008. However the 2010 total was down 36 percent from 2007's total of 1,007 vessels.

The preliminary number of vessel-based ocean salmon recreational angler trips taken on the West Coast in 2010 was 182,900 a decrease of three percent from 2009, and 70 percent below the 1979 through 1990 average. Compared with 2009, preliminary estimates of the number of trips taken in 2010 decreased by 37 percent in Oregon and 18 percent in Washington. California effort was up substantially since the sport fishery was not restricted to a 10-day fishery in the Klamath Management Zone as it was in 2009; however it was still severely depressed compared to historic levels. Recreational salmon fishing takes place primarily in two modes, (1) anglers fishing from privately owned pleasure crafts, and (2) anglers employing the services of the charter boat fleet. In general, success rates on charter vessels tend to be higher than success rates on private vessels. Small amounts of shore-based effort directed toward ocean area salmon occur, primarily from jetties and piers. Coastwide, the proportion of angler trips taken on charter vessels in 2010 was relatively stable at 24 percent compared with 23 percent in 2009; however underlying this trend was a decline in the proportion of charter trips in Oregon and increases in California and Washington. During 2010, the Review indicates that there were 465 charter boats that participated in the 2010 fishery.

While some of the treaty Indian harvest was for ceremonial and subsistence purposes, the vast majority of the catch was commercial harvest. For all of 2010 the preliminary exvessel value of Chinook and coho landed in the treaty Indian ocean troll fishery was $1.8 million, compared with the exvessel value in 2009 of $1.0 million. According to a Northwest Indian Fisheries Commission representative, the tribal fleet consists of 40 to 50 trollers./ The commercial entities directly regulated by the Pacific Council's Fishery Management Plan are non-tribal commercial trollers, tribal commercial trollers, and charter boats. During 2010, these fleets consisted of 641 non-tribal trollers, 40 to 50 tribal trollers, and 465 charter boats.

Total West Coast income impact associated with recreational and commercial ocean salmon fisheries for all three states combined was estimated at $25.5 million in 2010. This was 46 percent above the estimated 2009 level of $17.4 million. 2010 had the third lowest income impacts on record, with 2008 having the lowest on record at $7.5 million and 2009 the second lowest (adjusted for inflation).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

5.11.1.4 Description of the Alternatives

The alternatives address the following areas:

Stock Classification

- Stocks In The Fishery.

  Stocks in need of conservation and management measures in Council-area fisheries would be classified as "in the fishery" under Amendment 16. Target stocks in Council-area fisheries are hatchery stocks and productive natural stocks with ocean distributions primarily within the Council area. Non-target salmon stocks include stocks listed under the ESA or depressed natural stocks. Under Amendment 16, all salmon stocks currently included in the FMP would be considered to be in the fishery except for Canadian Chinook, coho and pink stocks, and mid-Columbia River spring Chinook salmon. The Canadian stocks were removed because Canadian stocks are managed under the Pacific Salmon Treaty, and their status is assessed by the Canadian government. The mid-Columbia River spring Chinook salmon would be removed because Council area fisheries have negligible impacts on the stock, and therefore they are not in need of conservation and management measures in fisheries under Council authority. Two stocks would be added to the FMP: Oregon coastal hatchery coho and Willapa Bay natural coho. Smith River Chinook salmon would also be identified as a separate stock from other ESA listed California Coastal Chinook stocks.

- Stock Complexes

  Stock complexes are groups of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impacts of management actions on the stocks are similar. Stock complexes may be formed to facilitate management requirements such as setting ACL, or determining stock status. Three Chinook stock complexes are specified in Amendment 16: Central Valley Fall (CVF), Southern Oregon Northern California (SONC), and far-north migrating coastal (FNMC). The complexes would facilitate specification of ACLs and AMs.

- Internationally managed stocks.

  Amendment 16 identifies the FNMC Chinook complex; Washington coastal and Puget Sound coho; and Puget Sound pink salmon as exempt from the ACL and AM requirements in the MSA because these stocks are subject to management under an international agreement (P.L. 109-479, sec. 104(b), MSA § 303 note). These stocks are managed in accordance with terms of the Pacific Salmon Treaty between the U.S. and Canada. While stocks managed under an international agreement can be exempted from specification of ACLs, all other MSA 303(a) requirements apply, thus they are still required to have MSY and SDC specified.

- Status Determination Criteria

  Under Amendment 16, SDC would be determined for natural stocks for which specification of these reference points is appropriate and possible, based on the best available science. SDC would be specified only for individual stocks, including indicator stocks within stock complexes, not for stock complexes as a whole. The proposed SDC incorporate the reference points identified in the NS1Gs; however, the proposed definitions of some of these reference points differ slightly from those in the NS1Gs to accommodate the life history of Pacific salmon, whose reproduction is semelparous and for which a stock's full reproductive potential can be spread out over a multi-year period. These modified approaches are proposed in accordance with the provision allowing for flexibility in the application of NS1Gs (50 CFR 600.310(h)(3)).

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Under Amendment 16, a stock would be considered subject to overfishing when the postseason estimate of the fishing mortality rate (F) exceeds the MFMT, where the MFMT is generally defined as F_{MSY}. The definitions of overfished, approaching overfished, and rebuilt rely on multi-year postseason estimates of spawning escapement to be assessed using a 3-year geometric mean to determine status. MSST would be variable among stocks, with MSST defined for most stocks as $0.5*S_{MSY}$, but MSST for SRFC, KRFC, Grays Harbor, Queets, Hoh, and Quillayute coho defined as $0.75*S_{MSY}$, and MSST for Puget Sound coho defined as the stock specific low/critical abundance breakpoint multiplied by one minus the low exploitation rate limit. The Puget Sound coho provisions are designed to be consistent with the conservation and management provisions developed through the Pacific Salmon Treaty. An approaching overfished determination would be made if the geometric mean of the two most recent postseason estimates of spawning escapement and the current preseason forecast of spawning escapement are below the MSST.

- Annual Catch Limits.

  Under Amendment 16, specification of overfishing limit OFL, ABC, and ACL reference points would be made on an individual stock basis as required based on the best available science. These reference points would not be specified for internationally managed stocks identified in the FMP. Hatchery stocks and ESA-listed stocks identified in the FMP would be managed to meet hatchery goals and ESA consultation standards, consistent with the NS1Gs, which provide the flexibility to consider alternative approaches for specifying ACLs and AMs. Under Amendment 16, the relevant stocks for specifying OFL/ABC/ACL reference points would be SRFC and KRFC as indicator stocks for the CVF and SONC Chinook complexes respectively.

  Under Amendment 16, OFL, ABC and ACL would be specified as escapement levels for each stock. These OFL, ABC, and ACL escapement levels would be determined annually using exploitation rates (i.e., F_{MSY}, F_{ABC}, and F_{ACL}) and abundance estimates for each stock. F_{ABC} incorporates a reduction from F_{MSY} to account for scientific uncertainty. F_{MSY} and F_{ABC} are defined in terms of total exploitation rate across all salmon fisheries (Federal and nonfederal jurisdiction). Impacts in non-salmon fisheries are included in the natural mortality assumptions used to estimate population parameters for salmon stocks; therefore, all fishing mortality sources are accounted for when reference points are specified. Amendment 16 leaves in place existing conservation objectives for stocks in the FMP. Under the amendment, the fishery would be managed to meet the greater of either the ACL or the conservation objective in a given year.

- *De Minimis* Fishing Provisions

  The *de minimis* fishing provisions that exist in the current FMP and would be revised by Amendment 16 allow for more flexibility in setting annual regulations when the conservation objectives for limiting stocks are projected not to be met, and provide opportunity to access more abundant salmon stocks that are typically available in the Council management area when the status of one stock may otherwise preclude all ocean salmon fishing in a large region, as is the case under the conservation alert in the current FMP. *De minimis* fishing provisions vary by stock and depend on the form and structure of the conservation objective. Amendment 16 describes *de minimis* fishing provisions that would be applied to SRFC and KRFC specifically, although these provisions are such that they could be applied to other stocks as well. Under Amendment 16, *de minimis* fishing provisions would use a multi-step F-based control rule that would allow some harvest at all abundance levels. As stock size declines, the allowable exploitation rate declines from F_{ABC} in order to achieve S_{MSY} until F=0.25. A constant maximum exploitation rate of 0.25 would be allowed until the potential spawner abundance reaches the

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midpoint between S_{MSY} and MSST where F would be reduced in proportion to abundance to no more than 10 percent at MSST. At potential spawner abundance levels less than or equal to half of MSST the allowable exploitation rate would be further reduced to levels approaching zero as abundance approaches zero.

Chapter Two of the draft EA describes the following alternatives in detail.

2.0 DESCRIPTION OF ALTERNATIVES
2.1 Stock Classification
2.1.1 Classification Issues
2.1.2 Alternatives for Stock Classification
2.1.3 Alternatives for Stock Complexes and Indicator Stocks
2.1.4 The International Exception
2.2 Alternatives for Reference Points – Status Determination Criteria
2.2.1 Criteria Used to Evaluate the Alternatives
2.2.2 Overview of Alternatives
2.2.3 SDC Alternative 1: Status Quo
2.2.4 Alternative 2: Single Year Basis SDC, MSST = 0.5*SMSY
2.2.5 Alternative 2b: Single Year SDC, MSST = 0.75*SMSY
2.2.6 Alternative 3: 3-Year Geometric Mean Basis SDC, MSST = 0.5*SMSY
2.2.6 Alternative 3b: 3-Year Geometric Mean Basis SDC, MSST = 0.75*SMSY
2.2.7 Alternative 3c: 3-Year Geometric Mean Basis SDC, MSST = 0.86*SMSY
2.2.8 Alternative 4: 3-Year Arithmetic Mean Basis SDC, MSST = 0.5*SMSY
2.2.9 Alternative 4b: 3-Year Arithmetic Mean Basis SDC, MSST = 0.75*SMSY
2.2.10 FPA Alternative 5: 3-Year Geometric Mean Basis SDC, MSST Variable Among Stocks
2.2.11 Stock-Specific Considerations
2.2.12 Council Response to Triggering SDC
2.3 Alternatives for Reference Points: OFL, ABC, ACL and Associated Frameworks
2.3.1 Criteria Used to Evaluate the Alternatives
2.3.2 Alternative Reference Points for OFL, ABC, and ACL
2.3.3 Alternative 1: Status Quo – Not defined
2.3.4 Overview of Alternatives 2, FPA 3 and 3b
2.3.5 Specification of Frameworks for Stock Complexes
2.3.6 Alternatives Eliminated From Detailed Study
2.4 Accountability Measures
2.4.1 Criteria Used to Evaluate the AM Alternatives
2.4.2 Alternative 1: Status Quo
2.4.3 Alternative 2 – Classify Current Measures in the FMP as AMs
2.4.4 FPA 3 – Classify Current Measures in the FMP as AMs, Except "Conservation Alert" and "Overfishing Concern"
2.4.5 Other AMs Associated with Both Alternative 2 and FPA 3
2.5 *De minimis* Fishing Provisions
2.5.1 *De minimis* Fishing Alternatives
2.5.2 *De minimis* Fishing Provisions and Stock Rebuilding

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5.11.1.5 An economic analysis of the expected effects of each selected alternative relative to the No Action Alternative

According to NMFS Guidelines for Economic Analysis of Fishery Management Actions (March, 2007), the economic analysis of proposed fishery management actions should discuss the types and direction of expected effects on the living marine resources, their habitats, and those who benefit from these resources. The types of effects to consider include the following: changes in net benefits within a benefit cost framework; changes in benefits and costs of groups of individuals, businesses of differing sizes, and other entities (including small communities and governmental entities); changes in income and employment in fishing communities; cumulative impacts of regulations; and changes in other social concerns. The economic analysis provided above in the 2010 economic snapshot" addressed participation, ex-vessel revenue, and income impacts associated with various sectors. What follows is discussion of the economic analysis of the Amendment 16 alternatives.

The key components of Amendment 16 are administrative as they are revisions to the key components of the process by which the Council and NMFS make decisions on how best to manage various stocks in the fishery. These key components include defining what stocks are in the fishery; how these stocks may be organized into stock complexes, the treatment of international stocks, revising the stock status determination criteria including definitions of overfishing, ABC, and ACL reference points; and revised de minimis fishing provisions that to allow for more flexibility in setting annual regulations when the conservation objectives for limiting stocks are projected not to be met, and provide opportunity to access more abundant salmon stocks that are typically available in the Council management area when the status of one stock may otherwise preclude all ocean salmon fishing in a large region. This action revises the process of how conservation and management decisions will be made; it contains no actual application of the methods to set ABC, ACL, or OFL or the management measures (e.g. closed seasons, area closures, bag limits, etc.) to keep the fishery within the ACL and other conservation objectives to assure that overfishing does not occur. As a result there are no immediate economic impacts to evaluate. These will occur when the new process is actually applied in future actions and the economic impacts will be evaluated then.

However, the EA did undertake an economic analysis of the expected effects of the preferred action and options relative to "No Action" alternative and presented the following conclusions. The proposed alternatives for classifying the stocks in the FMP will have no economic impacts, as there are no biological implications to designating stocks "in the fishery" and "ecosystem components", as compared with the no action Alternative. Proposed alternatives for SDC have no significant biological or economic impacts. The stocks have had low frequency of experiencing overfishing in the past and many of the current control rules clearly prevent fishing at or above FMSY. It has been rare that stock abundance or other constraints on the fishery have created opportunity for fishing above FMSY in other cases. Identifying clearer criteria with which to determine stock status will more clearly align with the MSA and NS1Gs, and can help managers implement timelier management responses and contribute to ensuring sustainable salmon stock levels to support the fishery, resulting in positive economic effects. The proposed alternatives for implementing ACLs, ABCs, and associated reference points (i.e., the ACL framework) are similar in nature to the effects of the proposed SDC, thus, have no significant biological or economic impacts. In the short term, fisheries may be constrained in a given year to prevent overfishing, but such actions will provide long-term benefits from more sustainable salmon populations to support harvest and recreational opportunities. Proposed alternatives to identify AMs have no significant biological or economic impacts, compared to the no action alternative. Many of the proposed AMs identified are actions that exist in the FMP currently and are administrative in nature (e.g., notification). Proposed alternatives for de minimis fishing are not expected to result in significant biological or

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economic effects. However, providing for de minimis fishing will afford more opportunities for harvest, consistent with National Standard 8, and achieve optimum yield for the fishery consistent with NS1. Therefore, there are projected positive economic benefits of the proposed action by allowing some minimal harvest of weaker stocks in an effort to harvest healthier, abundant stocks in the mixed stock fishery.

5.11.1.6 Conclusion

Because the proposed action does not have any immediate economic impacts and because expected effects are not likely to result in significant effects, it is determined that the proposed rule, if implemented, would not meet the thresholds that constitute a "significant regulatory action" under E.O. 12866. The proposed actions will not have a cumulative effect on the economy of $100 million or more, nor will they result in a major increase in costs to consumers, industries, governmental agencies, or geographical regions. No significant adverse impacts are anticipated on competition, employment, investments, productivity, innovation, or competitiveness of U.S.-based enterprises. The annual effect on the economy of $100 million (positively or adversely) due to the Amendment 16 Alternatives will not be realized, as by virtue of total coastal community and personal income impacts (in real, inflation-adjusted 2010 dollars) of the commercial troll and recreational ocean salmon fishery are only about $10.4 million and $12.5 million, respectively, for major port areas in US West Coast in 2010. The average annual total Coastal community and personal income impacts (in real, inflation-adjusted 2010 dollars) of the commercial troll and recreational ocean salmon fishery were only about $34.3 million and $26.1 million, respectively, for major port areas in US West Coast during 2001 to 2009 (PFMC 2011a)

5.11.2 Initial Regulatory Flexibility Analysis

The RFA, 5 U.S.C. 603 et seq., requires government agencies to assess the effects that regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. A fish-harvesting business is considered a "small" business by the Small Business Administration (SBA) if it has annual receipts not in excess of $4.0 million. For related fish-processing businesses, a small business is one that employs 500 or fewer persons. For wholesale businesses, a small business is one that employs not more than 100 people. For marinas and charter/party boats, a small business is one with annual receipts not in excess of $6.5 million. All of the businesses that would be affected by this action are considered small businesses under SBA guidance.

When an agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an IRFA that describes the impact on small businesses, non-profit enterprises, local governments, and other small entities. The IRFA is to aid the agency in considering all reasonable regulatory alternatives that would minimize the economic impact on affected small entities. Under the RFA, an agency does not need to conduct an IRFA and/or Final Regulatory Flexibility Analysis (FRFA), if a certification can be made that the proposed rule, if adopted, will not have a significant economic impact on a substantial number of small entities. To certify, the agency must: state the basis and purpose of the rule, describe and estimate the number of small entities to which the rule applies, estimate economic impacts on small entities, by entity size and industry, and explain the criteria used to evaluate whether the rule would impose "significant economic impacts."

5.11.2.1 Why the Action is Being Considered, Objectives and the Legal Basis for the Action

The MSRA amended the MSA to include new requirements for ACLs, AMs, and other provisions regarding preventing and ending overfishing and rebuilding fisheries. On January 16, 2009, NMFS published a final rule (74 FR 3178) amending the NS1Gs to implement these new requirements. This

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proposed action will bring the Salmon FMP into compliance with the MSA, as amended in 2007, and the revised NS1Gs, by developing and implementing ACLs and AMs to prevent overfishing on stocks in the fishery to which MSA Section 303(a)(15) applies, ensure "measurable and objective" SDC for stocks in the fishery, and define the control rules under which *de minimis* fishing opportunity would take place consistent with NS1.

5.11.2.2 Description and Estimate of the Number of Small Entities to Which the Rule Applies.

The commercial entities directly regulated by the Pacific Council's Fishery Management Plan are non-tribal commercial trollers, tribal commercial trollers, and charter boats. The total ex-vessel revenue from ocean commercial troll salmon landings (targeting Chinook and coho) in the West Coast (combined for California, Oregon, and Washington states) was only about $7.15 million in 2010 The average revenue per vessel of the vessels 641 vessels operating on the West Coast during 2010 was only about $11,000. (Approximately 300 of these trollers account for 90 percent of the revenues for an average revenue of $21,000.) Commercial fishing was very limited off of California in 2010, following two years of commercial fishery closure due to a fishery resource disaster. Fishing year 2005 was the most recent year that was not limited off California and southern Oregon by weak runs of either KRFC or SRFC. In 2005, the average annual revenue per vessel coast-wide was only $18,780 which is also much less than the threshold limit of $4.0 million in revenue per vessel. According to a Northwest Indian Fishery Commission representative, there are approximately 40 to 50 tribal trollers. During 2010, the tribal troll harvest was worth $1.8 million ex-vessel implying that the average revenue per troller ranges from $36,000 to $45,000.

According to Pacific Council estimates 465 charter boat operations participated in the fishery in 2010. Specific data on the economics of halibut charter operations is unavailable. However, in January 2004, the Pacific States Marine Fisheries Commission (PSMFC) completed a report on the overall West Coast charter boat fleet. In surveying charter boat vessels concerning their operations in 2000, the PSMFC estimated that there were about 315 charter boat vessels in operation off Washington and Oregon. The PSMFC has developed preliminary estimates of the annual revenues earned by this fleet and they vary by size class of the vessels and home state. Small charter boat vessels range from 15 to 30 feet and typically carry 5 to 6 passengers. Medium charter boat vessels range from 31 to 49 feet in length and typically carry 19 to 20 passengers. (Neither state has large vessels of greater than 49 feet in their fleet.) Average annual revenues from all types of recreational fishing, whale watching, and other activities ranged from $7,000 for small Oregon vessels to $131,000 for medium Washington vessels. These data lead to the conclusion that salmon charter boat vessels qualify as small entities under the RFA.

The commercial entities directly regulated by the Pacific Council's Fishery Salmon Management Plan are non-tribal commercial trollers, tribal commercial trollers, and charter boats. During 2010, these fleets consisted of 641 non-tribal trollers, 40 to 50 tribal trollers, and 465 charter boats. A fish-harvesting business is considered a "small" business by the Small Business Administration (SBA) if it has annual receipts not in excess of $4.0 million. For marinas and charter/party boats, a small business is one with annual receipts not in excess of $6.5 million. All of the businesses that would be affected by this action are considered small businesses under SBA guidance. Average 2010 tribal and non-tribal vessel revenues are approximately $13,000 and according to a PSMFC study on charter boats; average 2000 vessel revenues ranged from $7,000 to $131,000 depending on vessel size class. As these average revenues are far below SBA's thresholds, NMFS has determined that all of these entities are small entities under Small Business Administration's definitions.

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5.11.2.3 Reporting and Recordkeeping Requirements

There are no reporting and recordkeeping requirements for this action.

5.11.2.4 Relevant Federal Rules that may Duplicate, Overlap or Conflict with the Proposed Action.

There are no relevant Federal rules that may duplicate or overlap or conflict with the proposed action.

5.11.2.5 A description of any significant alternatives to the proposed rule

A description of any significant alternatives to the proposed rule that accomplish the stated objectives of applicable statutes and that minimize any significant economic impact of the proposed rule on small entities is required, including determination of a significant impacts and an estimate of economic impacts on small entities, by entity size and industry.

There is no significant economic impact of the proposed rule on small entities.

The key components of Amendment 16 are administrative as they are revisions to the key components of the process by which the Council and NMFS make decisions on how best to manage various stocks in the fishery. As a result there are no immediate economic impacts to evaluate. These will occur when the new process is actually applied in future actions and the economic impacts will be evaluated then.

However, the EA did undertake an economic analysis of the expected effects of the preferred action and options relative to "No Action" alternative and presented the following conclusions. The proposed alternatives for classifying the stocks in the FMP will have no economic impacts, as there are no biological implications to designating stocks "in the fishery" and "ecosystem components", as compared with the no action Alternative. Proposed alternatives for SDC have no significant biological or economic impacts. The stocks have had low frequency of experiencing overfishing in the past and many of the current control rules clearly prevent fishing at or above F_{MSY}. It has been rare that stock abundance or other constraints on the fishery have created opportunity for fishing above FMSY in other cases. Identifying clearer criteria with which to determine stock status will more clearly align with the MSA and NS1Gs, and can help managers implement timelier management responses and contribute to ensuring sustainable salmon stock levels to support the fishery, resulting in positive economic effects. The proposed alternatives for implementing ACLs, ABCs, and associated reference points (i.e., the ACL framework) are similar in nature to the effects of the proposed SDC, thus, have no significant biological or economic impacts. In the short term, fisheries may be constrained in a given year to prevent overfishing, but such actions will provide long-term benefits from more sustainable salmon populations to support harvest and recreational opportunities. Proposed alternatives to identify AMs have no significant biological or economic impacts, compared to the no action alternative. Many of the proposed AMs identified are actions that exist in the FMP currently and are administrative in nature (e.g., notification). Proposed alternatives for de minimis fishing are not expected to result in significant biological or economic effects. However, providing for de minimis fishing will afford more opportunities for harvest, consistent with National Standard 8, and achieve optimum yield for the fishery consistent with NS1. Therefore, there are projected positive economic benefits of the proposed action by allowing some minimal harvest of weaker stocks in an effort to harvest healthier, abundant stocks in the mixed stock fishery.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

5.11.2.6 Conclusion

The proposed changes to the FMP do not include any reporting or recordkeeping requirements. These changes will also not duplicate, overlap or conflict with other laws or regulations. The economic analysis does not highlight any significant impact. The key components of Amendment 16 are administrative as they are revisions to the key components of the process by which the Council and NMFS make decisions on how best to manage various stocks in the fishery. As a result there are no immediate economic impacts to evaluate. These will occur when the new process is actually applied in future actions and the economic impacts will be evaluated then. Consequently, these changes are not expected to meet any of the RFA tests of having a "significant" economic impact on a "substantial number" of small entities. Nonetheless, NMFS has prepared this IRFA. Through the rulemaking process associated with this action, we are requesting comments on this conclusion.

F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

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F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

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F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; NS1Gs-National Standard 1 Guidelines; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

APPENDIX A: LIST OF PUBLIC MEETINGS, AGENCIES AND PERSONS CONSULTED, AND DOCUMENT PREPARERS

The following public meetings were held as part of the Salmon Amendment 16 process:

March 8-13, 2009:	**Pacific Fishery Management Council meeting**, Seattle, Washington.
August 4-5:	Ad Hoc Salmon Amendment Committee, Santa Cruz, California.
September 11-17:	**Pacific Fishery Management Council meeting**, Foster City, California.
October 7:	Ad Hoc Salmon Amendment Committee, Portland, Oregon.
November 5:	Ad Hoc Salmon Amendment Committee, Portland, Oregon.
January 26, 2010:	Ad Hoc Salmon Amendment Committee, Portland, Oregon.
May 6-7:	Ad Hoc Salmon Amendment Committee, Portland, Oregon.
June 10-17:	**Pacific Fishery Management Council meeting**, Foster City, California.
September 10-16:	**Pacific Fishery Management Council meeting**, Boise, Idaho.
November 3-9:	**Pacific Fishery Management Council meeting**, Costa Mesa, California.
March 4-10, 2011:	**Pacific Fishery Management Council meeting**, Vancouver, Washington.
May 16-17	Ad Hoc Salmon Amendment Committee, Portland, Oregon.
June 6-13:	**Pacific Fishery Management Council meeting**, Spokane, Washington.

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

Yurok Tribe
Hoopa Valley Tribe
Columbia River Treaty Tribes
Washington Coast Indian Tribes,
Puget Sound Indian Tribes

Pacific Fishery Management Council and its Salmon Advisory Subpanel, Salmon Technical Team, and Scientific and Statistical Committee

The Council's Ad Hoc Salmon Amendment Committee prepared this EA:

Mr. Chuck Tracy, Pacific Fishery Management Council Staff
Dr. Peter Dygert, NMFS Northwest Region
Ms. Jennifer Isé, NMFS Southwest Region
Dr. Michael O'Farrell, NMFS Southwest Fisheries Science Center
Mr. Michael Mohr, NMFS Southwest Fisheries Science Center
Mr. Naresh Pradhan, NMFS Southwest Region
Mr. Larrie LaVoy, NMFS Northwest Region
Ms. Jennifer Stanford, NMFS Southwest Region
Dr. Robert Kope, NMFS Northwest Fisheries Science Center
Dr. Pete Lawson, NMFS Northwest Fisheries Science Center
Ms. Peggy Mundy, NMFS Northwest Region
Ms. Sheila Lynch, NOAA General Counsel Northwest Region
Ms. Shelby Mendez, NMFS Southwest Region
Mr. Keith Lutz, Northwest Indian Fish Commission
Mr. Doug Milward, Washington Department of Fish and Wildlife
Mr. Craig Foster, Oregon Department of Fish and Wildlife
Mr. Ron Boyce, Oregon Department of Fish and Wildlife
Mr. Henry Yuen, U.S. Fish and Wildlife Service

With assistance from Dr. Steve Freese, NMFS Northwest Region

APPENDIX B: VULNERABILITY OF SALMON FMP STOCKS TO COUNCIL AREA FISHERIES

In the National Standard 1 (NS1) guidelines, the “vulnerability” of fish stocks is referenced as one of the bases for differentiating between stocks that are “in the fishery” versus those that are “ecosystem components.” To clarify the definition of “vulnerability” a Vulnerability Evaluation Work Group (VEWG) was established to develop a methodology for determining the vulnerability of stocks managed under a fishery management plan (FMP) (Patrick et al. 2010). We applied the methodology developed by the VEWG to three salmon stock groups to help establish a basis for distinguishing stocks that can reasonably be considered “ecosystem components” in Council fisheries.

In general, stocks “in the fishery” include target stocks (those that are directly pursued by commercial fisheries) and non-target stocks (fish species that are not targeted but are caught incidentally in target fisheries). Stocks may be managed as single species or in stock complexes. All stocks “in the fishery” are generally retained for sale or personal use and/or are vulnerable to overfishing, being overfished, or could become so in the future based on the best available information. As a default, NMFS declares that all stocks and stock complexes currently listed in FMPs are considered “in the fishery.” Because ecosystem component stocks are a type of non-target stock, occasional retention of the stock is not in and of itself a reason to classify it as “in the fishery. In addition, ecosystem component stocks must not be subject to overfishing, becoming overfished, or likely to become so in the future in the absence of conservation and management measures.

The vulnerability of a stock to becoming overfished was described by the VEWG as the potential for the productivity of the stock to be diminished by direct or indirect fishing pressure. Vulnerability is expected to differ among stocks based on their life history characteristics and susceptibility to the fishery. The definition developed by the VEWG followed Stobutzki (2001) and includes two key elements: 1) stock productivity (a function of the stock's life history characteristics) and 2) stock susceptibility (the degree to which the fishery can negatively impact the stock.) Stocks with low productivity are not necessarily vulnerable to overfishing unless they have some level of susceptibility to the fishery. The methodology developed to assess vulnerability is termed a “productivity and sensitivity analysis” (PSA).

The PSA was originally developed to classify differences in bycatch sustainability in the Australian prawn fishery (Stobutzki et al. 2001) and has been modified and adapted to include habitat and community components (Hobday et al. 2004). Both methods create numerical indexes of productivity (p) and susceptibility (s) separately using a variety of ranking factors. Based largely on these two studies the VEWG created a PSA designed to accommodate a wide variety of U.S. fisheries ranging from long-line tuna and swordfish to trawl groundfish.

The PSA adaptation developed by the VEWG included ten productivity attributes and twelve susceptibility attributes. Each attribute was scored from 1 (low productivity, low susceptibility) to 3 (high productivity, high susceptibility) and weighted from 0 to 4 (with a default of 2). Note that the least vulnerable stocks have high productivity (3) and low susceptibility (1). Factors can be weighted to emphasize those most relevant to a class of fishery and to de-emphasize factors that are uninformative or, even misleading. The weighed factors are combined in to an index for p and an index for s. These can then be combined to calculate a vulnerability score (v) or plotted to show p and s relative to other stocks and fisheries. Guidelines are provided for scoring, but ultimately there is an element of expert opinion involved in the evaluation. The VEWG also provided a data quality index to aid in evaluating data-poor stocks. Salmon, in general, are data rich, so we did not consider data quality in this analysis. More

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

information and a spreadsheet for doing the evaluation can be obtained at: http://www.nmfs.noaa.gov/msa2007/vulnerability.htm.

The Vulnerability Analysis Working Group assessed productivity and susceptibility scores for 166 non-salmonid species in U.S. fisheries. These included Atlantic sharks, Bering Sea and Aleutian Island Skates, California nearshore groundfish, California Current pelagics, Northeast groundfish, Hawaii pelagic longline swordfish, Hawaii pelagic longline tuna, and South Atlantic and Gulf of Mexico longline species (Patrick et al. 2010). Overall vulnerability can be visualized in a plot of productivity vs. susceptibility (Figure B-1.) Since the least vulnerable stocks have high productivity and low susceptibility the x-axis in Figure B-1 is reversed so that the stocks closest to the origin have the lowest vulnerability.

We applied PSA analysis to Pacific salmon to evaluate their vulnerability to Council-area fisheries in the context of other fish and fisheries. In the context of all U.S. fisheries, most Pacific salmon stocks are quite similar in productivity and susceptibility, so PSA analysis is not useful for differentiating individual stocks for management purposes. There are, however, two groups of stocks that differ from what might be considered generic salmon in the Eastern Pacific. These are Far North Migrating (FNM) Chinook stocks, with migration timings and patterns that separate them from southern U.S. Fisheries, and Fraser River and Puget Sound pink salmon, somewhat more productive, and caught at very low rates in Council-area fisheries. We developed a PSA for three salmon stock groups; 1) generic salmon, 2) FNM salmon, and 3) pink salmon. Generic salmon include most Chinook and coho salmon from Washington, Oregon, and California. These fish share productivity characteristics and are effectively targeted in Council-area fisheries. FNM Chinook stocks migrate north to Alaska as juveniles and have low susceptibility to Council-area fisheries. Pink stocks mature at a younger age and also have low susceptibility to Council-area fisheries.

Attribute scores were determined based on the criteria in the VEWG spreadsheet and discussion among several scientists knowledgeable about salmon biology and Council-area fisheries. Most factors were scored directly using the quantitative criteria specified by the VEWG. All weights were left at the default of 2 except for "r," intrinsic rate of increase, weighted at 4. We felt that this was one of the defining properties of Pacific salmon, and warranted stronger consideration.

Productivity for Pacific salmon stocks is quite high, with scores of 2.409 for generic and FNM salmon, and 2.455 for pink salmon (Table B-1). Susceptibility was moderate to low, with scores of 2.208 (generic), 1.875 (FNM), and 1.708 (pink). In relation to other U.S. fisheries, these productivity scores are among the highest. Susceptibility scores range from average to low. Overall vulnerability scores (distance from the origin in Figure B-1) were 1.345 (generic), 1.056 (FNM), and 0.894 (pink). Pink salmon and FNM salmon are among the least vulnerable to overfishing of all the stocks analyzed by the VEWG. Generic salmon are more vulnerable because, despite their high productivity they are susceptible to highly effective fisheries.

Table B-1. The VEWG worksheet, including productivity and susceptibility attributes, with definitions, and attribute scores for three salmon stocks. "Generic Salmon" includes most Chinook and coho salmon in Council-area fisheries, "Far North Migrate" includes stocks of spring Chinook that migrate out of Council fisheries, and "Pink Salmon" includes mostly Fraser River pink salmon that are caught at very low rates in the Strait of Juan de Fuca and Puget Sound. Attributes that differ for individual stocks are in bold.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

					Generic Salmon		Far North Migrate		Pink Salmon	
Productivity Attributes	**High (3)**	**Moderate (2)**	**Low (1)**	**Weight**	**Attribute Score**	**Weighted Attribute Score**	**Attribute Score**	**Weighted Attribute Score**	**Attribute Score**	**Weighted Attribute Score**
r	>0.5	0.5-0.16 (mid-point 0.10)	<0.16	4	3.0	12.0	3.0	12.0	3.0	12.0
Maximum Age	< 10 years	10 - 30 years (mid-point 20)	> 30 years	2	3.0	6.0	3.0	6.0	3.0	6.0
Maximum Size	< 60 cm	60-150 cm (mid-point 105)	> 150 cm	2	2.0	4.0	2.0	4.0	**3.0**	**6.0**
von Bertalanffy Growth Coefficient (k)	> 0.25	0.15-0.25 (mid-point 0.20)	< 0.15	2	3.0	6.0	3.0	6.0	3.0	6.0
Estimated Natural Mortality	> 0.40	0.20-0.40 (mid-point 0.30)	< 0.20	2	2.0	4.0	2.0	4.0	2.0	4.0
Measured Fecundity	> 10e4	10e2-10e3	< 10e2	2	2.0	4.0	2.0	4.0	2.0	4.0
Breeding Strategy	0	between 1 and 3	≥4	2	2.0	4.0	2.0	4.0	2.0	4.0
Recruitment Pattern	highly frequent recruitment success (> 75% of year classes are successful)	moderately frequent recruitment success (between 10% and 75% of year classes are successful)	infrequent recruitment success (< 10% of year classes are successful)	2	3.0	6.0	3.0	6.0	3.0	6.0
Age at Maturity	< 2 years	2-4 years (mid-point 3.0)	> 4 years	2	2.5	5.0	2.5	5.0	**2.0**	**4.0**
Mean Trophic Level	<2.5	2.5-3.5 (mid-point 3)	>3.5	2	1.0	2.0	1.0	2.0	1.0	2.0
	Overall Productivity Scores					**2.409**		**2.409**		**2.455**
Susceptibility Attributes	**Low (1)**	**Moderate (2)**	**High (3)**	**Weight**						
Management Strategy	Targeted stocks have catch limits and proactive accountability measures; Non-target stocks are closely monitored.	Targeted stocks have catch limits and reactive accountability measures	Targeted stocks do not have catch limits or accountability measures; Non-target stocks are not closely monitored.	2	1.0	2.0	1.0	2.0	1.0	2.0
Areal Overlap	< 25% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	> 50% of stock occurs in the area fished	2	3.0	6.0	**1.0**	**2.0**	**1.0**	**2.0**
Geographic Concentration	stock is distributed in > 50% of its total range	stock is distributed in 25% to 50% of its total range	stock is distributed in < 25% of its total range	2	1.0	2.0	1.0	2.0	1.0	2.0
Vertical Overlap	< 25% of stock occurs in the depths fished	Between 25% and 50% of the stock occurs in the depths fished	> 50% of stock occurs in the depths fished	2	3.0	6.0	3.0	6.0	3.0	6.0
Fishing rate relative to M	<0.5	0.5 - 1.0	>1	2	3.0	6.0	**1.0**	**2.0**	**1.0**	**2.0**
Biomass of Spawners (SSB) or other proxies	B is > 40% of B0 (or maximum observed from time series of biomass estimates)	B is between 25% and 40% of B0 (or maximum observed from time series of biomass estimates)	B is < 25% of B0 (or maximum observed from time series of biomass estimates)	2	3.0	6.0	3.0	6.0	3.0	6.0
Seasonal Migrations	Seasonal migrations decrease overlap with the fishery	Seasonal migrations do not substantially affect the overlap with the fishery	Seasonal migrations increase overlap with the fishery	2	1.0	2.0	1.0	2.0	1.0	2.0
Schooling/Aggregation and Other Behavioral Responses	Behavioral responses decrease the catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear [i.e., hyperstability of CPUE with schooling behavior]	2	3.0	6.0	3.0	6.0	3.0	6.0
Morphology Affecting Capture	Species shows low selectivity to the fishing gear.	Species shows moderate selectivity to the fishing gear.	Species shows high selectivity to the fishing gear.	2	3.0	6.0	3.0	6.0	3.0	6.0
Survival After Capture and Release	Probability of survival > 67%	33% < probability of survival < 67%	Probability of survival < 33%	2	1.5	3.0	1.5	3.0	1.5	3.0
Desirability/Value of the Fishery	stock is not highly valued or desired by the fishery	stock is moderately valued or desired by the fishery	stock is highly valued or desired by the fishery	2	3.0	6.0	3.0	6.0	**1.0**	**2.0**
Fishery Impact to EFH or Habitat in General for Non-targets	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary but are mitigated	Adverse effects more than minimal or temporary and are not mitigated	2	1.0	2.0	1.0	2.0	1.0	2.0
	Overall Susceptibility Scores					**2.208**		**1.875**		**1.708**
				Vulnerability		**1.345**		**1.056**		**0.894**

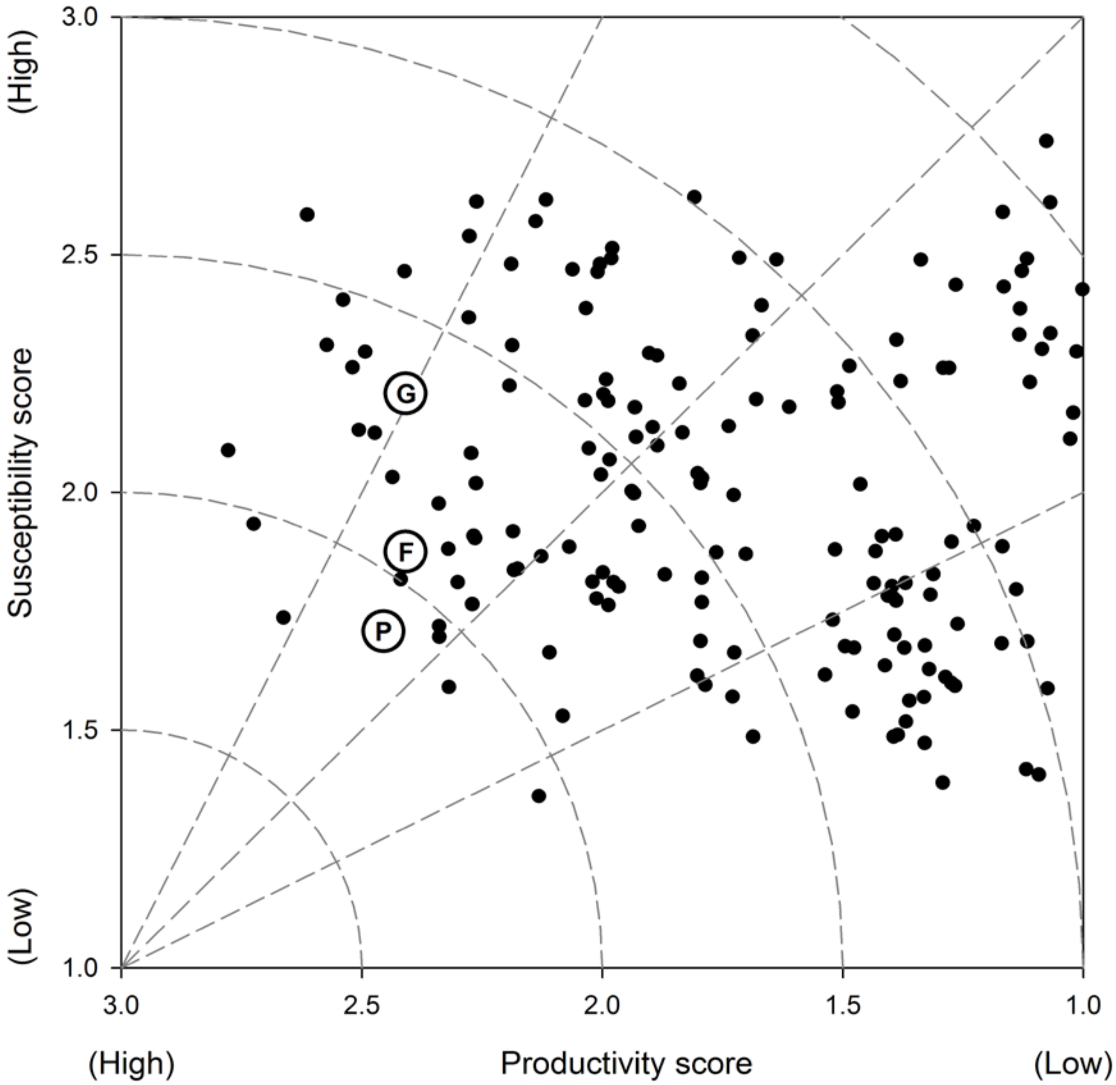

Figure B-1. Productivity and susceptibility scores for three Pacific salmon stocks (open circles) and 166 other species of fish (solid dots) in U.S. fisheries. Vulnerability is interpreted as distance from the origin, as indicated by the arcs, with higher vulnerability in the upper right and lower vulnerability in the lower left. The three salmon stocks are; G: generic, F: far north migrating, and P: pink. Figure is adapted from Patrick et al. 2010, Figure 2, using data from Table 5.

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APPENDIX C: CHINOOK F_{MSY} PROXY DEVELOPMENT

The development of a proxy F_{MSY} value is necessary for Chinook salmon since direct estimates of this rate are not available for all stocks in the fishery. F_{MSY} is defined as the fixed annual exploitation rate (e.g., harvest fraction or spawner reduction rate) that results in MSY over the long-term, under prevailing ecological and environmental conditions. An estimate of F_{MSY} can be readily computed given the estimated parameters from a stock-recruitment analysis. However, because many stocks do not have adequate data to perform such an analysis, the development of an F_{MSY} proxy is necessary for determining required reference points such as OFL and ABC for all stocks in the fishery.

We began by amassing all stock-recruitment analyses that we could find for California, Oregon, and Washington stocks. The data sets underlying these analyses varied both in quantity (number of spawner-recruit data points) and quality (contrast in spawner abundance, measurement error). It was also evident that some data sets would not be appropriate to include in the development of the F_{MSY} proxy, which lead to the following rules for eliminating data sets from further consideration.

1. Data sets from British Columbia and Alaska were omitted. In particular, many British Columbia Chinook stocks have obligate "stream-type" life histories, where freshwater emigration occurs at the yearling stage. This life history type is by and large not present in Chinook stocks managed by the PFMC.

2. Data sets were omitted if they were very old and characterized an era very different than the present one. For example, data sets from pre-dam periods on the Columbia River were omitted.

3. Data sets were omitted if grilse (age-2) escapement was included with adult (> age-2) escapement in the estimate of "spawner" abundance. Grilse contribute little to the reproductive potential of a stock.

4. Data sets were omitted if they were not the most recent one available for a given stock.

Twenty data sets remained for F_{MSY} proxy development, which included a broad spatial representation of stocks, from northern Washington to the Sacramento River basin, and included spring-, summer-, and fall-run life history types.

For the retained data sets, the Ricker stock-recruitment model (Ricker 1975), most commonly expressed as

$$R = \alpha \cdot S \cdot \exp(-\beta S),$$

was used in the original analyses to characterize the relationship between recruitment, R, and spawner abundance, S, where the parameter α reflects stock productivity (recruits per spawner at low spawner abundance), and the parameter β reflects stock habitat capacity. For this model, F_{MSY} depends only on a stock's productivity, and it can be estimated by solving (iteratively)

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

$$(1\text{-}F_{MSY})\cdot\alpha\cdot\exp(\text{-}F_{MSY}) = 1$$

for F_{MSY} given the α estimate from the original stock-recruitment analysis (Ricker 1975, Appendix III, Curve No. 1, equations 17 and 20).

Table C-1 displays the 20 independent estimates of α and the corresponding F_{MSY} estimates. The F_{MSY} estimates ranged from 0.62 to 0.90, with a mean value of 0.78. We therefore set

$$F_{MSY} \text{ proxy} = 0.78.$$

Currently, this F_{MSY} proxy value will be applied only to Sacramento River fall Chinook because it is the only tier 2 Chinook stock in the fishery which requires SDC and ACLs.

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Table C-1. Independent estimates of F_{MSY} used in the development of the Chinook F_{MSY} proxy.

Run	Location	Brood years	α	F_{MSY}	Source
Fall	Hoh River	1968-1982	23.57	0.90	Cooney (1984)
Fall	Queets River	1968-1982	18.27	0.87	Cooney (1984)
Fall	Quillayute River	1968-1982	17.71	0.87	Cooney (1984)
Fall	Columbia River	1947-1959	7.40	0.72	Chapman et al. (1982), from Reisenbichler (1987)
Spring	Columbia River	1957-1972	8.70	0.76	Chapman et al. (1982), from Reisenbichler (1987)
Summer	Columbia River	1979-1995	8.60	0.75	CTC (1999)
Fall	Columbia River bright	1964-1991	16.75	0.86	Langness and Reidinger (2003)
Fall	North Lewis River	1964-1991	8.93	0.76	CTC (1999)
Fall	Deschutes River	1977-1998	4.85	0.62	Sharma et al. (2010)
Fall	Nehalem River	1967-1991	6.54	0.69	CTC (1999)
Fall	Siletz River	1973-1991	12.10	0.81	CTC (1999)
Fall	Siuslaw River	1965-1991	4.84	0.62	CTC (1999)
Spring	Umpqua River	1946-1977	7.20	0.72	ODFW (Pers. Comm.), from Reisenbichler (1987)
Spring	Rogue River	1960-1979	11.80	0.81	ODFW (Pers. Comm.), from Reisenbichler (1987)
Fall	Klamath River	1979-2000	7.19	0.72	STT (2005)
Fall	Shasta River	1955-1978	9.70	0.78	Reisenbichler (1986)
Fall	South Fork Eel River	1963-1972	11.80	0.81	Reisenbichler (1986)
Fall	Upper Sacramento River	1967-1979	10.40	0.79	Reisenbichler (1986)
Fall	Feather River	1955-1966	13.20	0.83	Reisenbichler (1986)
Fall	San Joaquin River	1955-1976	16.40	0.86	Reisenbichler (1986)
				0.78	mean

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

APPENDIX D: F_{MSY} SCIENTIFIC UNCERTAINTY AND THE LIKELIHOOD OF OVERFISHING

For salmon fishery management, F_{MSY} and F_{ABC} estimates are needed for setting OFLs, ABCs, and ACLs as well as determining stock status on an annual basis. As specified in the Alternatives, $F_{ABC} < F_{MSY,}$ where the buffer between F_{ABC} and F_{MSY} accounts for scientific uncertainty. In particular, buffers applied to F_{MSY} as presented herein account for scientific uncertainty about the true value of F_{MSY}.

Two levels of buffers are proposed for the two "tiers" of salmon stocks that differ in the level of information associated with them. Tier 1 stocks include those for which an estimate of F_{MSY} has been obtained directly from a stock-specific spawner-recruit analysis. The Tier 1 buffer between F_{MSY} and F_{ABC} is 5%. Tier 2 stocks include those for which there isn't a stock-specific estimate of F_{MSY} from a spawner-recruit analysis, and a proxy F_{MSY} value is used instead (see Appendix C for derivation of proxy F_{MSY} values for Chinook). The Tier 2 buffer between F_{MSY} and F_{ABC} is 10%. In the next sections, we describe and quantify how the Tier 1 and Tier 2 buffers reduce the likelihood of overfishing.

Tier 1

For Tier 1 stocks, where a spawner-recruit model has been fitted to stock-specific data, the uncertainty of the F_{MSY} estimate can be readily characterized using standard statistical methods, assuming the model is in fact appropriate. Because Klamath River fall Chinook (KRFC) is presently the only Tier 1 stock in the FMP (see Stock Classification section 2.1), our analysis of the effect of a 5% buffer between the F_{MSY} and F_{ABC} values given this uncertainty is restricted to KRFC.

In 2005, a spawner-recruit analysis for KRFC was completed by the PFMC Salmon Technical Team (STT 2005), and endorsed by the PFMC Scientific and Statistical Committee as the best available science on the subject. Model 2 in that analysis (a Ricker model that includes an early-life survival covariate) was found to have the greatest statistical support of the alternative models considered, and was adopted for the present analysis. The STT did not report the corresponding F_{MSY} point estimate (the focus of the report was on S_{MSY}), but it can be readily computed from the β and S_{MSY} point estimates (STT 2005, Table 2): $F_{MSY} = \beta \cdot S_{MSY} = 0.72$.

To quantify the uncertainty of this F_{MSY} estimate, we used the same bootstrap model-based resampling of errors procedure employed by the STT (2005). Denoting spawner abundance as S and recruitment as R, a bootstrap dataset was created by sampling with replacement the log(R/S) fitted model residuals and adding them to the log(R/S) fitted model values at the observed covariate values. Model 2 was fit to each dataset as described by the STT (2005), and F_{MSY} estimated. The number of bootstrap replications was 100,000.

The resulting bootstrap distribution of F_{MSY} estimates is shown in Figure D-1. The bootstrap 0.90 percentile interval for the true F_{MSY} is [0.62, 0.78]. Moreover, $F_{ABC} = F_{MSY}(1\text{-buffer}) = 0.68$ corresponds to the 0.26 percentile. For KRFC then, we can state with confidence level 74% that the true $F_{MSY} \geq F_{ABC}$. Thus, use of the Tier 1 5% buffer substantially reduces the likelihood that the F_{ABC} value in fact exceeds the true F_{MSY} level, and thereby substantially reduces the probability of overfishing assuming that the fishery was being managed to achieve $F = F_{ABC}$.

Figure D-1. Distribution of bootstrap F_{MSY} estimates for Klamath River fall Chinook (100,000 replications). Vertical dashed lines reference point estimates of F_{MSY} (0.72) and F_{ABC} (0.68).

More generally, for any Tier 1 stock, the scientific uncertainty associated with the F_{MSY} estimate will depend on the inherent variation in the spawner-recruit relationship for that stock, along with the data quantity and quality. Thus, the degree to which the 5% buffer between F_{MSY} and F_{ABC} reduces the likelihood of overfishing will vary among the Tier 1 stocks.

Tier 2

For Tier 2 stocks, where a spawner-recruit model has not been fitted to stock-specific data, a proxy F_{MSY} value is relied upon. The proxy F_{MSY} value is 0.78 for Chinook (Appendix C). While the proxy F_{MSY} value used for Tier 2 stocks is species-specific, it is not stock-specific, and therefore likely more uncertain than F_{MSY} for Tier 1 stocks. For this reason, the buffer between F_{MSY} and F_{ABC} for Tier 2 stocks was doubled to 10%.

To quantify the uncertainty of these proxy F_{MSY} values, we first characterized the distribution of the stock-specific F_{MSY} estimates that were used to derive the proxy value for each species, and then evaluated the probability that an F_{MSY} value for an individual stock would exceed the F_{ABC} level. The analysis does not directly take into account the estimation error contained in the individual stock-specific F_{MSY} estimates. A beta(a, b) distribution was used to characterize the species-specific estimates because, like F, it is defined on the (0, 1) interval, and because it fit the histogram of F_{MSY} estimates fairly well. The distribution parameters a and b were estimated by the method-of-moments (Johnson et al. 1995, Chapter 25), which insured that the mean value of the fitted distribution, $a/(a+b)$, was equal to the proxy F_{MSY} value (the arithmetic mean of the stock-specific F_{MSY} estimates).

For Chinook, the histogram of the 20 stock-specific F_{MSY} estimates used to develop the proxy F_{MSY} (Appendix C, Table C-1) along with the fitted beta (21.84, 6.30) distribution[1] is shown in Figure D-2. With the Tier 2 10% buffer, F_{ABC} = proxy F_{MSY} * (1-0.10) = 0.70. The probability that an F_{MSY} value for an individual stock would exceed this F_{ABC} level (the proportion of the beta distribution to the right of the F_{ABC} value) was thus estimated to be 0.84, and compared favorably to the empirical estimate of 17/20 = 0.85. Thus, use of the Tier 2 10% buffer substantially reduces the likelihood that the F_{ABC} value in fact exceeds a stock's F_{MSY} level, and thereby substantially reduces the probability of overfishing assuming that the fishery was being managed to achieve $F = F_{ABC}$.

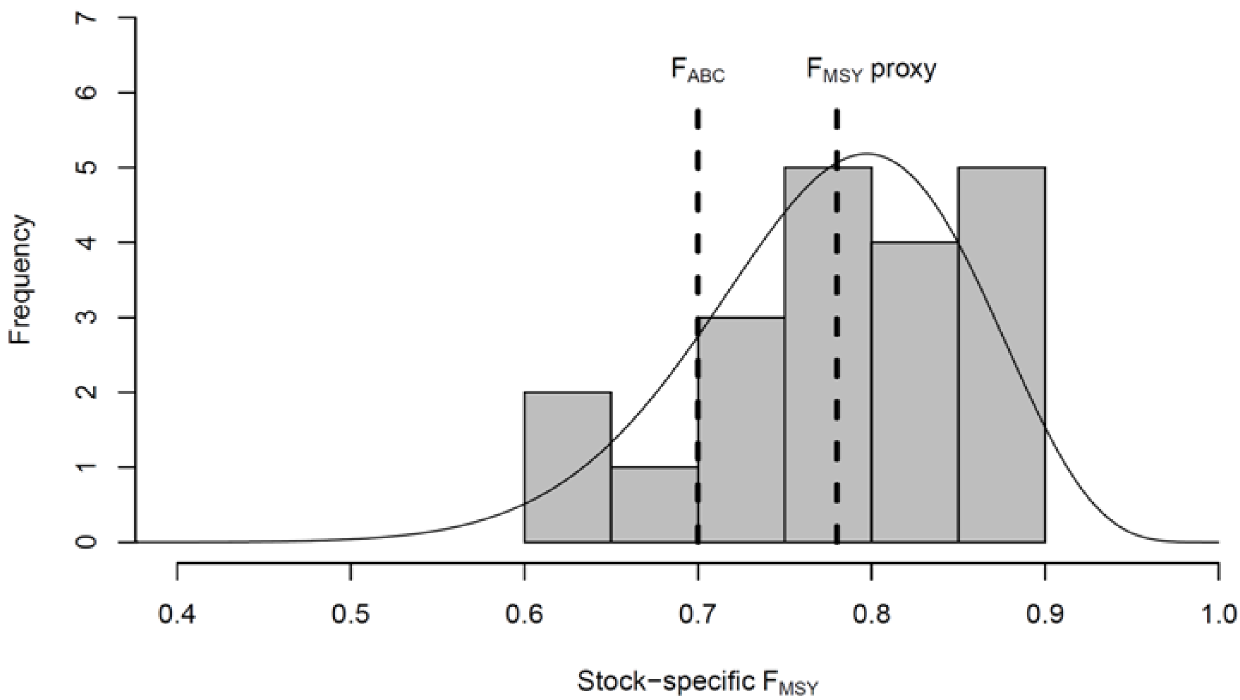

Figure D-2. Histogram of 20 stock-specific Chinook F_{MSY} estimates (Appendix C, Table C-1) and fitted beta(21.84, 6.30) distribution. Vertical dashed lines reference Tier 2 Chinook proxy F_{MSY} (0.78) and F_{ABC} (0.70) values.

A summary of the Tier 2 proxy F_{MSY} analysis results for Chinook are provided in Table D-1.

Table D-1. Summary of Tier 2 proxy F_{MSY} analysis results.

	Chinook
N	20
a	21.84
b	6.30
F_{MSY} proxy	0.78
F_{ABC}	0.70
$Pr(F_{MSY} \geq F_{ABC})$	0.84

[1] Estimation by maximum likelihood yielded essentially equivalent results.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

References

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STT (Salmon Technical Team) 2005. Klamath River fall Chinook stock-recruitment analysis. Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, Oregon.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

APPENDIX E: DEVELOPMENT OF REFERENCE POINTS FOR WASHINGTON COASTAL COHO STOCKS

Estimates of biological reference points (F_{MSY} and S_{MSY}) are lacking for Washington coastal coho stocks. These reference points are needed to develop needed to develop required status determination criteria (SDC) for Amendment 16 to the Salmon Fishery Management Plan. Required SDC include a maximum fishing mortality threshold (MFMT) and a minimum stock size threshold (MSST). One solution to this problem is to use a proxy value for F_{MSY} derived from other stocks to develop MFMTs and to develop MSSTs from the current conservation objectives for Washington coastal coho. However, data are available to derive stock specific estimates of the necessary reference points for Washington coastal stocks, eliminating the need for a proxy.

Methods

Spawning escapement estimates and reconstructed ocean abundance for natural coho stocks were extracted from outputs of backward coho FRAM runs for each individual year from 1986-2008. The initial ocean abundances were scaled by a factor of 0.812, which is the product of natural survival (1-natural mortality) over the 5 time periods used in the coho FRAM, and represents the probability of a fish at the beginning of the first time period surviving to spawn in the absence of fishing. This scales the initial ocean abundance to adult-equivalent (AEQ) recruits, with the result that exploitation rates are also in terms of AEQ.

Beverton-Holt (equation 1) and Ricker (equation 2) SRRs were fitted to the data for each stock. In the analyses done in support of current FMP reference points for Puget Sound stocks, Beverton-Holt SRRs were used. There is some evidence to support this form of relationship, but this SRR always produced higher intrinsic productivity than a Ricker SRR fitted to the same data, with a consequently higher estimate of F_{MSY}, and in some cases the best fit of a Beverton-Holt SRR was spawner independent (i.e., F_{MSY} = 1.0 and S_{MSY} = 0). For this reason, and the fact that Ricker SRRs were used in developing F_{MSY} values for Chinook, both forms were examined for coho.

$$R = \frac{aS}{(b+S)} \tag{1}$$

$$R = Se^{(\alpha-\beta S)} \tag{2}$$

Beverton-Holt SRRs were fitted by non-linear least-squares regression of recruits on spawning escapement. For the Beverton-Holt SRR S_{MSY} was calculated using equation (3).

$$S_{MSY} = \sqrt{ab} - b \tag{3}$$

F_{MSY} was calculated as $(R_{MSY}$-$S_{MSY})/R_{MSY}$, and R_{MSY} was calculated by substituting S_{MSY} from equation (3) into equation (1).
Ricker SRR were fitted using the procedures described in STT (2005), including correction for process error.

Results and Discussion

Fits of Beverton-Holt SRRs (Table E-1) do not appear to provide meaningful results. With the exception of the Skagit management unit, all estimates of S_{MSY} are below current goals (Tables E-2 and E-3) and all estimates of F_{MSY} are greater than 0.8. For the Snohomish, Big Beef Creek, and Quillayute fall stocks, the best fits are independent of spawning escapement and expected yield is maximized by harvesting 100% of

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

the abundance. For these reasons, results from fitting Beverton-Holt SRRs are excluded from further consideration.

The Ricker SRRs appear to be much more reasonable fits of the data than those of the Beverton-Holt (Figure E-1). For Quillayute fall, Queets, and Hoh stocks, all estimates of S_{MSY} (Table E-4) are within the range of estimates used to develop current management objectives (Table E-3) (Lestelle, et al. 1984). Estimates of F_{MSY} range from 0.59 for Quillayute fall coho to 0.69 for the Hoh and Grays Harbor.

Recommendations

In light of these results, we recommend that reference points in Table E-4 be used as SDC for Washington Coastal stocks with MFMT = F_{MSY} and MSST = 0.5*S_{MSY}.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Table E-1. Parameters and associated reference points from fitting Beverton-Holt SRRs to Puget Sound and Washington coast coho stocks, and MSST calculated as $0.5*S_{MSY}$. Big Beef Creek, Dungeness, and Chehalis do not encompass the entire management unit, so the S_{MSY} and MSST are not applicable to the FMP stock.

Stock	a	b	F_{MSY}	S_{MSY}	MSST
Skagit	146286	41734.4	0.47	36,401	18,201
Stillaguamish	39568	700.5	0.87	4,564	2,282
Snohomish	185475	0.0	1.00	0	0
Big Beef Creek (Hood Canal)	34523	0.0	1.00	0	0
Dungeness (Strait of Juan de Fuca)	3291	87.2	0.84	448	224
Quillayute Fall	14592	0.0	1.00	0	0
Hoh	7421	107.6	0.88	786	393
Queets	14647	254.8	0.87	1,677	839
Chehalis (Grays Harbor)	67623	1792.4	0.84	9,217	4,609

Table E-2. Current proposed FMP reference points for Puget Sound Management units.

Management Unit	MFMT	S_{MSY}	MSST
Skagit	0.60	25,000	14,857
Stillaguamish	0.50	10,000	6,100
Snohomish	0.60	50,000	31,000
Hood Canal	0.65	14,362	10,217
Strait of Juan de Fuca	0.60	11,000	7,007

Table E-3. Current proposed reference points for Washington coastal coho stocks.

Management Unit	MFMT	Escapement goal	S_{MSY}
Quillayute fall	F_{MSY} proxy	6,300-15,800	4,700-9,600
Hoh	F_{MSY} proxy	2,000-5,000	1,500-3,100
Queets	F_{MSY} proxy	5,800-14,500	4,200-9,400
Grays Harbor	F_{MSY} proxy	35,400	-

Table E-4. Parameters and associated reference points from fitting Ricker SRRs to Washington Coast coho stocks. Chehalis does not encompass the entire management unit, so the S_{MSY} and MSST are not applicable to the FMP stock.

Stock	α'	β	F_{MSY}	S_{MSY}	MSST
Quillayute Fall	4.36	0.0000987	0.59	5,873	2,937
Hoh	6.34	0.0002729	0.69	2,520	1,260
Queets	6.10	0.0001232	0.68	5,500	2,750
Chehalis (Grays Harbor)	6.43	0.0000303	0.69	22,802	11,401

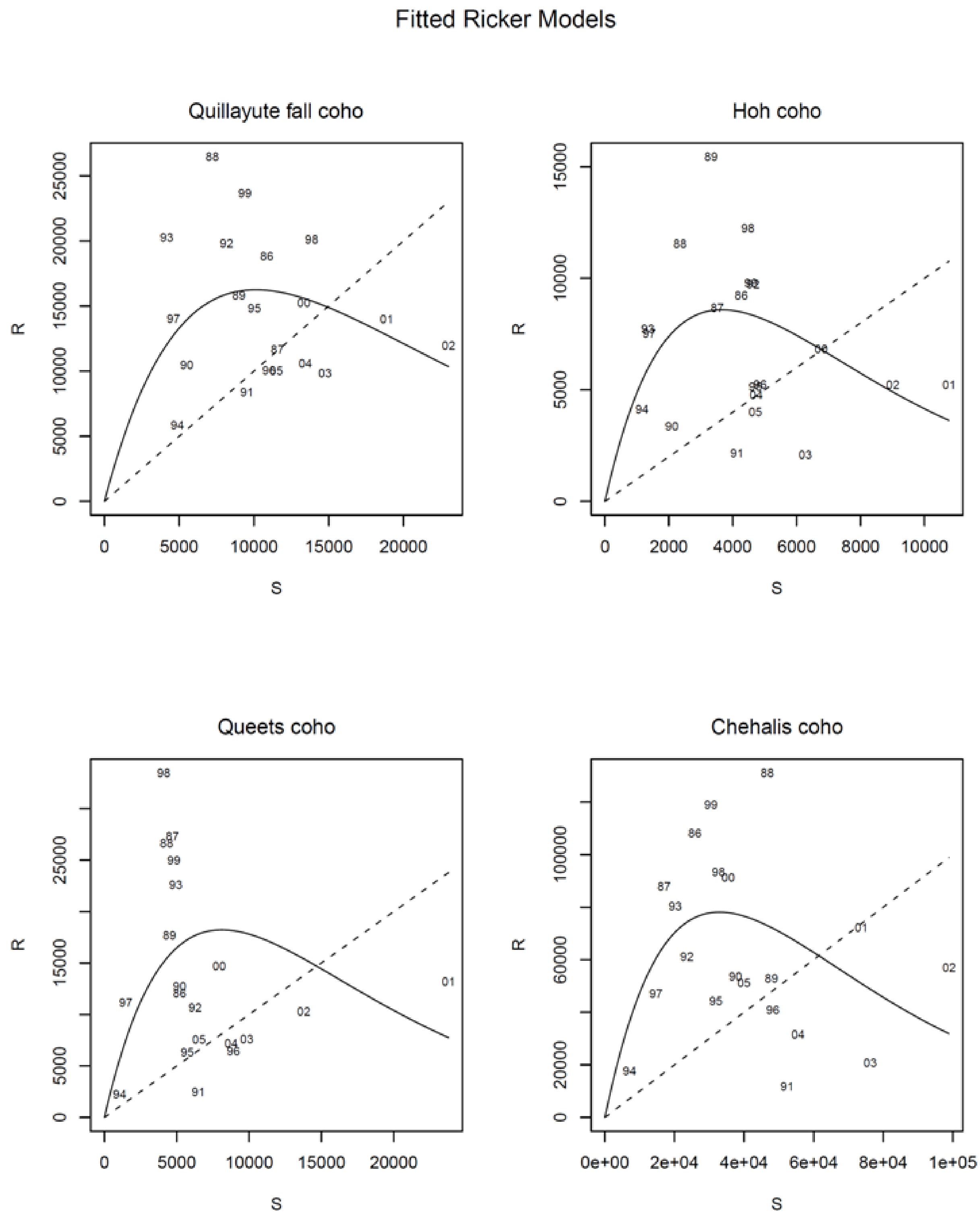


Figure E-1. Fit of Ricker spawner-recruit models to Washington coast coho stocks. Recruitment is expressed in adult equivalents. Data points are represented by brood year.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

References

Lestelle, L.C., G.S. Morishima, and T.D. Cooney. 1984. Determining spawning escapement goals for wild coho salmon on the Washington north coast. Pp 243-254 In: J.M Walton, and D.B. Houston, eds. Proceedings of the Olympic Wild Fish Conference. Peninsula College, Port Angeles, Washington. 1984. 308 p.

STT (Salmon Technical Team) 2005. Klamath River fall Chinook stock-recruitment analysis. Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384. 31p.

APPENDIX F: COMPLIANCE WITH QUOTAS AND CATCH EXPECTATIONS FOR COUNCIL AREA FISHERIES

Quota Fisheries

Quota fisheries require inseason monitoring and closure authority to prevent overages. They also require models that account for the majority of stocks composing the catch to accurately predict stock specific impacts and total catch. Chinook and Coho FRAM have extensive stock representation and therefore lend themselves to quota management in areas north of Cape Falcon (NOF). The States of Oregon and Washington have intensive monitoring programs for both recreational and commercial sectors to track effort and catch. The FMP also has allocation provisions for both sectors, and the flexibility to allow quota transfers within and between sectors NOF. As a result, quota fisheries have been used exclusively since the early 1980s. The management system NOF has performed well, with a 92 percent and 96 percent compliance rate since 1996 for non-Indian commercial and recreational quota fisheries, respectively (Figure F-1). More than half of quota fisheries evaluated were managed to within 75 percent of the quota, which implies that management was able to monitor and constrain fisheries effectively, and the high compliance rate was not generally the result of quotas set beyond the fishery capacity, or of lower than expected stock abundance. The apparent exception is non-Indian commercial coho quotas, which rarely achieve more than 50 percent of the quota. However, this is not surprising because the commercial fleet targets Chinook stocks due to their relatively higher economic value. The emphasis on commercial Chinook targeting is also reflected in the FMPs fishery objectives and allocation formulas.

One reason for the high compliance rate in NOF commercial fisheries is the structured format used in recent years with weekly open and closed periods. This format allows more accurate monitoring and provides managers with more reaction time to implement closures or season modifications. This format has also been combined with weekly landing limits to control effort (e.g., open Thursday through Sunday with a landing limit of no more than 100 salmon per vessel per open period). This combined format has had benefits to both fishers and processors by maintaining a more consistent supply of fish over time while preventing market gluts, as well as providing more structured notice to the public and stakeholders of management actions. Establishing per vessel landing limits also reduces the tendency for a derby type approach to quota fisheries by creating a form of individual quota (IQ) program. This allows individual harvesters to plan their weeks' activities according to weather forecasts and the cost/benefits of pursuing a given allocation of fish. It also improves safety-at-sea for the fleet in comparison to unconstrained quota fisheries. There are, however, associated costs for management agencies in terms of enforcement, monitoring fisheries, more frequent inseason management actions, and additional notice requirements.

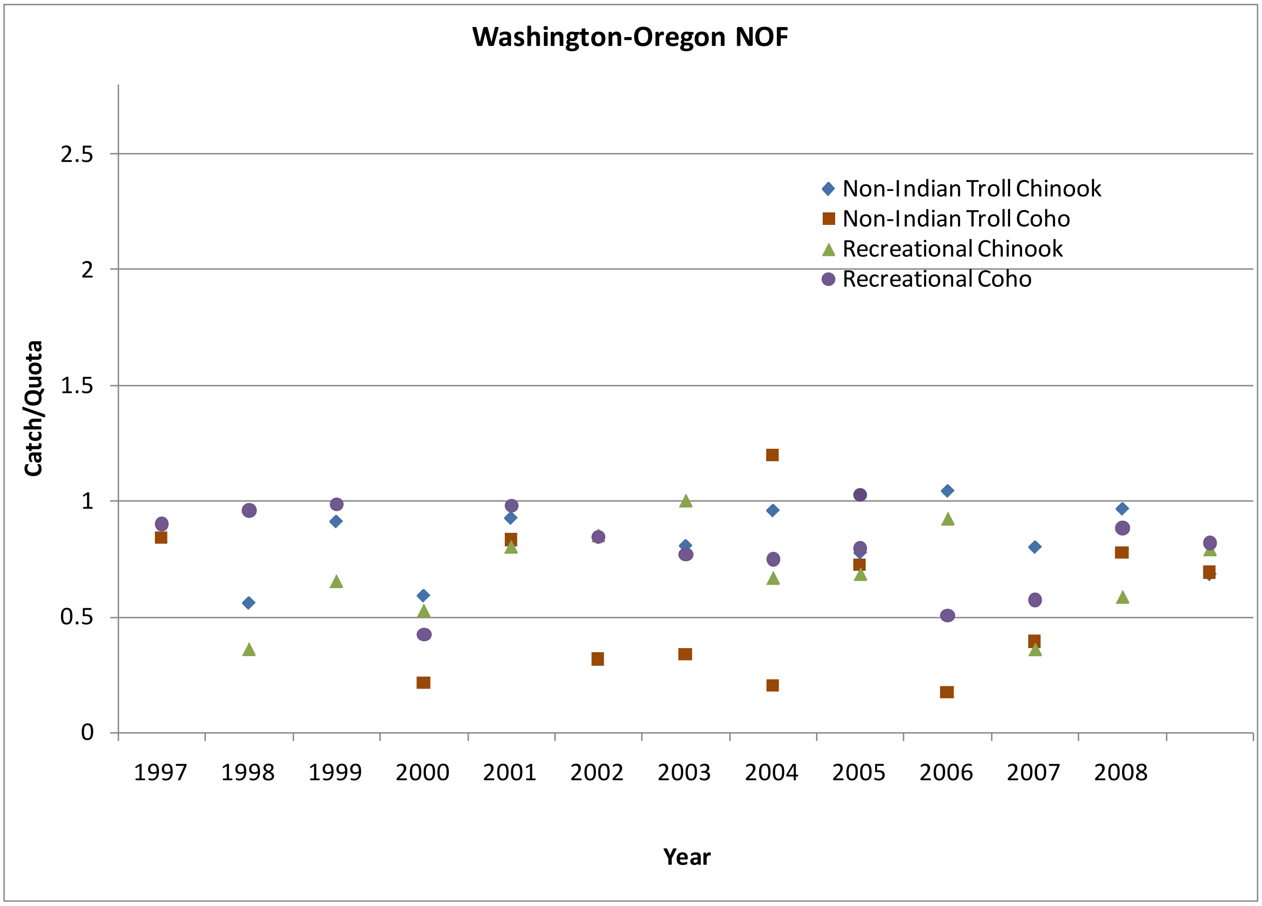


Figure F-1. Quota compliance rates for non-Indian commercial and recreational fisheries in the ocean north of Cape Falcon. Only post-season total allowable catch quotas were evaluated for each sector due to frequent inseason trades among sectors and port areas.

The treaty Indian fisheries NOF are also primarily quota managed for the same reasons as the non-Indian fisheries. The Treaty Indian fisheries have had a 78 percent compliance rate, and about half of the quota fisheries were managed to within 75 percent or more of the quota (Figure F-2).

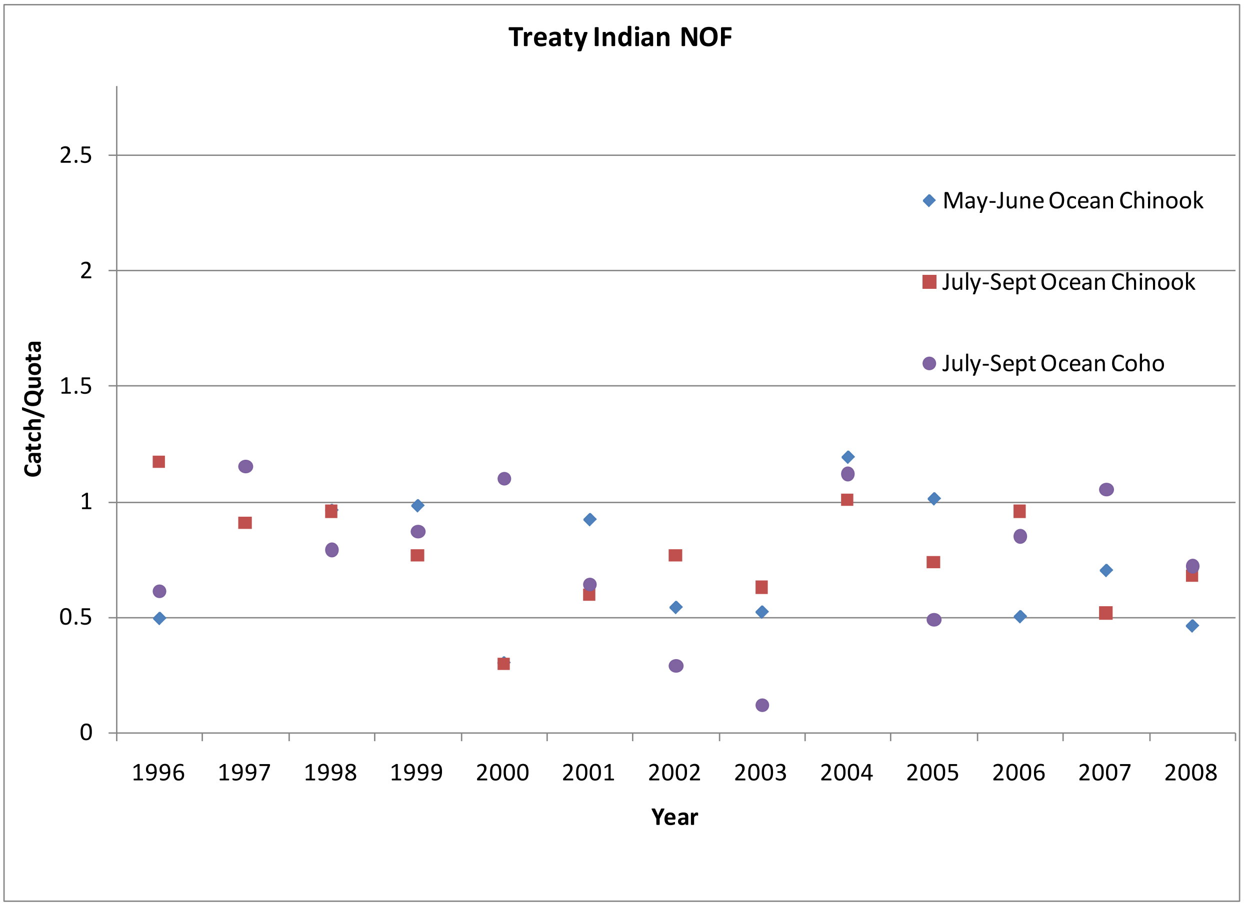


Figure F-2. Quota compliance rates for treaty Indian commercial fisheries in the ocean north of Cape Falcon. Separate evaluations for May-June and July-September fishery periods were possible because carry-over of unused quota was generally prohibited.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Oregon fisheries south of Cape Falcon (SOF) are managed with quotas primarily for commercial Chinook fisheries in the KMZ and recreational coho fisheries coast wide, plus some small state-waters only fisheries. Oregon commercial quota fisheries have had an 83 percent compliance rate and recreational quota fisheries have had a 90 percent compliance rate. About 40 percent have been managed to within 75 percent or more of their quota. Three of the four fisheries to exceed their quota were KMZ commercial fisheries, which typically have three or four month long quota fisheries per year, with most coming in well below the quota, and the occasional high success month resulting in an overage (Figure F-3).

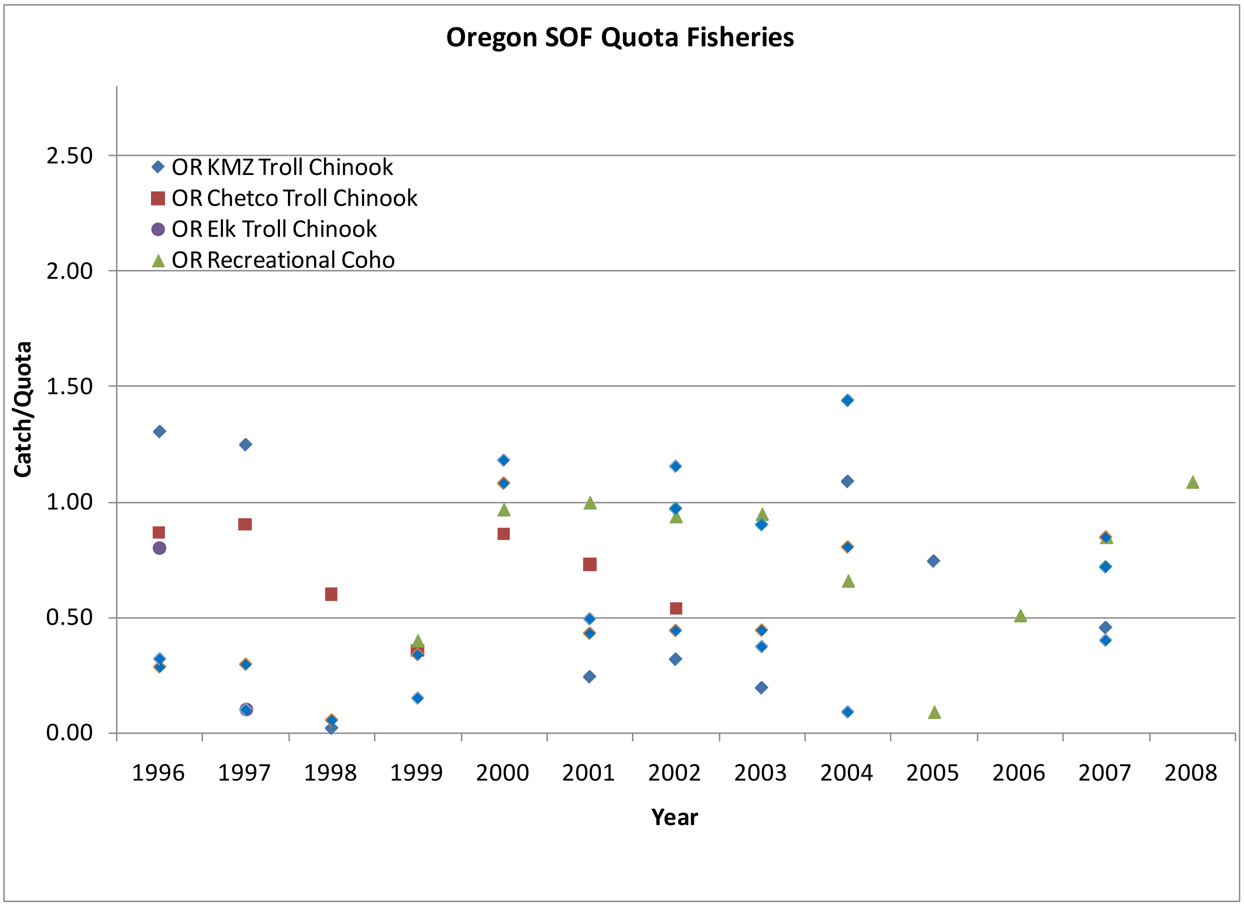


Figure F-3. Quota compliance rates for commercial fisheries in the ocean between of Cape Falcon and the Oregon/California border. KMZ troll fisheries also included some quota fisheries that extended up to Cape Arago in 1996 and 1997.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

California fisheries are primarily managed by time-area seasons, with commercial quota fisheries used in the KMZ, occasionally in the Fort Bragg area, and rarely south of Fort Bragg. California quota fisheries have a 52 percent compliance rate, with about 55 percent managed to within 75 percent or more of their quota. Quota fisheries in all areas had similar compliance rates (Figure F-4).

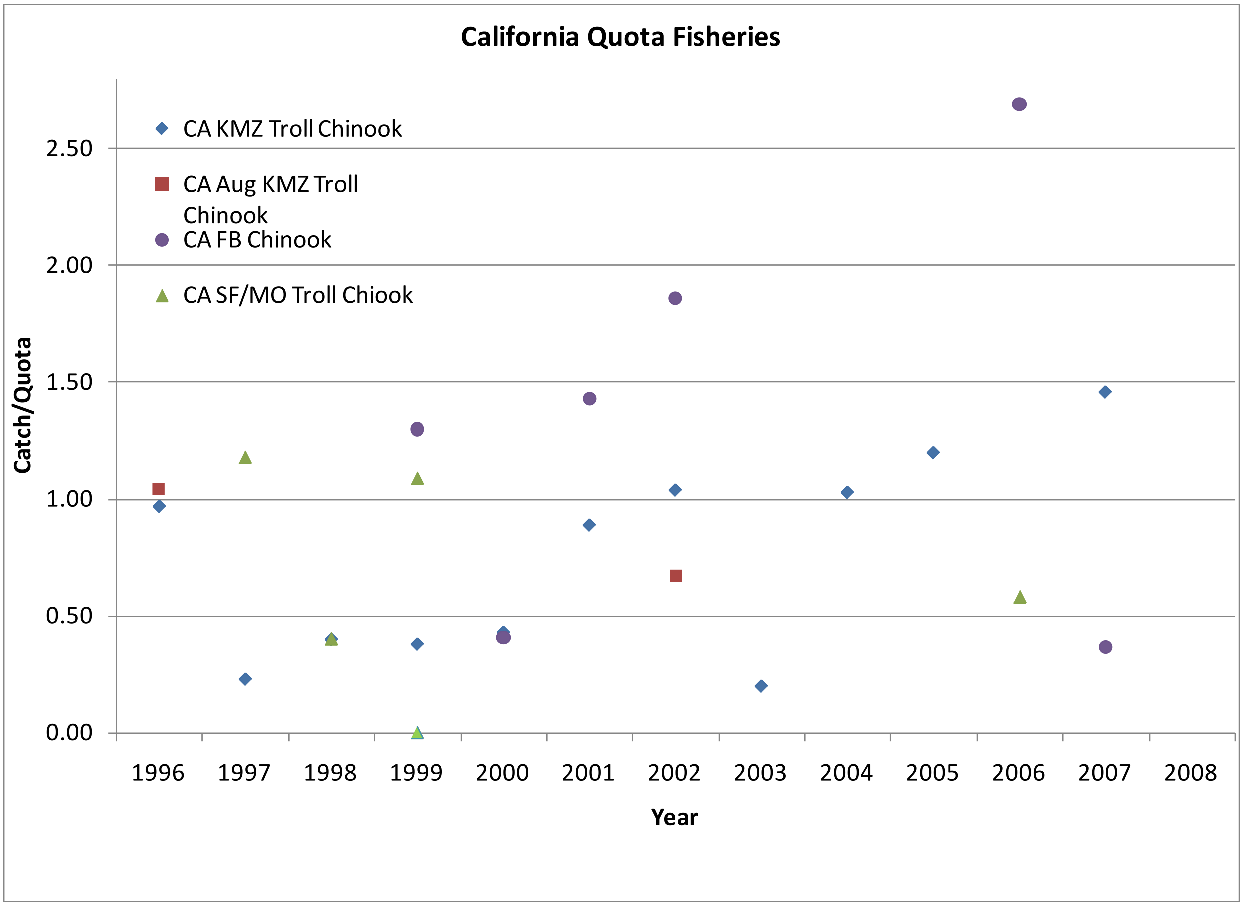


Figure F-4. Quota compliance rates for commercial fisheries in the ocean south of the Oregon/California border.

Most Chinook fisheries SOF have not been managed by quotas, partly because the KOHM was the primary harvest model used for ocean Chinook fisheries SOF. The KOHM is a single stock model and was only considered adequate to model quota fisheries in the KMZ where KRFC make up the majority of the catch. Other quota fisheries SOF were set to constrain catch below historical levels during conservation concerns (e.g., 2006 when an emergency rule was required to prosecute fisheries due to KRFC concerns), or to collect information on new or recently reopened time/area strata (e.g., April 2007 Fort Bragg commercial fishery). With the development of the Sacramento Harvest Model (SHM), the use of quota fisheries SOF may be more practible given that SRFC and KRFC constitute the majority of catch in most fishery strata.

Time-Area Fisheries

The majority of Chinook catch in Oregon and California occurs in time-area managed fisheries. The STT develops an expected catch for both commercial and recreational fisheries in areas NOF Falcon, Cape Falcon to Humbug Mt., the KMZ, and south of the KMZ. Their forecasts include quota fisheries in those areas, but those make up a small portion of the total expected catch SOF, except for KMZ commercial fisheries. Since 2000, about 52 percent of time-area fisheries had an actual catch less than the preseason expectation, as would be expected given unbiased projections. (Figure F-5). However, the Oregon fisheries exhibited a declining trend of in the ratio of catch-to-expectations over the time series. The expectations are based on historical fishery patterns and most were adjusted for preseason abundance forecasts; however, the early part of the decade had near record high abundance of SRFC, and contact rates for KRFC were greater than the historical data range. Since 2006, catch has been generally below expectations, which coincides with record low SRFC abundance. It is possible that abundance relative to average conditions affects the catch-to-expectation ratio, but it may also be a result of improving forecast methods since the trend was not observed in California fisheries or the KMZ recreational fishery.

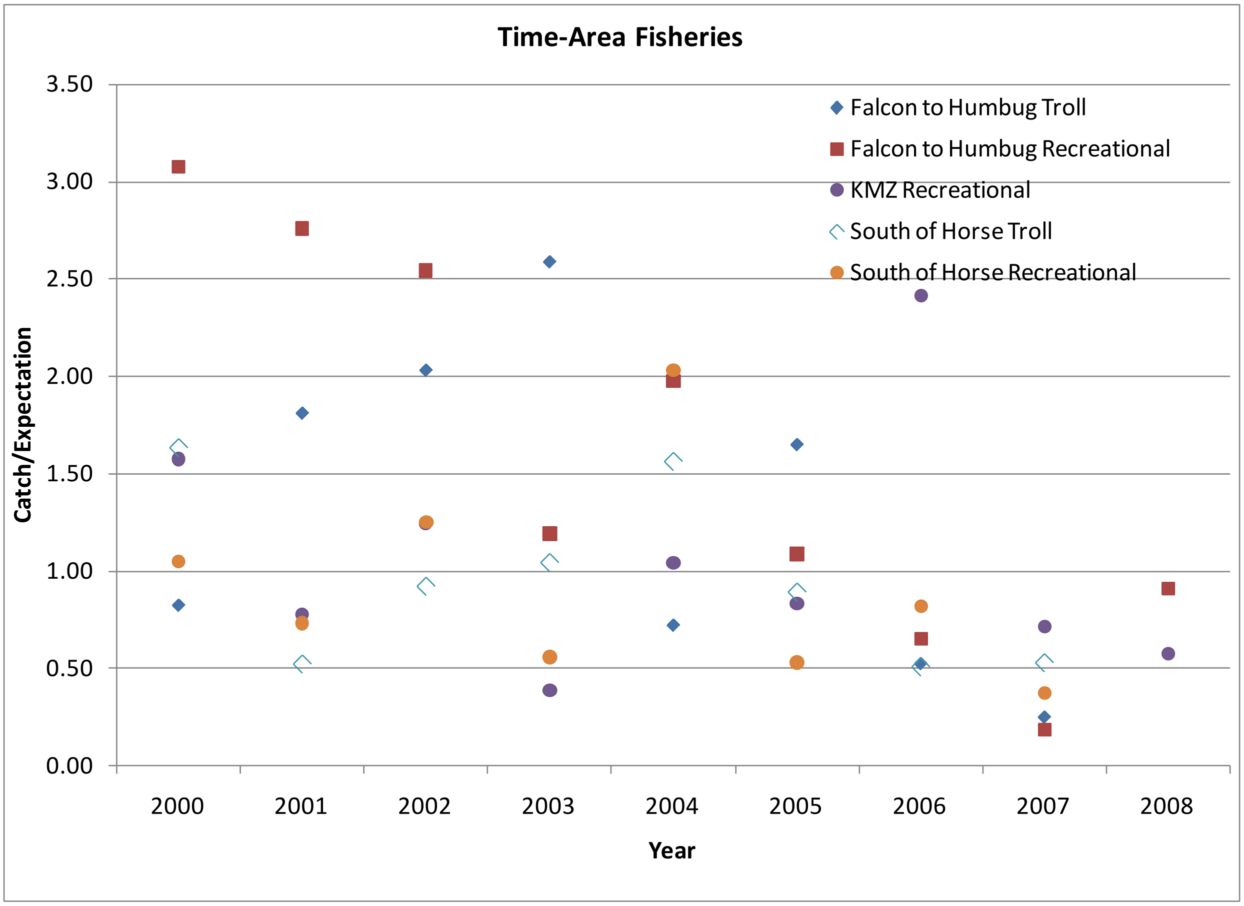


Figure F-5. Time-Area fisheries south of Cape Falcon. Actual catch compared with preseason expectations.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

APPENDIX G – IMPACTS TO COUNCIL SALMON STOCKS IN OCEAN FISHERIES

LaVoy, L. 2010. Memorandum to P. Dygert. CWT recovery distribution for WA coast, OR coast and Mid-Columbia spring run Chinook. November 15, 2010. 3 pp.

November 15, 2010

To: Peter Dygert

From: Larrie La Voy

Subject: CWT recovery distribution for WA coast, OR coast and Mid-Columbia spring run Chinook.

The tables below show distribution of estimated recoveries of CWTs from Chinook originating from WA and OR coast and Mid-Columbia hatchery facilities and identified in PSMFC-RMIS as “spring run”. The WA coast tag groups were almost exclusively from the Quillayute River and Sol Duc rivers except for one small release group from the Hoh River. The OR coast tag groups were primarily from the Trask and Nestucca rivers in the north, to the Umpqua and Rogue-Cole rivers in the south. Tag groups from the Yakima basin were used to represent Mid-Columbia spring Chinook.

The tables contain estimated CWTs landed in fisheries and escapement from expansion of observed recoveries by a mark sampling rate. The percent distribution into fisheries and escapement should not be used to calculate an exploitation rate for the stock for three primary reasons: 1) recoveries only represent landed fish and not total fishery related mortalities, 2) recoveries are not adjusted for “adult equivalency” as is the normal procedure for calculating exploitation rates, and 3) recoveries especially in terminal fisheries and escapement areas is oftentimes inadequate or lacks expansion for sampling rates. Commonly, natural spawning areas are not adequately sampled and/or sampling rate expansions are not applied to the observed recoveries and will show few escapement recoveries relative to the number of fishery recoveries. In most cases, using CWT recovery data directly from RMIS as-is without manually adjusting some fisheries and most escapements will most likely result in overestimating the exploitation rates. Before undertaking a normal exploitation rate analysis, these tag groups would require recovery-year specific scrutiny of the observed-to-estimated expansions (especially in the terminal areas) and the status of whether likely recovery locations were even sampled.

The impacts in Council fisheries can be compared to those in other areas to get a relative measure of fishery related mortality. As expected, impacts in Council fisheries are much lower compared to northern fisheries in Alaska and Canada for WA coast spring Chinook. For northern OR coast spring Chinook, a higher portion is taken in Council fisheries but still less than in northern fisheries. Spring Chinook from the Umpqua and Rogue are taken primarily in Council fisheries south of Cape Falcon. Mid-Columbia spring Chinook are rarely caught in ocean fisheries anywhere.

WA Coast Combined Quillayute-Sol Duc- Hoh	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2007	2008	2009	Total		Fishery Distribution
AK	3	11	121	52	43	79	54	23	15	6	12	9				428	7%	10%
BC	17	220	597	261	322	53	61	53	8	5		5		9	9	1620	28%	39%
Council	3	23	134	57	77	17	2		5	10	7			3	5	343	6%	8%
High Seas	2	2	7													11	0%	0%
WA Inside		94	98	104	140	46	3	12			16			1		514	9%	12%
Term. Fishery	5	23	155	314	193	307	137	116	31							1281	22%	31%
Escapement a/		4	129	384	454	209	112	155	45	19	23					1534	27%	--
Total	30	377	1241	1172	1229	711	369	359	104	40	58	14		13	14	5731	100%	100%

a/ Escapement should be considered minimum value; spawning ground recoveries not expanded for sampling rates.

Trask and Nestucca Recovery Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total		Fishery Distribution
AK		6	14	15	38	47	28	9	30	18	89	48	69	54	59	26	9	9	568	13%	21%
BC		6	8	2	2	5		7	14	11	92	162	255	171	68	40	23		866	20%	33%
Council-NoF		7	3			2		9	7	14	76	55	69	33	20	25	7	4	331	8%	12%
Council-SoF			52	59	46	16	39	28	12	53	105	80	99	79	38	17	3		726	17%	27%
High Seas					6			4			0	1			13				24	1%	1%
Terminal Spt		2	6	10	10	20	11	12	6	9	5		11	6	8	6	8	4	134	3%	5%
Escapement a/	1	6	53	96	88	120	107	91	58	74	63	72	165	151	225	124	155		1649	38%	--
Total	1	27	136	182	190	210	185	160	127	179	430	418	668	494	431	238	205	17	4298	100%	100%

a/ Escapement should be considered a minimum value; no recoveries on spawning grounds before 2005 and samples thereafter imply 100% sampling rate.

Umpqua Recovery Area	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total		Fishery Distribution
AK		2			9	9				3	2	7	7	4			43	1%	1%
BC	13	4	2			2		14	18	17	18	17	16	44	7	9	181	6%	6%
Council-NoF	6		2	2		2	17	9	30	44	34	21	16	32	22		237	8%	8%
Council-SoF	25	60	82	181	135	66	50	160	360	272	440	318	71	6	65		2291	73%	78%
High Seas	4	8	16		3			21	26	4	6	2			15	10	115	4%	4%
Terminal Spt			2	1	6	5	18	28	1		6	1					68	2%	2%
Escapement a/	2	16	14	14	24	13		30	39	3	6	12	3	14	13		203	6%	--
Total	50	90	118	198	177	97	85	262	474	343	512	378	113	100	122	19	3138	100%	100%

a/ Escapement should be considered a minimum value due to limited or no spawning ground sampling and few hatchery rack recoveries.

Rogue-Cole Rivers Recovery Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total		Fishery Distribution
AK							17	26	5									48	0%	1%
BC							5	5		5			6	2	4			27	0%	0%
Council-NoF		2						11	2	7			12	1	3			38	0%	0%
Council-SoF	5	265	777	857	694	121	99	204	346	224	756	1401	2037	433	49	143		8411	26%	96%
High Seas		4	28	29		3			8	3	41	21	1	3				141	0%	2%
Terminal Spt	1		1	23	25	7	6	23	10	3	1	2		1		2		105	0%	1%
Escapement a/	47	337	278	4205	2406	2217	879	1298	1686	1706	2866	2870	1450	534	376	411	269	23835	73%	--
Total	53	608	1084	5114	3125	2348	1006	1567	2057	1948	3664	4294	3506	974	432	556	269	32605	100%	100%

a/ Escapement should be considered a minimum value: only hatchery rack recoveries except in 1997 and 2007-08 which also show spawning ground recoveries.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Yakima Recovery Area	2000	2001	2002	2003	2004	2005	2006	2007	Total		Fishery Distribution
Council		5							5	1%	1%
High Seas	2								2	0%	0%
Terminal	5	215	214	15	26	2	36	10	523	74%	99%
Escapement	13	160	2		2				177	25%	--
Total	20	380	216	15	28	2	36	10	707	100%	100%

Table 1. Average 1999-2008 distribution of fishing mortality and escapement from PSC Chinook Technical Committee CWT analysis.

	Alaska	Canada	So. US Marine	Terminal	Esc
Col URB	16.5%	9.2%	1.9%	24.4%	48.0%
Snake R-Lyons F	3.4%	5.6%	7.1%	10.3%	73.6%
Col Summer	18.1%	17.1%	8.4%	12.2%	44.2%
Willamette Sp	5.6%	3.0%	0.9%	28.0%	62.4%
OR No Cst-Salmon R	20.1%	12.2%	2.6%	27.1%	37.8%
OR mid Cst-Elk R	7.0%	6.4%	18.0%	14.0%	54.5%
Queets Fall	27.4%	14.2%	1.1%	17.1%	40.2%
Hoko Fall	16.8%	13.9%	0.9%	0.0%	68.3%

APPENDIX H: DOCUMENTATION OF METHODS USED FOR A16 ECONOMIC ANALYSIS: 2001-2010

General Overview

Annual assessments completed by the STT during the PFMC preseason management process produce forecasts of total Chinook catch and ocean fishing effort, as well as river harvest and escapement of select stocks. The draft Amendment 16 to the salmon FMP is comprised of alternatives that have the potential to modify existing harvest control rules by specifying maximum allowable harvest rates, *de minimis* fishing provisions, and changes to target escapement levels. These changes could have resulted in different forecasts of catch, effort, and escapement for past years if Amendment 16 provisions were in place. The purpose of this analysis is to describe the potential changes in forecast catch and effort that would have resulted in years 2001-2010 if the FMP at the time reflected provisions contained in Amendment 16. To aid in addressing the economic effect that Amendment 16 may have to salmon fisheries, forecasts have been generated of ocean commercial fishery harvest, ocean recreational angler trips (effort), river tribal fishery harvest of KRFC, and river recreational fishery harvest of KRFC using the Klamath Ocean Harvest Model (KOHM) and Sacramento Harvest Model (SHM) for discrete alternatives proposed in the draft of Amendment 16.

The factors that can result in changes in harvest and fishing effort relative to the forecasts made for years in the past include the choice of the Minimum Stock Size Threshold (MSST) convention and the seven *de minimis* fishing alternatives currently identified in the draft EA. Catch and effort forecasts based on each of the MSST conventions and *de minimis* fishing alternatives currently being considered are presented.

The first set of tables (Appendix Tables 1.1-1.9) contains forecasts of ocean commercial fishery Chinook harvest under the three MSST conventions (MSST = 0.50 * S_{MSY}, MSST = 0.75 * S_{MSY}, MSST = 0.86 * S_{MSY}), seven Amendment 16 *de minimis* fishing alternatives, and the final forecasts made during the management year (labeled “Pre III” in the spreadsheet). Each year is depicted in its own worksheet (see tabs at the bottom of the spreadsheet). Harvest is stratified by four geographical areas: (1) Cape Falcon to Humbug Mountain (NO and CO), Humbug Mountain to Horse Mountain (KO and KC, or together referred to as the KMZ), Horse Mountain to Point Arena (FB), and South of Point Arena (SF and MO). Amendment 16 Alternative 1 represents the status quo control rule. However, in some years additional guidance from the Council or NMFS resulted in management measures that did not conform to the status quo control rule. An example of this was the targeting of 40,700 natural area adult KRFC spawners for 2008-2010 as a result of the KRFC rebuilding plan, whereas the status quo KRFC control rule specifies targeting a minimum of 35,000 natural area adult spawners. In cases such as these, the “Pre III” forecasts in this table may not match the alternative 1 status quo forecasts. Harvest forecasts within a year represent the period between September 1 (year t-1) and August 31 (year t). Fall harvest (from September through December, year t-1) are estimated before the preseason process since they have already occurred, and are not affected by changes in allowable exploitation rates specified by MSST conventions and Amendment 16 alternatives. Therefore, changes in Chinook harvest between various MSST and alternative combinations reflect changes in planned spring/summer fisheries during the management year (t).

The second set of tables (Appendix Tables 2.1-2.9) has the same properties as the commercial spreadsheet described above, with two exceptions. First, the values given in the tables represent angler trips rather than catch. Second, the forecast number of angler trips is for the period from January through August of the management year (year t). Fishing effort is only forecast for this period of time during the PFMC preseason process, and therefore changes in target exploitation rates would only be expected to affect effort forecasts during this period.

The third set of tables (Appendix Tables 3.1 and 3.2) contains forecasts of river tribal and river recreational catch of KRFC reported in Pre III, forecast catch under each Amendment 16 alternative, and each MSST convention. Tribal and

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

recreational river harvest forecasts are depicted in their own worksheets identified by tabs at the bottom of the spreadsheet.

In a given year, for each combination of MSST convention and Amendment 16 *de minimis* fishing alternative, there is the potential for a different allowable exploitation rate than was forecast during the preseason process. To achieve the alternative exploitation rate in expectation requires modifications of the structure of fisheries from those adopted in that year. The modification of fishery management measures to achieve the target exploitation rate under the alternative control rule could result in more or less fishing opportunity than was adopted in that year. While it is impossible to know exactly how the PFMC would have configured fishery management measures under alternative control rules, the analysis relied on some basic rules to derive plausible management measures for each year under each of the alternatives. A general description of these rules, as well as more specific notes regarding how management measures were derived in each year to achieve the target exploitation rates under the alternatives follows.

In years when the KRFC river recreational allocation was greater than 15 percent of the non-tribal harvest, and the exploitation rate required reduction, the river recreational harvest was reduced to achieve the target exploitation rate, subject to not reducing the allocation below 15 percent. Such an adjustment results in no changes to ocean fisheries, but does affect river recreational and tribal fishery harvest. The tribal allocation of 50 percent of the nontribal harvest was not modified at any time.

When a modification to the KRFC river recreational fishery alone was insufficient to achieve a target exploitation rate, ocean fishery management measures were modified. When ocean fishery measures needed modification, attempts were made to retain the allocation fractions used during the preseason process in that year. These allocations included the proportion of the commercial harvest taken in Oregon versus California and the proportion of total ocean harvest taken in the KMZ recreational fishery. To maintain these allocation proportions while increasing or decreasing ocean fisheries required specific decisions to be made about which month, area, and fishery would be modified. Specific decisions regarding fine-scale fisheries modifications were made based on judgments informed by past Council decisions.

In most years (2001-2007), the KRFC escapement goal or age-4 ocean harvest rate was the primary factor limiting ocean fisheries. In these years, target KRFC exploitation rates were achieved by modifying fishery configurations as described above, and outputs used for this analysis were extracted from the KOHM. In 2008-2010, limits to the allowable exploitation rate for SRFC primarily determined the structure of ocean fisheries. In these cases, target SRFC exploitation rates were achieved by modifying fishery configurations until the exploitation rate forecast by the SHM matched the target rate. The KOHM was then used to assess this ocean fishery configuration, and the outputs from the KOHM were reported for this analysis. This procedure ensured that forecasts of commercial catch, recreational effort, and river KRFC catch are derived from the KOHM in each year, and are therefore comparable.

Annual Details

2001

- Predictions from 2001 management:
    - KRFC natural area escapement forecast of 47,000
    - KRFC exploitation rate forecast of 67%
    - Forecast KRFC age-4 ocean harvest rate of 17%
- California Coastal Chinook consultation standard and maximum exploitation rate limit for KRFC limiting factors.
- No difference between Alternatives (under all MSST conventions) would have be realized in 2001 since the natural area escapement forecast was greater than 40,700 and *de minimis* fisheries would not be a factor.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- Increase in allowable maximum exploitation rate from 66.7% to 68% would have no effect on commercial or harvest or ocean recreational effort in 2001 because the age-4 ocean harvest rate cap of 17% also constrained ocean fisheries.
- Harvest and effort not reported in the spreadsheets because the forecasts are identical to those found in the 2001 Pre III report.

2002

- Predictions from 2002 management:
  - KRFC Natural area escapement forecast of 35,000
  - KRFC exploitation rate forecast of 63%
  - Forecast KRFC age-4 ocean harvest rate of 12.9%
- Minimum natural area spawner "floor" limiting factor.
- Reduction in the allowable exploitation rate from the 2002 management year would result for Alternatives 2, 3, 4, FPA (for all MSST conventions) as a result of targeting 40,700 natural area adult spawners instead of 35,000.
  - The reduction in allowable exploitation rate was accomplished in the KOHM by reducing the river recreational quota.
  - No changes to commercial ocean catch or recreational effort would therefore be expected under any of the Alternatives.

2003

- Predictions from 2003 management:
  - KRFC natural area escapement forecast of 35,000
  - KRFC exploitation rate forecast of 60%
  - Forecast KRFC age-4 ocean harvest rate of 16%
- California Coastal Chinook consultation standard limiting factor.
- Reduction in the allowable exploitation rate from 2003 management would result for Alternatives 2, 3, 4, FPA (for all MSST conventions) as a result of targeting 40,700 natural area adult spawners instead of 35,000.
  - The reduction in allowable exploitation rate was accomplished in the KOHM by reducing the river recreational quota.
  - No changes to commercial ocean catch or recreational effort would therefore be expected under any of the Alternatives.

2004

- Predictions from 2004 management:
  - KRFC natural area escapement forecast of 35,000
  - KRFC exploitation rate forecast of 52%
  - Forecast KRFC age-4 ocean harvest rate of 15%
- Minimum natural area spawner "floor" limiting factor.
- Reduction in the allowable exploitation rate from the 2004 management year would result for Alternatives 2, 3, 4, FPA(for all MSST conventions) as a result of targeting 40,700 natural area adult spawners instead of 35,000.
  - The reduction in allowable exploitation rate was accomplished by reducing ocean commercial and recreational fisheries from those in 2004 (the river recreational fishery was already operating at the 15% of nontribal harvest minimum guideline).
  - This was accomplished by reducing fisheries in a way the Council has reduced them in the past (when KRFC limiting) and attempting to preserve the CA/OR troll and KMZ sport fishery share allocations expected under 2004 management.
  - The ocean fishery was downsized by:
    - Eliminating July commercial fishery in FB

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- Eliminating August commercial fishery in NO and CO
- Reducing days open in SF and MO commercial fishery in June
- Reducing days open in KMZ commercial fishery in August

2005

- Predictions from 2005 management:
  - KRFC natural area escapement forecast of 35,000
  - KRFC exploitation rate forecast of 20%
  - Forecast KRFC age-4 ocean harvest rate of 7.7%
- Minimum natural area spawner “floor” limiting factor.
- Increases in the allowable exploitation rate from the 2005 management year would result for all Alternatives, with dependence on the MSST conventions, as a result of *de minimis* fishing provisions.
- Changes in the allowable exploitation rate from the forecast value in 2005 would result for Alternatives 2, 2b, 3, 3b, with dependence on MSST conventions, as a result of different *de minimis* fishing provisions.
  - MSST = 0.50 *Smsy results in F=0.25 for all Alternatives
  - MSST = 0.75 *Smsy results in F=0.25 for Alternative 1,3,3b,4,5,FPA; F=0.18 for Alternatives 2,2b
  - MSST = 0.86 *Smsy results in F=0.25 for Alternative 1,4,5, F=0.20 for Alternatives 3,3b; F=0.13 for Alternatives 2,2b
- Increase in F to 0.25 was achieved by
  - Increasing days open in SF and MO commercial fishery in May and July
  - Increasing days open in NO and CO commercial fishery in June and July
  - Opening FB commercial fishery for a portion of August
  - Increasing days open in the KMZ recreational fishery
  - These changes retained 2005 predicted allocations
- Increase in F to 0.20 was achieved by
  - No action taken
  - 2005 expected F=0.197, while F=0.198 for A16 Alternatives
- Decrease in F to 0.18 was achieved by
  - Reducing CO and NO commercial fishery in May and June
  - Reducing May commercial fishery in MO, July troll in SF and MO
  - Reducing KMZ recreational days open in May and August
  - These changes retained 2005 predicted allocations
- Decrease in F to 0.13 was achieved by
  - Eliminating all Oregon commercial fisheries
  - Reduction in commercial fishing opportunity in MO and SF
  - Reduction in recreational fishing opportunity in the KMZ
  - These changes adhered to 2005 predicted allocations with exception of the CA/OR troll split, which could not remain equivalent due to large KRFC harvest in Fall 2004

2006

- Predictions from 2006 management
  - KRFC natural area escapement forecast of 21,100
  - KRFC exploitation rate forecast of 35%
  - Forecast KRFC age-4 ocean harvest rate of 11.5%
  - Tribal harvest: 10,039
  - Recreational river harvest: 0
- Minimum natural area spawner “floor” limiting factor (could not be achieved absent fishing in 2006).

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- Reductions in the allowable exploitation rate relative to the exploitation rate forecast in 2006 would result for all Alternatives, with the magnitude depending on the MSST convention and the *de minimis* provisions from the Alternatives.
    - MSST = 0.50 *Smsy results in F=0.25 for Alternative 1,3,3b,4, and 5 and F=0.06 for Alternative 2,2b.
    - MSST = 0.75 *Smsy results in F=0.25 for Alternative 1,4,5; F=0 for Alternative 2,2b; F=0.06 for Alternative 3,3b, F=0.16 for FPA
    - MSST = 0.86 *Smsy results in F=0.25 for Alternative 1,4,5 and F=0 for Alternative 2,2b,3,3b
- Decrease in F to 0.25 was achieved by:
    - Elimination of ocean commercial fishery
    - Reducing the KMZ recreational fishery in May and June
- Decrease in F to 0, 0.06 and 0.16 could not be achieved due to fall 2005 fisheries, yet the following actions were taken to reduce F as much as possible.
    - All spring/summer fisheries eliminated (commercial and recreational)
    - This results in a forecast F of 0.23 (the lowest possible while achieving 50% tribal fishery share)

2007

- Predictions from 2007 management
    - KRFC natural area escapement forecast of 35,000
    - KRFC exploitation rate forecast of 53%
    - Forecast KRFC age-4 ocean harvest rate of 16%
    - Tribal harvest: 40,775
    - Recreational river harvest: 10,601
- California Coastal Chinook consultation standard limiting factor
- Reduction in the allowable exploitation rate from 2007 management would result for Alternatives 2, 3, 4, FPA (for all MSST conventions) as a result of targeting 40,700 natural area adult spawners instead of 35,000.
    - The reduction in allowable exploitation rate was accomplished in the KOHM by reducing the river recreational quota
    - No changes to commercial ocean catch or recreational effort would therefore be expected under any of the Alternative

2008

- Predictions from 2008 management
    - SRFC escapement forecast of 59,000
    - SRFC forecast exploitation rate: 0.064
    - KRFC natural area escapement forecast of 40,700
    - KRFC exploitation rate forecast of 47%
    - Forecast KRFC age-4 ocean harvest rate of 2.4%
- SRFC escapement goal limiting factor for ocean fisheries
- Changes in the SRFC allowable exploitation rate from the forecast value in 2008 would result for Alternatives 3, 3b, 4, and 5, with dependence on MSST conventions, as a result of different *de minimis* fishing provisions.
    - MSST = 0.50 *Smsy results in F=0 for Alternatives 1,2,2b; F=0.03 for Alternatives 3,3b; F=0.25 for Alternatives 4,5.
    - MSST = 0.75 *Smsy results in F=0.0 for Alternative 1,2,2b,3,3b; F=0.10 for Alternative FPA; F=0.25 for Alternatives 4,5
    - MSST = 0.86 *Smsy: NA for SRFC
- Increase in F to 0.25 was achieved by
    - Turn all Oregon coho-only recreational fisheries to Chinook and coho fisheries
    - Open FB recreational fishery for a full season

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- Open SF and MO recreational fisheries for a reduced season
    - Increase days open in the KMZ recreational fishery
    - Open the Sacramento River recreational fishery for a 3,000 fish quota
    - Open NO and CO commercial fishery in June and July
    - Open KO commercial fishery in May
- Increase in F to 0.10 was achieved by
    - Turn all Oregon coho-only recreational fisheries to Chinook and coho fisheries
    - KC and KO open 9 days in Jun, 31 in July, 31 in Aug
    - Open FB recreational fishery for a full season, except 15 days in July and Aug closed
    - Open SF and MO recreational fisheries for 10 days in July
- Decrease in F to 0 and 0.03
    - These target harvest rates cannot be achieved due to SRFC harvest from fall 2007
    - To get as close as possible to these target F levels, recreational coho-only fisheries were eliminated

2009

- Predictions from 2009 management
    - SRFC escapement forecast of 122,100
    - SRFC forecast exploitation rate: 0.001
    - KRFC natural area escapement forecast of 40,700
    - KRFC exploitation rate forecast of 50%
    - Forecast KRFC age-4 ocean harvest rate of 0.1%
    - Tribal harvest: 30,895
    - Recreational river harvest: 30,773
- SRFC escapement goal limiting factor for ocean fisheries.
- Changes in the SRFC allowable exploitation rate from the forecast value in 2009 would result for Alternatives 2,2b,3,3b, 4, and 5, with dependence on MSST conventions, as a result of different *de minimis* fishing provisions.
    - MSST = 0.50 *Smsy results in F=0.002 for Alternative 1; F=0.25 for Alternatives 2,2b,3,3b,4,5
    - MSST = 0.75 *Smsy results in F=0.002 for Alternative 1; F=0.13 for Alternatives 2,2b; F=0.25 for Alternatives 3,3b,4,5,FPA
- Increase in F to 0.002 was achieved by:
    - No action taken- nearly equivalent to 2009 forecast value
- Increase in F to 0.13 was achieved by:
    - Allowing Chinook retention in all 2009 Oregon recreational coho-only fisheries
    - Allow recreational fishing in the KMZ from Jun-August
    - Allow recreational fishing in FB from May through August
    - Allow recreational fishing in SF and MO from May through July
    - Open Jun and July commercial fisheries in NO and CO
    - Allow a 2000 SRFC river recreational quota
- Increase in F to 0.25 was achieved by:
    - Begin with the 2010 regulations (which resulted in F=0.27), and modify in the following ways:
        - Eliminate Genetic Stock Identification (GSI) non-retention fisheries
        - Reduce river quota to 4000 (relative to 8200 in 2010)
        - Reduce FB quotas to achieve F=0.25

2010

- Predictions from 2010 management

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

- SRFC escapement forecast of 180,000
  - SRFC forecast exploitation rate: 0.27
  - KRFC natural area escapement forecast of 40,700
  - KRFC exploitation rate forecast of 53%
  - Forecast KRFC age-4 ocean harvest rate of 12%
- SRFC escapement goal (modified by NMFS guidance to achieve 180,000 spawners) limiting factor for ocean fisheries.
- An increase in the SRFC allowable exploitation rate to 0.50 would result for all Alternatives and all MSST conventions, as a result of targeting 122,000 spawners instead of 180,000 spawners.
- Increase in F to 0.50 was achieved by:
  - Increase the SRFC river quota to 33,000 from 8200
  - Eliminate non-retention GSI fisheries
  - Open the recreational fishery in FB, SF, MO continuously from April to August
  - Open the NO and CO commercial fishery continuously from May to August
  - Open the commercial fishery in KO for May, and add a June quota fishery of 1500 fish
  - Open the FB commercial fishery for May and August
  - Open the SF and MO commercial fishery for May, July, and August

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Ocean Commercial Data

Appendix Table 1.1 Ocean Commercial Fishery Chinook Catch -Year 2002

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	168339	168339	168339	168339	168339	168339	168339	168339	NA
Hum-Horse	19463	19463	19463	19463	19463	19463	19463	19463	NA
Horse-Arena	37652	37652	37652	37652	37652	37652	37652	37652	NA
So. Arena	212939	212939	212939	212939	212939	212939	212939	212939	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	168339	168339	168339	168339	168339	168339	168339	168339	168339
Hum-Horse	19463	19463	19463	19463	19463	19463	19463	19463	19463
Horse-Arena	37652	37652	37652	37652	37652	37652	37652	37652	37652
So. Arena	212939	212939	212939	212939	212939	212939	212939	212939	212939

MSST = 0.86 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	168339	168339	168339	168339	168339	168339	168339	168339	NA
Hum-Horse	19463	19463	19463	19463	19463	19463	19463	19463	NA
Horse-Arena	37652	37652	37652	37652	37652	37652	37652	37652	NA
So. Arena	212939	212939	212939	212939	212939	212939	212939	212939	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 1.2 Ocean Commercial Fishery Chinook Catch -Year 2003

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	256223	256223	256223	256223	256223	256223	256223	256223	NA
Hum-Horse	22012	22012	22012	22012	22012	22012	22012	22012	NA
Horse-Arena	68699	68699	68699	68699	68699	68699	68699	68699	NA
So. Arena	212893	212893	212893	212893	212893	212893	212893	212893	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	PPA	6-FPA
Falcon-Hum	256223	256223	256223	256223	256223	256223	256223	256223	256223
Hum-Horse	22012	22012	22012	22012	22012	22012	22012	22012	22012
Horse-Arena	68699	68699	68699	68699	68699	68699	68699	68699	68699
So. Arena	212893	212893	212893	212893	212893	212893	212893	212893	212893

MSST = 0.86 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	PPA	6-FPA
Falcon-Hum	256223	256223	256223	256223	256223	256223	256223	256223	NA
Hum-Horse	22012	22012	22012	22012	22012	22012	22012	22012	NA
Horse-Arena	68699	68699	68699	68699	68699	68699	68699	68699	NA
So. Arena	212893	212893	212893	212893	212893	212893	212893	212893	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 1.3 Ocean Commercial Fishery Chinook Catch -Year 2004

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	189496	189496	171391	189496	171391	189496	171391	189496	NA
Hum-Horse	11021	11021	11021	11021	11021	11021	11021	11021	NA
Horse-Arena	100878	100878	83249	100878	83249	100878	83249	100878	NA
So. Arena	169907	169907	168944	169907	168944	169907	168944	169907	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	189496	189496	171391	189496	171391	189496	171391	189496	171391
Hum-Horse	11021	11021	11021	11021	11021	11021	11021	11021	11021
Horse-Arena	100878	100878	83249	100878	83249	100878	83249	100878	83249
So. Arena	169907	169907	168944	169907	168944	169907	168944	169907	168944

MSST = 0.86 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	189496	189496	171391	189496	171391	189496	171391	189496	NA
Hum-Horse	11021	11021	11021	11021	11021	11021	11021	11021	NA
Horse-Arena	100878	100878	83249	100878	83249	100878	83249	100878	NA
So. Arena	169907	169907	168944	169907	168944	169907	168944	169907	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 1.4 Ocean Commercial Fishery Chinook Catch -Year 2005

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	76093	102552	102552	102552	102552	102552	102552	102552	NA
Hum-Horse	6740	6740	6740	6740	6740	6740	6740	6740	NA
Horse-Arena	11000	22144	22144	22144	22144	22144	22144	22144	NA
So. Arena	191394	185739	185739	185739	185739	185739	185739	185739	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	76093	102552	60037	60037	102552	102552	102552	102552	102552
Hum-Horse	6740	6740	6740	6740	6740	6740	6740	6740	6740
Horse-Arena	11000	22144	11000	11000	22144	22144	22144	22144	22144
So. Arena	191394	185739	178606	178606	185739	185739	185739	185739	185739

MSST = 0.86 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	76093	102552	34300	34300	76093	76093	102552	102552	NA
Hum-Horse	6740	6740	6740	6740	6740	6740	6740	6740	NA
Horse-Arena	11000	22144	11000	11000	11000	11000	22144	22144	NA
So. Arena	191394	185739	125329	125329	191394	191394	185739	185739	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 1.5 Ocean Commercial Fishery Chinook Catch -Year 2006

MSST = 0.50 * Smsy
Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	108954	99810	99810	99810	99810	99810	99810	99810	NA
Hum-Horse	9400	9400	9400	9400	9400	9400	9400	9400	NA
Horse-Arena	45700	45700	45700	45700	45700	45700	45700	45700	NA
So. Arena	267883	30100	30100	30100	30100	30100	30100	30100	NA

MSST = 0.75 * Smsy
Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	108954	99810	99810	99810	99810	99810	99810	99810	99810
Hum-Horse	9400	9400	9400	9400	9400	9400	9400	9400	9400
Horse-Arena	45700	45700	45700	45700	45700	45700	45700	45700	45700
So. Arena	267883	30100	30100	30100	30100	30100	30100	30100	30100

MSST = 0.86 * Smsy
Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	108954	99810	99810	99810	99810	99810	99810	99810	NA
Hum-Horse	9400	9400	9400	9400	9400	9400	9400	9400	NA
Horse-Arena	45700	45700	45700	45700	45700	45700	45700	45700	NA
So. Arena	267883	30100	30100	30100	30100	30100	30100	30100	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 1.6 Ocean Commercial Fishery Chinook Catch -Year 2007

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	64940	64940	64940	64940	64940	64940	64940	64940	NA
Hum-Horse	6064	6064	6064	6064	6064	6064	6064	6064	NA
Horse-Arena	44597	44597	44597	44597	44597	44597	44597	44597	NA
So. Arena	168774	168774	168774	168774	168774	168774	168774	168774	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	64940	64940	64940	64940	64940	64940	64940	64940	64940
Hum-Horse	6064	6064	6064	6064	6064	6064	6064	6064	6064
Horse-Arena	44597	44597	44597	44597	44597	44597	44597	44597	44597
So. Arena	168774	168774	168774	168774	168774	168774	168774	168774	168774

MSST = 0.86 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	64940	64940	64940	64940	64940	64940	64940	64940	NA
Hum-Horse	6064	6064	6064	6064	6064	6064	6064	6064	NA
Horse-Arena	44597	44597	44597	44597	44597	44597	44597	44597	NA
So. Arena	168774	168774	168774	168774	168774	168774	168774	168774	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 1.7 Ocean Commercial Fishery Chinook Catch -Year 2008

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	2200	2200	2200	2200	2200	2200	24573	24573	NA
Hum-Horse	9450	9450	9450	9450	9450	9450	9968	9968	NA
Horse-Arena	200	200	200	200	200	200	200	200	NA
So. Arena	2600	2600	2600	2600	2600	2600	2600	2600	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	2200	2200	2200	2200	2200	2200	24573	24573	2200
Hum-Horse	9450	9450	9450	9450	9450	9450	9968	9968	9450
Horse-Arena	200	200	200	200	200	200	200	200	200
So. Arena	2600	2600	2600	2600	2600	2600	2600	2600	2600

MSST = 0.86 * Smsy

*Total harvest equivalent to condition when MSST = 0.50 * Smsy when this convention applies for SRFC

*Total harvest equivalent to condition when MSST = 0.75 * Smsy when this convention applies for SRFC

Appendix Table 1.8 Ocean Commercial Fishery Chinook Catch -Year 2009

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	PPA	6-FPA
Falcon-Hum	310	310	32051	32051	32051	32051	32051	32051	NA
Hum-Horse	200	200	3471	3471	3471	3471	3471	3471	NA
Horse-Arena	0	0	22688	22688	22688	22688	22688	22688	NA
So. Arena	0	0	4994	4994	4994	4994	4994	4994	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	PPA	6-FPA
Falcon-Hum	310	310	15875	15875	32051	32051	32051	32051	32051
Hum-Horse	200	200	200	200	3471	3471	3471	3471	3471
Horse-Arena	0	0	0	0	22688	22688	22688	22688	22688
So. Arena	0	0	0	0	4994	4994	4994	4994	4994

MSST = 0.86 * Smsy

*Total harvest equivalent to condition when MSST = 0.50 * Smsy when this convention applies for SRFC

*Total harvest equivalent to condition when MSST = 0.75 * Smsy when this convention applies for SRFC

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 1.9 Ocean Commercial Fishery Chinook Catch -Year 2010

MSST = 0.50 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	53785	59653	59653	59653	59653	59653	59653	59653	NA
Hum-Horse	3515	5015	5015	5015	5015	5015	5015	5015	NA
Horse-Arena	36230	34086	34086	34086	34086	34086	34086	34086	NA
So. Arena	8973	101220	101220	101220	101220	101220	101220	101220	NA

MSST = 0.75 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	53785	59653	59653	59653	59653	59653	59653	59653	59653
Hum-Horse	3515	5015	5015	5015	5015	5015	5015	5015	5015
Horse-Arena	36230	34086	34086	34086	34086	34086	34086	34086	34086
So. Arena	8973	101220	101220	101220	101220	101220	101220	101220	101220

MSST = 0.86 * Smsy

Commercial fishery Chinook catch (Sept. t-1 through August t)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	53785	59653	59653	59653	59653	59653	59653	59653	NA
Hum-Horse	3515	5015	5015	5015	5015	5015	5015	5015	NA
Horse-Arena	36230	34086	34086	34086	34086	34086	34086	34086	NA
So. Arena	8973	101220	101220	101220	101220	101220	101220	101220	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Ocean Recreational Data

Appendix Table 2.1 Ocean Recreational Trips -Year 2002

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	38573	38573	38573	38573	38573	38573	38573	38573	NA
Hum-Horse	42576	42576	42576	42576	42576	42576	42576	42576	NA
Horse-Arena	21865	21865	21865	21865	21865	21865	21865	21865	NA
So. Arena	126084	126084	126084	126084	126084	126084	126084	126084	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	38573	38573	38573	38573	38573	38573	38573	38573	38573
Hum-Horse	42576	42576	42576	42576	42576	42576	42576	42576	42576
Horse-Arena	21865	21865	21865	21865	21865	21865	21865	21865	21865
So. Arena	126084	126084	126084	126084	126084	126084	126084	126084	126084

MSST = 0.86 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	38573	38573	38573	38573	38573	38573	38573	38573	NA
Hum-Horse	42576	42576	42576	42576	42576	42576	42576	42576	NA
Horse-Arena	21865	21865	21865	21865	21865	21865	21865	21865	NA
So. Arena	126084	126084	126084	126084	126084	126084	126084	126084	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 2.2 ***Ocean Recreational Trips -Year 2003***

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	69619	69619	69619	69619	69619	69619	69619	69619	NA
Hum-Horse	73874	73874	73874	73874	73874	73874	73874	73874	NA
Horse-Arena	27059	27059	27059	27059	27059	27059	27059	27059	NA
So. Arena	128156	128156	128156	128156	128156	128156	128156	128156	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	69619	69619	69619	69619	69619	69619	69619	69619	69619
Hum-Horse	73874	73874	73874	73874	73874	73874	73874	73874	73874
Horse-Arena	27059	27059	27059	27059	27059	27059	27059	27059	27059
So. Arena	128156	128156	128156	128156	128156	128156	128156	128156	128156

MSST = 0.86 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	69619	69619	69619	69619	69619	69619	69619	69619	NA
Hum-Horse	73874	73874	73874	73874	73874	73874	73874	73874	NA
Horse-Arena	27059	27059	27059	27059	27059	27059	27059	27059	NA
So. Arena	128156	128156	128156	128156	128156	128156	128156	128156	NA

Appendix Table 2.3 ***Ocean Recreational Trips -Year 2004***

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	89656	89656	89656	89656	89656	89656	89656	89656	NA
Hum-Horse	66157	66157	56721	66157	56721	66157	56721	66157	NA
Horse-Arena	26515	26515	26515	26515	26515	26515	26515	26515	NA
So. Arena	121054	121054	121054	121054	121054	121054	121054	121054	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	89656	89656	89656	89656	89656	89656	89656	89656	89656
Hum-Horse	66157	66157	56721	66157	56721	66157	56721	66157	56721
Horse-Arena	26515	26515	26515	26515	26515	26515	26515	26515	26515
So. Arena	121054	121054	121054	121054	121054	121054	121054	121054	121054

MSST = 0.86 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	89656	89656	89656	89656	89656	89656	89656	89656	NA
Hum-Horse	66157	66157	56721	66157	56721	66157	56721	66157	NA
Horse-Arena	26515	26515	26515	26515	26515	26515	26515	26515	NA
So. Arena	121054	121054	121054	121054	121054	121054	121054	121054	NA

Appendix Table 2.4 ***Ocean Recreational Trips -Year 2005***

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	60169	60169	60169	60169	60169	60169	60169	60169	NA
Hum-Horse	29936	39095	39095	39095	39095	39095	39095	39095	NA
Horse-Arena	23405	23405	23405	23405	23405	23405	23405	23405	NA
So. Arena	127636	127636	127636	127636	127636	127636	127636	127636	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	60169	60169	60169	60169	60169	60169	60169	60169	60169
Hum-Horse	29936	39095	27974	27974	39095	39095	39095	39095	39095
Horse-Arena	23405	23405	23405	23405	23405	23405	23405	23405	23405
So. Arena	127636	127636	127636	127636	127636	127636	127636	127636	127636

MSST = 0.86 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	60169	60169	60169	60169	60169	60169	60169	60169	NA
Hum-Horse	29936	39095	18872	18872	29936	29936	39095	39095	NA
Horse-Arena	23405	23405	23405	23405	23405	23405	23405	23405	NA
So. Arena	127636	127636	127636	127636	127636	127636	127636	127636	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 2.5 ***Ocean Recreational Trips -Year 2006***

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	59411	59411	0	0	59411	59411	59411	59411	NA
Hum-Horse	21677	11340	0	0	11340	11340	11340	11340	NA
Horse-Arena	20848	20848	0	0	20848	20848	20848	20848	NA
So. Arena	125032	125032	0	0	125032	125032	125032	125032	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	59411	59411	0	0	0	0	59411	59411	0
Hum-Horse	21677	11340	0	0	0	0	11340	11340	0
Horse-Arena	20848	20848	0	0	0	0	20848	20848	0
So. Arena	125032	125032	0	0	0	0	125032	125032	0

MSST = 0.86 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	59411	59411	0	0	0	0	59411	59411	NA
Hum-Horse	21677	11340	0	0	0	0	11340	11340	NA
Horse-Arena	20848	20848	0	0	0	0	20848	20848	NA
So. Arena	125032	125032	0	0	0	0	125032	125032	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 2.6 ***Ocean Recreational Trips -Year 2007***

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	84881	84881	84881	84881	84881	84881	84881	84881	NA
Hum-Horse	63460	63460	63460	63460	63460	63460	63460	63460	NA
Horse-Arena	26614	26614	26614	26614	26614	26614	26614	26614	NA
So. Arena	119576	119576	119576	119576	119576	119576	119576	119576	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	84881	84881	84881	84881	84881	84881	84881	84881	84881
Hum-Horse	63460	63460	63460	63460	63460	63460	63460	63460	63460
Horse-Arena	26614	26614	26614	26614	26614	26614	26614	26614	26614
So. Arena	119576	119576	119576	119576	119576	119576	119576	119576	119576

MSST = 0.86 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	84881	84881	84881	84881	84881	84881	84881	84881	NA
Hum-Horse	63460	63460	63460	63460	63460	63460	63460	63460	NA
Horse-Arena	26614	26614	26614	26614	26614	26614	26614	26614	NA
So. Arena	119576	119576	119576	119576	119576	119576	119576	119576	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 2.7 ***Ocean Recreational Trips -Year 2008***

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	70339	0	0	0	0	0	70339	70339	NA
Hum-Horse	17597	0	0	0	0	0	42562	42562	NA
Horse-Arena	665	665	665	665	665	665	25953	25953	NA
So. Arena	0	0	0	0	0	0	87656	87656	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

		A16 Alternative							
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	70339	0	0	0	0	0	70339	70339	70339
Hum-Horse	17597	0	0	0	0	0	42562	42562	42562
Horse-Arena	665	665	665	665	665	665	25953	25953	15576
So. Arena	0	0	0	0	0	0	87656	87656	12000

MSST = 0.86 * Smsy

*Total effort equivalent to condition when MSST = 0.50 * Smsy when this convention applies for SRFC

*Total effort equivalent to condition when MSST = 0.75 * Smsy when this convention applies for SRFC

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 2.8 ***Ocean Recreational Trips -Year 2009***

MSST = 0.50 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	PPA	6-FPA
Falcon-Hum	71763	71763	69060	69060	69060	69060	69060	69060	NA
Hum-Horse	18689	18689	51899	51899	51899	51899	51899	51899	NA
Horse-Arena	0	0	25226	25226	25226	25226	25226	25226	NA
So. Arena	0	0	92670	92670	92670	92670	92670	92670	NA

MSST = 0.75 * Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	PPA	6-FPA
Falcon-Hum	71763	71763	71763	71763	69060	69060	69060	69060	69060
Hum-Horse	18689	18689	41812	41812	51899	51899	51899	51899	51899
Horse-Arena	0	0	20579	20579	25226	25226	25226	25226	25226
So. Arena	0	0	63465	63465	92670	92670	92670	92670	92670

MSST = 0.86 * Smsy

*Total harvest equivalent to condition when MSST = 0.50 * Smsy when this convention applies for SRFC

*Total harvest equivalent to condition when MSST = 0.75 * Smsy when this convention applies for SRFC

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

Appendix Table 2.9 ***Ocean Recreational Trips -Year 2010***

MSST = 0.50 *
Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	69060	69060	69060	69060	69060	69060	69060	69060	NA
Hum-Horse	52063	52063	52063	52063	52063	52063	52063	52063	NA
Horse-Arena	25226	25226	25226	25226	25226	25226	25226	25226	NA
So. Arena	92670	119840	119840	119840	119840	119840	119840	119840	NA

MSST = 0.75 *
Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	69060	69060	69060	69060	69060	69060	69060	69060	69060
Hum-Horse	52063	52063	52063	52063	52063	52063	52063	52063	52063
Horse-Arena	25226	25226	25226	25226	25226	25226	25226	25226	25226
So. Arena	92670	119840	119840	119840	119840	119840	119840	119840	119840

MSST = 0.86 *
Smsy

Recreational fishery angler days (January through August)

	A16 Alternative								
	Pre III	1	2	2b	3	3b	4	5	6-FPA
Falcon-Hum	69060	69060	69060	69060	69060	69060	69060	69060	NA
Hum-Horse	52063	52063	52063	52063	52063	52063	52063	52063	NA
Horse-Arena	25226	25226	25226	25226	25226	25226	25226	25226	NA
So. Arena	92670	119840	119840	119840	119840	119840	119840	119840	NA

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

River Tribal Data

Appendix Table 3.1 River Tribal Chinook Harvests

Tribal harvest

MSST = 0.50 * Smsy

Alternative	Year 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pre III	NA	50430	41382	31122	8322	10039	40775	26998	30895	34608
1	NA	50430	41382	31122	10566	6954	40775	31271	35206	39742
2	NA	46036	37159	26318	10566	6136	35751	27071	36413	35746
2b	NA	50430	41382	31122	10566	6136	40775	31271	40725	39742
3	NA	46036	37159	26318	10566	6954	35751	27071	36413	35746
3b	NA	50430	41382	31122	10566	6954	40775	31271	40725	39742
4	NA	46036	37159	26318	10566	6954	35751	27596	36413	35746
5	NA	50430	41382	31122	10566	6954	40775	31765	40725	39742
6-FPA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

MSST = 0.75 * Smsy

Alternative	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pre III	NA	50430	41382	31122	8322	10039	40775	26998	30895	34608
1	NA	50430	41382	31122	10566	6954	40775	31271	35206	39742
2	NA	46036	37159	26318	7787	6136	35751	27071	32940	35746
2b	NA	50430	41382	31122	7787	6136	40775	31271	37251	39742
3	NA	46036	37159	26318	10566	6136	35751	27071	36413	35746
3b	NA	50430	41382	31122	10566	6136	40775	31271	40725	39742
4	NA	46036	37159	26318	10566	6954	35751	27596	36413	35746
5	NA	50430	41382	31122	10566	6954	40775	31765	40725	39742
6-FPA	NA	46036	37159	26318	10566	6136	35751	27270	36413	35746

MSST = 0.86 * Smsy

Alternative	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pre III	NA	50430	41382	31122	8322	10039	40775	26998	\1	34608
1	NA	50430	41382	31122	10566	6954	40775	31271	\1	39742
2	NA	46036	37159	26318	5611	6136	35751	27071	\1	35746
2b	NA	50430	41382	31122	5611	6136	40775	31271	\1	39742
3	NA	46036	37159	26318	8322	6136	35751	27071	\1	35746
3b	NA	50430	41382	31122	8322	6136	40775	31271	\1	39742
4	NA	46036	37159	26318	10566	6954	35751	27596	\1	35746
5	NA	50430	41382	31122	10566	6954	40775	31765	\1	39742
6-FPA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

\1 SRFC is the constraining stock for this year. If KRFC has the MSST convention of MSST = 0.86 * Smsy, the tribal harvest will be contingent on the MSST convention for SRFC. If SRFC MSST convention is MSST = 0.50 * Smsy, the tribal harvest for KRFC will be equal to the values in the top panel. If SRFC MSST convention is MSST = 0.75 * Smsy, the tribal harvest for KRFC will be equal to the values in the middle panel.

Appendix Table 3.2 River Non-Tribal Recreational Chinook Harvests

Recreational havest

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

MSST = 0.50 * Smsy

Alternative	Year 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pre III	NA	20451	10799	4668	1248	0	10601	22477	30773	11977
1	NA	20451	10799	4668	1585	0	10601	26750	35084	10748
2	NA	16057	6576	3948	1585	0	5577	22550	13561	6753
2b	NA	20451	10799	4668	1585	0	10601	26750	17874	10748
3	NA	16057	6576	3948	1585	0	5577	22550	13561	6753
3b	NA	20451	10799	4668	1585	0	10601	26750	17874	10748
4	NA	16057	6576	3948	1585	0	5577	16033	13561	6753
5	NA	20451	10799	4668	1585	0	10601	20203	17874	10748
6-FPA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

MSST = 0.75 * Smsy

Alternative	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pre III	NA	20451	10799	4668	1248	0	10601	22477	30773	11977
1	NA	20451	10799	4668	1585	0	10601	26750	35084	10748
2	NA	16057	6576	3948	1168	0	5577	22550	24858	6753
2b	NA	20451	10799	4668	1168	0	10601	26750	29169	10748
3	NA	16057	6576	3948	1585	0	5577	22550	13561	6753
3b	NA	20451	10799	4668	1585	0	10601	26750	17874	10748
4	NA	16057	6576	3948	1585	0	5577	16033	13561	6753
5	NA	20451	10799	4668	1585	0	10601	20203	17874	10748
6-FPA	NA	16057	6576	3948	1585	0	5577	19825	13561	6753

MSST = 0.86 * Smsy

Alternative	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pre III	NA	20451	10799	4668	1248	0	10601	22477	\1	11977
1	NA	20451	10799	4668	1585	0	10601	26750	\1	10748
2	NA	16057	6576	3948	842	0	5577	22550	\1	6753
2b	NA	20451	10799	4668	842	0	10601	26750	\1	10748
3	NA	16057	6576	3948	1248	0	5577	22550	\1	6753
3b	NA	20451	10799	4668	1248	0	10601	26750	\1	10748
4	NA	16057	6576	3948	1585	0	5577	16033	\1	6753
5	NA	20451	10799	4668	1585	0	10601	20203	\1	10748
6-FPA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

1/ SRFC is the constraining stock for this year. If KRFC has the MSST convention of MSST = 0.86 * Smsy, the recreational harvest will be contingent on the MSST convention for SRFC. If SRFC MSST convention is MSST = 0.50 * Smsy, the recreational harvest for KRFC will be equal to the values in the top panel. If SRFC MSST convention is MSST = 0.75 * Smsy, the recreational harvest for KRFC will be equal to the values in the middle panel

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

APPENDIX I: CHANGES TO THE PACIFIC COAST SALMON FISHERY MANAGEMENT PLAN IMPLEMENTING THE FINAL PREFERRED ALTERNATIVES FOR AMENDMENT 16

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; C-catch; F-fishing mortality rate; MFMT-maximum fishery mortality threshold; MSST-minimum stock size threshold; MSY-maximum sustainable yield; N-Abundance; OFL-overfishing limit; S-spawning escapement; SDC-status determination criteria

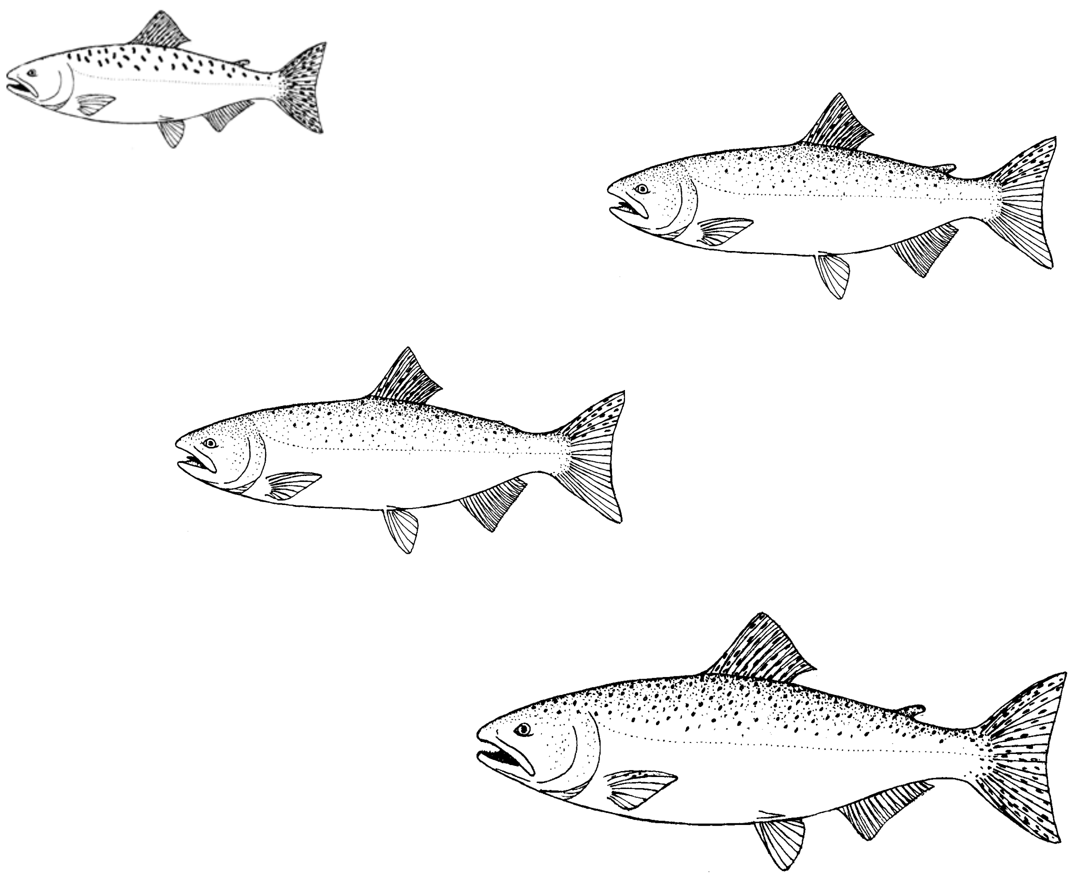
PACIFIC COAST
SALMON FISHERY MANAGEMENT PLAN

FOR COMMERCIAL AND RECREATIONAL SALMON FISHERIES

OFF THE COASTS OF WASHINGTON, OREGON, AND CALIFORNIA

AS REVISED THROUGH AMENDMENT 16

(Effective January 2012)



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IDENTIFICATION AND DESCRIPTION OF ESSENTIAL FISH HABITAT, ADVERSE IMPACTS, AND RECOMMENDED CONSERVATION MEASURES FOR SALMON

AMENDMENT 14 TO THE PACIFIC COAST SALMON PLAN, APPENDIX B:
DESCRIPTION OF THE OCEAN SALMON FISHERY AND ITS SOCIAL AND ECONOMIC CHARACTERISTICS

APPENDIX C TO THE PACIFIC COAST SALMON PLAN:
REVIEW OF OCEAN SALMON FISHERIES (Latest annual edition)

PRESEASON REPORT I:
STOCK ABUNDANCE ANALYSIS FOR OCEAN SALMON FISHERIES (Latest annual edition)

PRESEASON REPORT III:
ANALYSIS OF COUNCIL ADOPTED MANAGEMENT MEASURES FOR OCEAN SALMON FISHERIES (Latest annual edition)

LIST OF ACRONYMS AND ABBREVIATIONS

ABC	acceptable biological catch
ACL	annual catch limit
AEQ	adult equivalent
AM	accountability measure
ASETF	Anadromous Salmonid Environmental Task Force
CRFMP	Columbia River Fish Management Plan
Council	Pacific Fishery Management Council
CVF	Central Valley fall (Chinook stock complex)
EA	Environmental Assessment
EEZ	exclusive economic zone (three to 200 miles offshore)
EIS	Environmental Impact Statement
ESA	Endangered Species Act
EFH	essential fish habitat
ESU	Evolutionarily significant unit
F	instantaneous rate of fishing mortality
FAB	Fisheries Advisory Board (established in *U.S. v. Washington*)
FNMC	far-north migrating coastal (Chinook stock complex)
FMP	fishery management plan
FR	Federal Register
FRAM	Fishery Regulation Assessment Model
HC	Habitat Committee
KRFC	Klamath River fall Chinook
KRTT	Klamath River Technical Team
MFMT	maximum fishing mortality threshold
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSP	maximum sustainable production
MSST	minimum stock size threshold
MSY	maximum sustainable yield
N	abundance of fish in numbers
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OCN	Oregon coastal natural coho
ODFW	Oregon Department of Fish and Wildlife
OFL	overfishing limit
OFR	Office of the Federal Register
OPI	Oregon Production Index
OY	optimum yield
PFMC	Pacific Fishery Management Council
PSC	Pacific Salmon Commission
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
S	number of adult spawners
SAS	Salmon Advisory Subpanel
Secretary	Secretary of Commerce
SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
SONC	Southern Oregon/Northern California (Chinook stock complex)
SRFC	Sacramento River fall Chinook

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

SRFCRT	Sacramento River Fall Chinook Review Team
SSC	Scientific and Statistical Committee
STT	Salmon Technical Team
TAC	total allowable catch
WDF	Washington Department of Fisheries
WDFW	Washington Department of Fish and Wildlife

INTRODUCTION

This document is the *Pacific Coast Salmon Fishery Management Plan*, a fishery management plan (FMP) of the Pacific Fishery Management Council (Council or PFMC) as revised and updated for implementation in 2012 and beyond. It guides management of commercial and recreational salmon fisheries off the coasts of Washington, Oregon, and California.

Since 1977, salmon fisheries in the exclusive economic zone (EEZ) (three to 200 miles offshore) off Washington, Oregon, and California have been managed under salmon FMPs of the Council. Creation of the Council and the subsequent development and implementation of these plans were initially authorized under the Fishery Conservation and Management Act of 1976. This act, now known as the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; MSA), was amended by the Sustainable Fisheries Act (SFA) in 1996, and most recently amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA) in 2007. The plan presented in this document contains or references all the elements required for an FMP under the MSA. It completely replaces the 1999 version of the *Pacific Coast Salmon Plan*.

The Council's first salmon FMP and its environmental impact statement (EIS) were issued to govern the 1977 salmon season. A new salmon management plan and EIS were issued in 1978 to replace the 1977 documents. To establish management measures from 1979 through 1983, the 1978 FMP was amended annually and published along with a supplemental EIS (SEIS) and Regulatory Impact Review/Regulatory Flexibility Analysis (RIR/RFA). This annual process was lengthy, complex, and costly. It lacked a long-range perspective and was too cumbersome to allow for timely implementation of the annual regulations and efficient fishery management. Therefore, in 1984, the Council adopted a comprehensive framework amendment that was designed to end the need for annual plan amendments and supplemental EISs (PFMC 1984).

The comprehensive framework plan amendment of 1984 (Amendment 6) replaced the 1978 plan as the base FMP document and established a framework of fixed management objectives with flexible elements to allow annual management measures to be varied to reflect changes in stock abundance and other critical factors. Subsequently, at irregular intervals, the Council has developed various amendments to portions of the framework plan to address specific management issues raised by participants in the salmon management process or as necessary to respond to reauthorization of the MSA. The next seven amendments adopted since implementation of the framework FMP in 1984 were accompanied by an environmental assessment (EA). Amendment 14 was accompanied by an SEIS. Amendments 15 and 16 were accompanied by an EA.

The primary amendment issues since 1984 have included specific spawner escapement goals for Oregon coastal natural (OCN) coho and Klamath River fall Chinook (Amendments 7, 9, 11, 13, and 15), non-Indian harvest allocation (Amendments 7, 9, 10, and 14), inseason management criteria (Amendment 7), habitat and essential fish habitat (EFH) definition (Amendments 8 and 14), safety (Amendment 8), status determination criteria (SDC) (Amendments 10, 14, and 16), management objectives for stocks listed under the Endangered Species Act (ESA) (Amendments 12 and 14), bycatch reporting and priorities for avoiding bycatch (Amendment 14), selective fisheries (Amendment 14), stock classification (Amendment 16), annual catch limits (ACLs) and accountability measures (AMs) (Amendment 16), *de minimis* fishing provisions (Amendments 15 and 16).

In 1996, as part of Amendment 12, the Council made an editorial update to the framework FMP that included incorporating all of the amendments after 1984 into the *Pacific Coast Salmon Plan* (PFMC 1997b). Subsequently, the Council modified the OCN coho management goals under Amendment 13 in 1999 (PFMC 1999) and established de minimis fishing provisions for Klamath river fall Chinook under

Amendment 15 (PFMC and NMFS 2007). The current salmon FMP incorporates changes through Amendment 16, including Amendments 14 (PFMC 2000a) and 16 (PFMC and NMFS 2011) extensive revisions of the FMP primarily to respond to reauthorization of the MSA and to improve the readability and organization of the plan. Table 1 contains a complete listing of the issues in each amendment through Amendment 16.

This document is the current salmon FMP. Appendix A contains the complete description of essential fish habitat, Appendix B provides a description of the fishery, and Appendix C, which will always be the Council's most current annual review of the ocean fisheries, provides an annual updating of the fishery information. The reader may wish to refer to the original salmon FMP and individual amendment documents for more background and explanatory information, including the environmental impact assessments, EISs, and examples of management options not adopted by the Council.

TABLE 1. Record of salmon FMP documents.

DOCUMENT	CONTENT SUMMARY
Final 1977 Plan	Initial FMP/EIS document for the 1977 salmon season.
Final 1978 Plan (43 FR 29791, July 11, 1978) Effective July 11, 1978[a/]	Initial, comprehensive FMP/EIS document. Amended each year to establish annual management measures for 1979-1983.
Final Framework Amendment (49 FR 43679, Oct. 31, 1984) Effective Nov. 25, 1984[b/]	Comprehensive amendment and SEIS that replaced the 1978 Plan as a multi-year FMP document.
Technical amendments:	1) Spawner escapement goals, procedures to modify spawner goals, and inseason modification of daily bag limits (50 FR 812, Jan. 7, 1985) 2) Inseason rescission of automatic closures (50 FR 4977, Feb. 5, 1985) 3) Season opening and closing dates (50 FR 42529, Oct. 21, 1985)
Amendment 7 (52 FR 4146, Feb. 10, 1987) Effective Mar. 8, 1987	1) Sliding scale OCN coho spawner escapement goal 2) Inseason management actions and procedures 3) Coho harvest allocation south of Cape Falcon
Amendment 8 (53 FR 30285, Aug. 11, 1988) Effective Aug. 8, 1988; required no implementing regulations	1) Habitat policy and objectives 2) Consideration of temporary season adjustments for vessels precluded from harvesting due to unsafe weather
Amendment 9 (54 FR 19185, May 4, 1989) Effective May 1, 1989; except radio report section implemented July 13, 1989 (54 FR 29730, July 14, 1989)	1) Klamath River fall Chinook harvest rate spawner escapement goal 2) Commercial/recreational harvest allocation north of Cape Falcon 3) Inseason notice procedures 4) Steelhead management intent 5) Radio reporting requirements for commercial fishers 6) Deleted limitations on season opening and closing dates
Clarifying letter:	to Mr. Rolland Schmitten re harvest allocation, Issue 2; Feb. 27, 1989
Technical amendment:	Minor modification of Klamath spawner goal based on Council recommendation, March 8, 1989 (54 FR 19800, May 8, 1989 and 59 FR 23000, May 4, 1994)
Amendment 10 (56 FR 26774, June 11, 1991) Effective July 11, 1991	1) Inseason reallocation objectives for commercial and recreational fisheries south of Cape Falcon 2) Criteria guiding non-Indian catch allocation north of Cape Falcon, especially concerning recreational port allocation 3) Definition of overfishing
Amendment 11 (59 FR 23013, May 4, 1994) Effective April 29, 1994	OCN coho spawner escapement goal of 42 spawners/mile, incidental exploitation rate of 20% or less on OCN coho at low stock sizes and sport coho harvest allocation criteria at low harvest levels.
Clarifying letter:	to Mr. Gary Smith re incidental harvest and sport allocation; Apr. 15, 1994
Technical amendment:	Minor modification of Klamath spawner goal to meet tribal allocation based on Council recommendation of April 11, 1996 (61 FR 20186, May 6, 1996)
Amendment 12 (62 FR 35450, July 1, 1997) Effective July 31, 1997	1) Procedures governing retention of salmon bycatch in trawl nets 2) Management objectives for ESA listed salmon species 3) Update of the salmon FMP (no change in management objectives)

DOCUMENT	CONTENT SUMMARY
Amendment 13 (64 FR 26328, May 14, 1999) Effective June 14, 1999)	Revision of management objectives for OCN coho to increase the probability of recovery and to prevent listing under the ESA.
Amendment 14 (66 FR 29238, May 30, 2001; Effective June 29, 2001)	1) Update of the EIS and editorial improvements in the plan 2) New requirements of the SFA, including essential fish habitat, optimum yield, overfishing, and bycatch 3) Clarification of the stocks managed and management objectives 4) Minor revision of allocation north of Cape Falcon to allow more harvest in selective fisheries
Amendment 15 (73 FR 9960, February 25, 2008; Effective March 26, 2008)	Revision of Council action required under a Conservation Alert for Klamath River fall Chinook to allow *de minimis* fisheries.
Amendment 16 (Effective January 1, 2012)	1) Application of new requirements of the MSA as amended in 2007 and revised NS1 Guidelines 2) Stock classification 3) Establishment of ACLs and AMs 4) Acceptable biological catch and incorporating scientific uncertainty 5) Revision of status determination criteria 6) Characterization of stock conservation objectives related to reference points 7) Development and modification of *de minimis* fishing provisions.

a/ Implemented by emergency regulation on April 14, 1978 (43 FR 15629) and May 24, 1978 (43 FR 22214).
b/ Implemented by emergency regulation on May 3, 1984 (49 FR 18853; May 3, 1984).

1 WHAT THE PLAN COVERS

> *"It is therefore declared to be the purposes of the Congress in this Act (1) to take immediate action to conserve and manage the fishery resources found off the coasts of the United States, and the anadromous species and Continental Shelf Fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone . . ., and (B) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species and Continental Shelf fishery resources . . .(7) to promote the protection of essential fish habitat in the review of projects conducted under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat."*
>
> *Magnuson-Stevens Act, ' 2*(b)

This fishery management plan (FMP) covers the coastwide aggregate of natural and hatchery salmon species that is contacted by salmon fisheries in the exclusive economic zone (EEZ) off the coasts of Washington, Oregon, and California. Salmon of U.S. and Canadian origin are included except when specific species are managed in those waters by another management entity with primary jurisdiction (i.e., sockeye and pink salmon by the Fraser River Panel of the Pacific Salmon Commission (PSC) in the Fraser River Panel Area (U.S.) between 49°N latitude and 48°N latitude). In addition, the plan contains requirements and recommendations with regard to essential fish habitat for the managed stocks as described in Chapter 4 and Appendix A. The essential fish habitat includes marine areas within the EEZ as well as estuarine and freshwater habitat within the internal waters of Washington, Oregon, California, and Idaho.

Chinook or king salmon (*Oncorhynchus tshawytscha*) and coho or silver salmon (*O. kisutch*) are the main species caught in Council-managed ocean salmon fisheries. In odd-numbered years, catches of pink salmon (*O. gorbuscha*) can also be significant, primarily off Washington and Oregon (PFMC 2011a). Therefore, while all species of salmon fall under the jurisdiction of this plan, it currently contains fishery management objectives only for Chinook, coho, pink (odd-numbered years only), and any salmon species listed under the Endangered Species Act (ESA) that is measurably impacted by Council fisheries.

The plan contains no fishery management objectives for even-numbered year pink salmon, chum (*O. keta*), sockeye (*O. nerka*), steelhead (*O. mykiss*), sea-run cutthroat (*O. clarki*) or spring run Chinook from the mid-Columbia River tributaries (White Salmon, Klickitat, Yakima, Deschutes, John Day, Umatilla, and Walla Walla basins). The Council does not manage fisheries for these species and incidental catches are inconsequential (low hundreds of fish each year) to very rare (PFMC and NMFS 2011). In the event this situation should change, management objectives for these species could be developed and incorporated by plan amendment. The incidental harvest of these salmon species can be allowed or restricted under existing federal fishery regulations.

1.1 STOCK CLASSIFICATION

The MSA requires that an FMP describe the species of fish involved in the fishery. The NS1 Guidelines provide a structure for classifying stocks in and around the fishery, and organizing stock complexes. This classification scheme helps conceptualize how the fishery operates, which stocks are affected by various fishery sectors, and how SDC and ACL provisions, among other MSA Section 303(a) provisions, may be applied.

The stocks identified in an FMP are classified as in or out of the fishery, and as target or non-target stocks. Target stocks and some non-target stocks are in the fishery; ecosystem component (ECs) stocks are non-target stocks that are not in the fishery. Individual stocks can also be formed into stock complexes for management and assessment purposes. Stock complexes are groups of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impacts of management actions on the stocks are similar. Stock complexes may be formed to facilitate management requirements such as setting ACLs in a mixed stock fishery. Each stock complex could have one or more indicator stocks to establish annual harvest constraints based on status of those indicator stocks.

To the extent practicable, the Council has partitioned the coastwide aggregate of Chinook, coho, and pink salmon into various stock components and complexes with specific conservation objectives. A detailed listing of the individual stocks and stock complexes managed under this plan are provided in Tables 1-1, 1-2, and 1-3. Stocks designated as hatchery stocks rely on artificial production exclusively, while those designated as natural stocks have at least some component of the stock that relies on natural production, although hatchery production and naturally spawning hatchery fish may contribute to abundance and spawning escapement estimates.

1.2 Changes or Additions

The following classification actions will require an FMP amendment: adding stocks to the FMP either to the fishery or as EC species, removing stocks from the FMP, and reclassifying stocks as either in the fishery or as an EC species. The following actions will not require an FMP amendment as long as the stocks and complex remain in their original designation (in the fishery or EC): composition of stock complexes, specification of indicator stocks for complexes, identification as target or non-target stocks. All of these actions require a comprehensive technical review of the best scientific information available providing evidence that, in the view of the Salmon Technical Team (STT), Scientific and Statistical Committee (SSC), and the Council, such modifications are justified. Insofar as possible, proposed changes noted above that do not require a plan amendment will be reviewed and approved within the schedule established for salmon estimation methodology reviews and prior to the preseason planning process. The following actions will not require an FMP amendment: changes or additions involving ESA-listed stocks upon the recommendation of NMFS, changes or additions involving hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities; and Federal court-ordered changes.

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 1of 4)

Stocks and Complexes In The Fishery			
Stock or Stock Complex	**Component Stocks**	**Description**	**Target/Non-Target**
Central Valley Fall Chinook Stock Complex		Fall and late fall Chinook from the Sacramento and San Joaquin basins; the indicator stock is Sacramento River Fall Chinook.	
	Sacramento River Fall	Primarily hatchery stock with smaller natural component. Single largest contributor to ocean fisheries off California, a significant contributor off southern and central Oregon, and present north into British Columbia. Primary impact south of Pt. Arena; considerable overlap with coastal and Klamath River fall Chinook between Pt. Arena and Horse Mt.	Target
	Sacramento River Late Fall	Natural and hatchery components from upper Sacramento basin. Minor contributions to ocean fisheries.	Target
	San Joaquin River Fall	Natural and hatchery components. Minor contributions to ocean fisheries.	Target
Sacramento River Spring		ESA listed Threatened. Minor contributions to ocean fisheries off California, also known to occur off Oregon.	Non-Target ESA
Sacramento River Winter		ESA listed Endangered. Minor contributions to ocean fisheries south of Pt. Arena.	Non-Target ESA
California Coastal Chinook		ESA listed Threatened. Eel, Mattole, Mad Rivers fall and spring stocks. Minor contributions to ocean fisheries off northern California and southern Oregon.	Non-Target ESA
Southern Oregon Northern California Chinook Stock Complex		Natural and hatchery stocks south of the Elk River, Oregon to, and including, the Klamath River, plus Umpqua River spring Chinook; the indicator stock is Klamath River fall Chinook.	
	Klamath River Fall	Natural and hatchery components from the Klamath basin. Major contributions to ocean fisheries from Humbug Mt. to Horse Mt. and to Klamath River tribal and recreational fisheries. Significant contributions to ocean fisheries from Cape Falcon to Pt. Sur.	Target
	Klamath River - Spring	Natural and hatchery components from the Klamath basin. Minor contributions to ocean fisheries from Cape Falcon to Pt. Sur.	Non-Target
	Smith River	Natural spring and fall stocks from the Smith River basin. Minor contributions to ocean fisheries off northern California and Oregon.	Non-Target
	Southern Oregon	Aggregate of natural and hatchery fall and spring stocks in all streams south of Elk River, plus Umpqua spring stock; Rogue River fall stock is used to indicate relative abundance and ocean contribution rates. Significant contributions to ocean fisheries off northern California and Oregon.	Target

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 2 of 4)

Stocks and Complexes In The Fishery			
Stock or Stock Complex	**Component Stocks**	**Description**	**Target/Non-Target**
Far-North-Migrating Coastal Chinook Stock Complex		Spring/summer and fall stocks from the Central and Northern Oregon Coast (from the Elk River north, except Umpqua River spring Chinook), and spring/summer and fall coastal stocks north of the Columbia River. Indicator stocks for this complex are Quillayute, Hoh, Queets, and Grays Harbor fall Chinook. These stocks are subject to provisions of the Pacific Salmon Treaty.	
	Central and Northern Oregon	Aggregate of natural and hatchery fall and spring stocks in all streams from the Elk River to just south of the Columbia River. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off northern Oregon and Washington.	Non-Target
	Willapa Bay Fall (natural)	Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Willapa Bay Fall (hatchery)	Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Grays Harbor Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Grays Harbor Spring	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Quinault Fall	Hatchery stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Queets Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Queets Sp/Su	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Hoh Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Hoh Spring/Summer	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Quillayute Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Quillayute Spring/Summer	Hatchery and natural stocks. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Hoko Summer/Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 3 of 4)

Stocks and Complexes In The Fishery			
Stock or Stock Complex	**Component Stocks**	**Description**	**Target/Non-Target**
North Lewis River Fall		Natural stock. Component of Lower Columbia Chinook ESU - ESA listed Threatened. Significant contribution to Alaska and Canada ocean fisheries. Minor contribution to ocean fisheries off Washington and northern Oregon.	Non-Target ESA
Columbia Lower River Hatchery Fall		Significant contribution to ocean fisheries north of Cape Falcon and Canada. Minor contribution to ocean fisheries south of Cape Falcon.	Target
Columbia Lower River Hatchery Spring		Minor contribution to ocean fisheries north of Cape Falcon and Canada.	Non-Target
Upper Willamette Spring		Natural and hatchery stock. ESA listed Threatened. Minor contribution to ocean fisheries north of Cape Falcon, Canada, and Alaska.	Non-Target ESA
Columbia Mid-River Bright Hatchery Fall		Hatchery stock, Significant contribution to ocean fisheries off Canada and Alaska.	Non-Target
Columbia Spring Creek Hatchery Fall		Significant contribution to ocean fisheries north of Cape Falcon and Canada. Minor contribution to ocean fisheries south of Cape Falcon.	Target
Snake River Fall		Natural and hatchery stock. ESA listed Threatened. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington and Oregon.	Non-Target ESA
Snake River - Spring/Summer		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Columbia Upper River Bright Fall		Natural and hatchery stock. Significant contribution to Alaska and Canada ocean fisheries. Minor contribution to ocean fisheries off Washington and northern Oregon. Subject to Pacific Salmon Treaty provisions.	Non-Target
Columbia Upper River Summer		Natural and hatchery stock. Significant contribution to Alaska and Canada ocean fisheries. Minor contribution to ocean fisheries off Washington and northern Oregon. Subject to Pacific Salmon Treaty provisions.	Non-Target
Columbia Upper River Spring		Natural and hatchery stock. ESA listed Endangered. Negligible contributions to ocean fisheries.	Non-Target ESA

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 4 of 4)

Stocks and Complexes In The Fishery			
Stock or Stock Complex	**Component Stocks**	**Description**	**Target/Non-Target**
Eastern Strait of Juan de Fuca Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Skokomish Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Nooksack Spring early		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Skagit Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Skagit Spring		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Stillaguamish Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Snohomish Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Cedar River Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
White River Spring		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Green River Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Nisqually River Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA

TABLE 1-2. Coho stocks and stock complexes identified in the Salmon FMP. (Page 1 of 2)

Stocks and Complexes In The Fishery Stock or Stock Complex	Description	Target/Non-Target
Central California Coast	ESA Threatened. ~~Very minor component of OPI area fisheries,~~ limited contribution to ocean and inland fisheries. Current impacts incidental in ocean fisheries off California.	Non-Target ESA
Southen Oregon/Northern California Coast	ESA Threatened. Very minor natural component of OPI area fisheries, minor contribution to ocean fisheries off California and southern Oregon, and inland California fisheries.	Non-Target ESA
Oregon Coastal Natural	ESA Threatened. Major natural component of OPI area, significant contribution to ocean fisheries off ~~California,~~ Oregon, and Washington south of Leadbetter Pt., and freshwater fisheries in Oregon coastal streams.	Non-Target ESA
Lower Columbia Natural	ESA Threatened. Minor natural component of OPI area minor contribution to ocean fisheries off Oregon and Washington, and mainstem Columbia River fisheries.	Non-Target ESA
Oregon Coast Hatchery	Minor component of OPI area; minor contributtion to ocean fisheries off Oregon and Washington south of Leadbetter Pt., and freshwater fisheries in Oregon coastal streams.	Target
Columbia River Late Hatchery	Hatchery stock. Major component of ocean fisheries north of Cape Falcon. Significant contribution to ocean fisheries off Oregon north into Canada and Columbia River fisheries	Target
Columbia River Early Hatchery	Hatchery stock. Major component of OPI area fisheries. Significant contributions to ocean fisheries off California and north to Leadbetter Pt., Washington and to Columbia River fisheries.	Target
Willapa Bay - Hatchery	Minor component of ocean fisheries off northern Oregon north into Canada. Significant contribution to inside commercial net and recreational fisheries.	Target
Willapa Bay Natural	Minor component of ocean fisheries off northern Oregon north into Canada.	Target
Grays Harbor	Minor contribution to ocean fisheries off Oregon and north into Canada. Significant contribution to Washington inside tribal fishery, minor contribution to inside recreational fishery.	Target
Quinault - Hatchery	Contribution to ocean fisheries off Washington and north into British Columbia; present south to central Oregon; significance to Puget Sound and tribal fisheries.	Target
Queets	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon; significance to Puget Sound and tribal fisheries.	Target
Quillayute - Summer Hatchery	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon.	Target
Quillayute - Fall	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon.	Target
Hoh	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon.	Target

Table 1-2. Coho stocks and stock complexes identified in the Salmon FMP. (Page 2 of 2)

Stocks and Complexes In The Fishery Stock or Stock Complex	Description	Target/Non-Target
Strait of Juan de Fuca	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Hood Canal	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Skagit	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Stillaguamish	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Snohomish	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
South Puget Sound Hatchery	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target

TABLE1-3. Pink salmon stocks and stock complexes identified in the Salmon FMP.

Stocks and Complexes In The Fishery Stock or Stock Complex	Description	Target/Non-Target
Puget Sound	Contribution to U.S. ocean fisheries north of Leadbetter Point; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target

2 ACHIEVING OPTIMUM YIELD

"Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery"

Magnuson-Stevens Act, National Standard I

This chapter explains the Council's means of meeting the requirements of the Magnuson-Stevens Act to achieve the optimum yield from the salmon fishery.

2.1 THEORY

Optimum yield (OY) means the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account protection of marine ecosystems. It is prescribed on the basis of the maximum sustainable yield (MSY) from the fishery, reduced by any relevant economic, social, or ecological factors, and provides for rebuilding of an overfished stock, taking into account the effects of uncertainty and management imprecision.

MSY is a theoretical concept that, for the purposes of the Magnuson-Stevens Act, is defined as the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions and fishery technological characteristics, and distribution of catch among fleets. In Council management of naturally spawning salmon stocks, MSY is usually approached in terms of the number of adult spawners associated with this goal (S_{MSY}). Often, data are insufficient to directly estimate S_{MSY}. In these cases, the Council may use MSY proxies derived from more general estimates of productive capacity and implement harvest strategies that may be expected to result in a long-term average catch approximating MSY.

2.2 IMPLEMENTATION

The optimum yield to be achieved for species covered by this plan is the total salmon catch and mortality (expressed in numbers of fish) resulting from fisheries within the EEZ adjacent to the States of Washington, Oregon, and California, and in the waters of those states (including internal waters), and Idaho, that, to the greatest practical extent within pertinent legal constraints, fulfill the plan's conservation and harvest objectives. On an annual basis, the Council recommends management measures to comply with annual catch limits (ACLs) and to achieve the stock conservation objectives for each stock or stock complex, based on the estimated MSY, MSY proxy, maximum sustainable production (MSP), rebuilding schedule, or ESA consultation standard (Chapter 3), while simultaneously seeking to fulfill, to the extent practicable, the harvest and allocation objectives (Chapter 5) that reflect the Council's social and economic considerations. The subsequent catch and mortality resulting under the Council's management recommendations will embody the optimum yield. The level of total allowable harvest, the relative harvest levels in various management areas, and the species and stock composition of optimum yield will vary annually, depending on the relative abundance and distribution of the various stocks and contingencies in allocation formulas.

The Council's annual Review of Ocean Salmon Fisheries (stock assessment and fishery evaluation; SAFE) document and preseason reports (e.g., PFMC 2011a, 2011b, 2011c, and 2011d) assess and specify the present and historical range of harvests and harvest related mortalities that represent the optimum yield. A similar range of yields can be expected in the future, though further stock declines and listings under the ESA could result in even lower levels than experienced prior to 2009.

3 CONSERVATION

"Conservation and management measures shall be based upon the best scientific information available."

Magnuson-Stevens Act, National Standard 2

Conservation of salmon stocks includes determining and reporting individual stock status and establishing conservation objectives and control rules to manage harvest. To facilitate these processes, reference points, defined by the MSA and/or National Standard 1 (NS1) Guidelines are used as benchmarks.

Reference points used in the FMP include:

MFMT: Maximum Fishing Mortality Threshold. Defined in NS1 Guidelines as the level of fishing mortality (F) on an annual basis, above which overfishing is occurring. MFMT is generally less than or equal to $F_{MSY.}$

OFL: Overfishing Limit. Defined in NS1 Guidelines as the annual amount of catch that corresponds to the estimate of MFMT applied to a stock or complex's abundance, expressed in terms of numbers or weight of fish, and is the catch level above which overfishing is occurring

F_{MSY}: MSY fishing mortality rate. The fishing mortality rate that will, if applied over the long term, would result in MSY. Generally corresponds to MFMT.

ABC: Acceptable Biological Catch. Required by the MSA and defined in the NS1 Guidelines as the level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of OFL and other scientific uncertainty, and should be specified based on the ABC control rule. ABC may not exceed OFL and should be reduced from OFL to prevent overfishing.

F_{ABC}: ABC fishing mortality rate. The annual exploitation rate associated with the ABC.

ACL: Annual Catch Limit. Required by the MSA and defined in the NS1 Guidelines as the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures. The ACL cannot exceed the ABC.

F_{ACL}: ACL fishing mortality rate. The annual exploitation rate associated with the ACL.

S_{MSY}: MSY spawner abundance. The abundance of adult spawners that is expected, on average, to produce MSY.

MSST: Minimum Stock Size Threshold. Defined in the NS1 Guidelines as level of biomass below which the stock or stock complex is considered to be overfished. The MSST should be no less than one-half of S_{MSY}.

ACT: Annual Catch Target. Defined in the NS1 Guidelines as an amount of annual catch of a stock or stock complex that is the management target of the fishery. It should usually be less than its ACL. It is an optional accountability measure that may be adopted to account for management uncertainty in complying with the ACL (see section 3.3.5.3).

3.1 STATUS DETERMINATION CRITERIA

"Any fishery management plan . . . shall . . . specify objective and measurable criteria for identifying when the fishery . . . is overfished . . . and, . . . contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;"

Magnuson-Stevens Act, '§303(a)(10)

"Overfishing (to overfish) occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis"

NS1Gs (600.310 (e)(2)(i)(B))

"Overfished. A stock or stock complex is considered ''overfished'' when its biomass has declined below a level that jeopardizes the capacity of the stock or stock complex to produce MSY on a continuing basis."

NS1Gs (600.310 (e)(2)(i)(E))

"Approaching an overfished condition. A stock or stock complex is approaching an overfished condition when it is projected that there is more than a 50 percent chance that the biomass of the stock or stock complex will decline below the MSST within two years."

NS1Gs (600.310(e)(2)(i)(G)

In establishing criteria by which to determine the status of salmon stocks, the Council must consider the uncertainty and theoretical aspects of MSY as well as the complexity and variability unique to naturally producing salmon populations. These unique aspects include the interaction of a short-lived species with frequent, sometimes protracted, and often major variations in both the freshwater and marine environments. These variations may act in unison or in opposition to affect salmon productivity in both positive and negative ways. In addition, variations in natural populations may sometimes be difficult to measure due to masking by hatchery produced salmon.

3.1.1 General Application to Salmon Fisheries

In establishing criteria from which to judge the conservation status of salmon stocks, the unique life history of salmon must be considered. Chinook, coho, and pink salmon are short-lived species (generally two to six years) that reproduce only once shortly before dying. Spawning escapements of coho and pink salmon are dominated by a single year-class and Chinook spawning escapements may be dominated by no more than one or two year-classes. The abundance of year-classes can fluctuate dramatically with combinations of natural and human-caused environmental variation. Therefore, it is not unusual for a healthy and relatively abundant salmon stock to produce occasional spawning escapements which, even with little or no fishing impacts, may be significantly below the long-term average associated with the production of MSY.

Numerous West Coast salmon stocks have suffered, and continue to suffer, from nonfishing activities that severely reduce natural survival by such actions as the elimination or degradation of freshwater spawning and rearing habitat. The consequence of this man-caused, habitat-based variation is twofold. First, these habitat changes increase large scale variations in stock productivity and associated stock abundances, which in turn complicate the overall determination of MSY and the specific assessment of whether a stock is producing at or below that level. Second, as the productivity of the freshwater habitat is diminished, the benefit of further reductions in fishing mortality to improve stock abundance decreases. Clearly, the failure of several stocks managed under this FMP to produce at an historic or consistent MSY level has little to do with current fishing impacts and often cannot be rectified with the cessation of all fishing.

To address the requirements of the Magnuson-Stevens Act, the Council has established criteria based on biological reference points associated with MSY exploitation rate and MSY spawning escapement. The criteria are based on the unique life history of salmon and the large variations in annual stock abundance due to numerous environmental variables. They also take into account the uncertainty and imprecision surrounding the estimates of MSY, fishery impacts, and spawner escapements. In recognition of the unique salmon life history, the criteria differ somewhat from the general guidance in the National Standard 1 Guidelines (§600.310).

3.1.2 Overfishing

A stock will be considered subject to overfishing when the postseason estimate of F_t exceeds the MFMT, where the MFMT is generally defined as less than or equal to F_{MSY}. Stock-specific estimates of F_{MSY} based on spawner-recruit data will be used if available. Otherwise, a species-specific proxy value of F_{MSY}= 0.78 for Chinook based on species-specific meta-analyses, will be used (PFMC and NMFS 2011). Stock-specific overfishing determinations will be made annually and are based on exploitation during a single biological year.

3.1.2.1 Council Action

Because salmon are exploited in multiple fisheries, it is necessary to determine fishery specific contribution to the total exploitation rate to determine the actions necessary to end and prevent future overfishing. As the Council has no jurisdiction over river fisheries and ocean fisheries north of the U.S./Canada border, it also may be necessary for other responsible entities to take action to end ongoing and prevent future overfishing.

The STT will report postseason exploitation rates in the annual SAFE document, and when overfishing occurs, the Council shall:

1) notify the NMFS NWR administrator of the STT's findings;
2) direct the STT to assess the mortality rates in fisheries impacting the stock of concern and report their findings;
3) immediately take action to ensure Council area fisheries are not contributing to overfishing, and;
4) notify pertinent management agencies of the stock's status and the contribution of various fisheries to the total exploitation rate.

3.1.3 Approaching an Overfished Condition

An approaching overfished determination will be made if the geometric mean of the two most recent postseason estimates of spawning escapement, and the current preseason forecast of spawning escapement, is below the MSST. Stock-specific approaching overfished determinations will be made annually following development of the preseason spawning escapement forecasts.

3.1.3.1 Council Action

When a stock is approaching an overfished condition the Council shall:

1) notify the NMFS NWR administrator of this situation;
2) notify pertinent management entities, and;
3) structure Council area fisheries to avoid the stock becoming overfished and to mitigate the effects on stock status.

3.1.4 Overfished

> *"For a fishery that is overfished, any fishery management plan, amendment, or proposed regulations… for such fishery shall (A) specify a time period for ending overfishing and rebuilding the fishery that shall:(i) be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of the fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem; and (ii) not exceed 10 years, except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise…."*
>
> *Magnuson-Stevens Act, §304(e)(4)*

A stock will be considered overfished if the 3-year geometric mean of annual spawning escapements falls below the MSST, where MSST is generally defined as $0.5{*}S_{MSY}$ or $0.75{*}S_{MSY}$, although there are some exceptions (Table 3-1). Overfished determinations will be made annually using the three most recently available postseason estimates of spawning escapement.

3.1.4.1 Council Action

When the overfished status determination criteria set forth in this FMP have been triggered, the Council shall:

1) notify the NMFS NWR administrator of this situation;
2) notify pertinent management entities;
3) structure Council area fisheries to reduce the likelihood of the stock remaining overfished and to mitigate the effects on stock status;
4) direct the STT to propose a rebuilding plan for Council consideration within one year.

Upon formal notification from NMFS to the Council of the overfished status of a stock, a rebuilding plan must be developed and implemented within two years.

The STT's proposed rebuilding plan shall include:

1) an evaluation of the roles of fishing, marine and freshwater survival in the overfished determination;
2) any modifications to the criteria set forth in section 3.1.6 below for determining when the stock has rebuilt,
3) recommendations for actions the Council could take to rebuild the stock to S_{MSY}, including modification of control rules if appropriate, and;
4) a specified rebuilding period.

In addition, the STT may consider and make recommendations to the Council or other management entities for reevaluating the current estimate of S_{MSY}, modifying methods used to forecast stock abundance or fishing impacts, improving sampling and monitoring programs, or changing hatchery practices.

Based on the results of the STT's recommended rebuilding plan, the Council will adopt a rebuilding plan for recommendation to the Secretary. Adoption of a rebuilding plan will require implementation either through an FMP amendment or notice and comment rule-making process. Subject to Secretarial approval, the Council will implement the rebuilding plan with appropriate actions to ensure the stock is rebuilt in as short a time as possible based on the biology of the stock but not to exceed ten years, while taking into consideration the needs of the commercial, recreational and tribal fishing interests and coastal communities. The existing control rules provide a default rebuilding plan that targets spawning escapement at or above MSY, provided sufficient recruits are available, and targets a rebuilding period of one generation (two years for pink salmon, 3 years for coho, and 5 years for Chinook). If sufficient recruits are not available to achieve spawning escapement at or above MSY in a particular year, the control rules provide for the potential use of *de minimis* exploitation rates that allow continued participation of fishing communities while minimizing risk of overfishing. However, the Council should consider the specific circumstances surrounding an overfished determination and ensure that the adopted rebuilding plan addresses all relevant issues.

Even if fishing is not the primary factor in the depression of the stock, the Council must act to limit the exploitation rate of fisheries within its jurisdiction so as not to limit rebuilding of the stock or fisheries. In cases where no action within Council authority can be identified which has a reasonable expectation of contributing to the rebuilding of the stock in question, the Council will identify the actions required by other entities to recover the depressed stock. Due to a lack of data for some stocks, environmental variation, economic and social impacts, and habitat losses or problems beyond the control or management authority of the Council, it is possible that rebuilding of depressed stocks in some cases could take much longer than ten years. The Council may change analytical or procedural methodologies to improve the accuracy of estimates for abundance, harvest impacts, and MSY escapement levels, and/or reduce ocean harvest impacts when it may be effective in stock recovery. For those causes beyond Council control or expertise, the Council may make recommendations to those entities which have the authority and expertise to change preseason prediction methodology, improve habitat, modify enhancement activities, and re-evaluate management and conservation objectives for potential modification through the appropriate Council process.

In addition to the STT assessment, the Council may direct its Habitat Committee (HC) to work with federal, state, local, and tribal habitat experts to review the status of the essential fish habitat affecting the overfished stock and, as appropriate, provide recommendations to the Council for restoration and enhancement measures within a suitable time frame. However, this action would be a priority only if the STT evaluation concluded that freshwater survival was a significant factor leading to the overfished determination. Upon review of the report from the HC, the Council will consider appropriate actions to promote any solutions to the identified habitat problems.

3.1.5 Not Overfished-Rebuilding

After an overfished status determination has been triggered, once the stock's 3-year geometric mean of spawning escapement exceeds the MSST, but remains below S_{MSY}, or other identified rebuilding criteria, the stock status will be recognized as "not overfished-rebuilding". This status level requires no Council action, but rather is used to indicate that stock's status has improved from the overfished level but the stock has not yet rebuilt.

3.1.6 Rebuilt

The default criterion for determining that an overfished stock is rebuilt is when the 3-year geometric mean spawning escapement exceeds S_{MSY}; the Council may consider additional criteria for rebuilt status when developing a rebuilding plan and recommend such criteria, to be implemented subject to Secretarial approval.

Because abundance of salmon populations can be highly variable, it is possible for a stock to rebuild from an overfished condition to the default rebuilding criterion in as little as one year, before a proposed rebuilding plan could be brought before the Council.

In some cases it may be important to consider other factors in determining rebuilt status, such as population structure within the stock designation. The Council may also want to specify particular strategies or priorities to achieve rebuilding objectives. Specific objectives, priorities, and implementation strategies should be detailed in the rebuilding plan.

3.1.6.1 Council Action

When a stock is determined to be rebuilt, the Council shall:

1) notify the NMFS NWR administrator of its finding, and;
2) notify pertinent management entities.

3.1.7 Changes or Additions to Status Determination Criteria

Status determination criteria are defined in terms of quantifiable, biologically-based reference points, or population parameters, specifically, S_{MSY}, MFMT (F_{MSY}), and MSST. These reference points are generally regarded as fixed quantities and are also the basis for the harvest control rules, which provide the operative guidance for the annual preseason planning process used to establish salmon fishing seasons that achieve optimum yield and are used for status determinations as described above. Changes to how these status determination criteria are defined, such as MSST = $0.50*S_{MSY}$, must be made through a plan amendment. However, if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification of the estimated values of these reference points, changes to the values may be made without a plan amendment. Insofar as possible, proposed reference point changes for natural stocks will only be reviewed and approved within the schedule established for salmon methodology reviews and completed at the November meeting prior to the year in which the proposed changes would be effective and apart from the preseason planning process. SDC reference points that may be changed without an FMP amendment include: reference point objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities; and Federal court-ordered changes. All modifications would be documented through the salmon methodology review process, and/or the Council's preseason planning process.

3.2 SALMON STOCK CONSERVATION OBJECTIVES

"To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination"
Magnuson-Stevens Act, National Standard 3

To achieve optimum yield, prevent overfishing, and assure rebuilding of salmon stocks whose abundance has been depressed to an overfished level, this plan establishes conservation objectives to perpetuate the coastwide aggregate of salmon stocks covered by the plan (Chapter 1). The Council's stock conservation objectives (to be achieved annually) and other pertinent stock management information are contained in Table 3-1. Specific objectives are listed for natural and hatchery stocks that are part of the Council's preseason fishery alternative development process (Chapter 9), including all relevant stocks listed under the Federal ESA. The objectives may be applicable to a single stock independently or to an indicator stock or stocks for a stock complex. Stocks that are not included in the preseason analyses may lack specific conservation objectives because the stock is not significantly impacted by ocean fisheries or insufficient information is available to assess ocean fishery impacts directly. In the latter case, the stock will be included in a stock complex and the conservation objective for an indicator stock will provide for the conservation of closely related stocks unless, or until, more specific management information can be developed.

3.2.1 Basis

The Council's conservation objectives for natural stocks may (1) be based on estimates for achieving MSY or an MSY proxy, or (2) represent special data gathering or rebuilding strategies to approach MSY and to eventually develop MSY objectives. The objectives have generally been developed through extensive analysis by the fishery management entities with direct management authority for the stock, or through joint efforts coordinated through the Council, or with other state, tribal, or federal entities. Most of the objectives for stocks north of Cape Falcon have been included in U.S. District Court orders. Under those orders for Washington coastal and Puget Sound stocks (Hoh v. Baldrige No. 81-742 [R] C and U.S. v. Washington, 626 F. Supp. 1405 [1985]), the treaty tribes and WDFW may agree to annual spawner targets or other objectives that differ from the FMP objectives. Details of the conservation objectives in effect at the time this FMP was approved are available in PFMC (1984), in individual amendment documents (see Table 1 in the Introduction), and as referenced in Table 3-1. Updated conservation objectives and ESA consultation standards are available in Appendix A of the most recent Preseason Report I, and Table 5 of the most recent Preseason Report III produced each year by the STT (PFMC 2011d).

The Council's conservation objectives are generally expressed in terms of an annual fishery or spawning escapement estimated to be optimum for producing MSY over the long-term. The escapement objective may be (1) a specific number or a range for the desired number of adult spawners (spawner escapement), (2) a specific number or range for the desired escapement of a stock from the ocean or at another particular location, such as a dam, that may be expected to result in the target number of spawners, or (3) based on the exploitation rate that would produce MSY over the long-term. Objectives may be expressed as fixed or stepped exploitation or harvest rates and may include spawner floors or substantially reduced harvest rates at low abundance levels, or as special requirements provided in the Pacific Salmon Treaty or NMFS consultation standards for stocks listed under the ESA.

3.2.2 Changes or Additions

Conservation objectives generally are fixed quantities intended to provide the necessary guidance during the course of the annual preseason planning process to establish salmon fishing seasons that achieve optimum yield. Changes or additions to conservation objectives may be made either through a plan amendment or notice and comment rulemaking if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification. Insofar as possible, proposed changes for natural stocks will only be reviewed and approved within the schedule established for salmon estimation methodology reviews completed prior to the preseason planning process. The Council may change conservation objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities. Federal court-ordered changes in conservation objectives will also be accommodated without a plan amendment. The applicable annual objectives of Council-adopted rebuilding programs and the requirements of consultation standards promulgated by NMFS under the ESA may be employed without plan amendment to assure timely implementation. All of these changes will be documented during the Council's preseason planning process.

The Council considers established conservation objectives to be stable and a technical review of biological data must provide substantial evidence that a modification is necessary. The Council's approach to conservation objectives purposely discourages frequent changes for short-term economic or social reasons at the expense of long-term benefits from the resource. However, periodic review and revision of established objectives is anticipated as additional data become available for a stock or stock complex.

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 1 of 7)

CHINOOK					
Stocks In The Fishery	**Conservation Objective**	S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Sacramento River Fall Indicator stock for the Central Valley fall (CVF) Chinook stock complex.	122,000-180,000 natural and hatchery adult spawners (MSY proxy adopted 1984). This objective is intended to provide adequate escapement of natural and hatchery production for Sacramento and San Joaquin fall and late-fall stocks based on habitat conditions and average run-sizes as follows: Sacramento River 1953-1960; San Joaquin River 1972-1977 (ASETF 1979; PFMC 1984; SRFCRT 1994). The objective is less than the estimated basin capacity of 240,000 spawners (Hallock 1977), but greater than the 118,000 spawners for maximum production estimated on a basin by basin basis before Oroville and Nimbus Dams (Reisenbichler 1986).	122,000	91,500	78% Proxy (SAC 2011a)	Based on F_{ABC} and annual ocear abundance. F_{ABC} is F_{MSY} reduced by Tier 2 (10%) uncertainty
Sacramento River Spring ESA Threatened	NMFS ESA consultation standard/recovery plan: Conform to Sacramento River Winter Chinook ESA consultation standard (no defined objective for ocean management prior to listing).	Undefined	Undefined	Undefined	Undefined - Deferred to ESA consultation standard.
Sacramento River Winter ESA Endangered	NMFS ESA consultation standard/recovery plan: Recreational seasons: Point Arena to Pigeon Point between the first Saturday in April and the second Sunday in November; Pigeon Point to the U.S./Mexico Border between the first Saturday in April and the first Sunday in October. Minimum size limit ≥ 20 inches total length. Commercial seasons: Point Arena to the U.S./Mexico border between May 1 and September 30, except Point Reyes to Point San Pedro between October 1 and 15 (Monday through Friday). Minimum size limit ≥ 26 inches total length. Guidance from NMFS in 2010 and 2011 required implementation of additional closures and/or increased sized limits in the recreational fishery South of Point Arena. A new winter-run management framework and consultation standard is expected to be in place for the 2012 fishing season, or no later than March 1, 2012. (NMFS ESA Guidance for 2011).	Undefined	Undefined	Undefined	
California Coastal Chinook ESA Threatened	NMFS ESA consultation standard/recovery plan: Limit ocean fisheries to no more than a 16.0% age-4 ocean harvest rate on Klamath River fall Chinook.	Undefined	Undefined	Undefined	
Klamath River Fall Indicator stock for the Southern Oregon Northern California (SONC) Chinook stock complex.	At least 32% of potential adult natural spawners, but no fewer than 40,700 naturally spawning adults in any one year. Brood escapement rate must average at least 32% over the long-term, but an individual brood may vary from this range to achieve the required tribal/nontribal annual allocation. Natural area spawners to maximize catch estimated at 40,700 adults (STT 2005).	40,700	30,525	72% (STT 2005)	Based on F_{ABC} and annual ocear abundance. F_{ABC} is F_{MSY} reduced by Tier 1 (5%) uncertainty
Klamath River - Spring	Undefined	Undefined	Undefined	Undefined	Undefined - Deferred to SONC complex indicator stock(s)
Smith River	Undefined	Undefined	Undefined	Undefined	
Southern Oregon	Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982) measured by 60-90 fish per mile in index streams. ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council.	60 fish per mile in index streams	30 fish per mile in index streams	Undefined	

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 2 of 7

CHINOOK						
Stocks In The Fishery	**Conservation Objective**		S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Central and Northern Oregon	Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982) measured by 60-90 fish per mile in index streams. ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council.		60 Fish per mile in index streams	30 Fish per mile in index streams	Undefined	Undefined - Deferred to FNMC complex indicator stock(s)
Willapa Bay Fall	Undetermined in FMP. WDFW spawning escapement objective of 4,350.		Undefined	Undefined	Undefined	
Grays Harbor Fall Indicator stock for the Far North Migrating Coastal (FNMC) Chinook stock complex	14,600 natural adult spawners--MSP based on full seeding of spawning and rearing habitat (WDF 1979).	Annual natural spawning escapement targets may vary from FMP conservation objectives if agreed to by WDFW and treaty tribes under the provisions of Hoh v. Baldrige and subsequent U.S. District Court orders.	14,600	7,300	78% Proxy (SAC 2011a)	Undefined - International exception to ACL requirements, deferred to PST management constraints.
Queets Fall Indicator stock for the FNMC Chinook stock complex	Manage terminal fisheries for 40% harvest rate, but no less than 2,500 natural adult spawners, the MSY level estimated by Cooney (1984).		2,500	1,250	78% Proxy (SAC 2011a)	
Hoh Fall Indicator stock for the FNMC Chinook stock complex	Manage terminal fisheries for 40% harvest rate, but no less than 1,200 natural adult spawners, the MSY level estimated by Cooney (1984).		1,200	600	78% Proxy (SAC 2011a)	
Quillayute Fall Indicator stock for the FNMC Chinook stock complex	Manage terminal fisheries for 40% harvest rate, but no less than 3,000 natural adult spawners, the MSY level estimated by Cooney (1984).		3,000	1,500	78% Proxy (SAC 2011a)	
Hoko Summer/Fall Indicator stock for the FNMC Chinook stock complex	850 natural adult spawners, the MSP level estimated by Ames and Phinney (1977). May include adults used for supplementation program.		850	425	78% Proxy (SAC 2011a)	
Grays Harbor Spring	1,400 natural adult spawners.		1,400	700	78% Proxy (SAC 2011a)	Undefined - Deferred to FNMC complex indicator stock(s)
Queets Sp/Su	Manage terminal fisheries for 30% harvest rate, but no less than 700 natural adult spawners.		700	350	78% Proxy (SAC 2011a)	
Hoh Spring/Summer	Manage terminal fisheries for 31% harvest rate, but no less than 900 natural adult spawners.		900	450	78% Proxy (SAC 2011a)	
Quillayute Spring/Summer	1,200 natural adult spawners for summer component (MSY).		1,200	600	Undefined	
Willapa Bay Fall (hatchery)	8,200 adult return to hatchery. WDFW spawning escapement objective of 9,800 hatchery spawners.		Not applicable to hatchery stocks			
Quinault Fall (hatchery)	Hatchery production.					

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 3 of 7)

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

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 4 of 7)

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

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 5 of 7)

COHO						
Stocks In The Fishery	**Conservation Objective**		S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Central California Coast ESA Threatened	NMFS ESA consultation standard/recovery plan: No retention of coho south of the OR/CA border.		Undefined	Undefined	Undefined	Undefined - Deferred to ESA consultation standard.
Southen Oregon/Northern California Coast ESA Threatened	NMFS ESA consultation standard/recovery plan: No more than a 13.0% AEQ exploitation rate in ocean fisheries on Rogue/Klamath hatchery coho.		Undefined	Undefined	Undefined	
Oregon Coastal Natural ESA Threatened	NMFS ESA consultation standard/recovery plan: Total AEQ exploitation rate limit based on parental seeding level and marine survival matrix in FMP Table 3-2.		Undefined	Undefined	Undefined	
Lower Columbia Natural ESA Threatened	NMFS ESA consultation standard/recovery plan: AEQ exploitation rate limit on ocean and mainstem Columbia fisheries indentified in annual NMFS guidance.		Undefined	Undefined	Undefined	
Oregon Coast Hatchery	Hatchery production.		Not applicable to hatchery stocks			
Columbia River Late Hatchery	Hatchery rack return goal of 14,200 adults.					
Columbia River Early Hatchery	Hatchery rack return goal of 6,200 adults.					
Willapa Bay - Hatchery	Hatchery rack return goal of 6,100 adults.					
Quinault - Hatchery	Hatchery production.					
Quillayute - Summer Hatchery	Hatchery production.					
South Puget Sound Hatchery	Hatchery rack return goal of 52,000 adults.					
Willapa Bay Natural	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 6 of 7)

COHO						
Stocks In The Fishery	**Conservation Objective**		S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Grays Harbor	35,400 natural adult spawners (MSP based on WDF [1979])	Annual natural spawning escapement targets may vary from FMP conservation objectives if agreed to by WDFW and treaty tribes under the provisions of Hoh v. Baldrige, U.S. v. Washington, or subsequent U.S. District Court orders	24,426 S_{MSP} (FMP) *F_{SMY} (SAC 2010b)	18,320 (Johnstone et al. 2011)	MFMT=65% (Johnstone et al. 2011) F_{MSY}=69% (SAC 2011b)	Undefined - International exception to ACL requirements, deferred to PST management constraints
Queets	MSY range of 5,800 to 14,500 natural adult spawners (Lestelle et al 1984)		5,800 (Johnston et al. 2011)	4,350 (Johnstone et al. 2011)	MFMT=65% (Johnstone et al. 2011) F_{MSY}=68% (SAC 2011b)	
Hoh	MSY range of 2,000 to 5,000 natural adult spawners (Lestelle et al. 1984)		2,520 (SAC 2010b)	1,890 S_{MSY}*0.75	MFMT=65% (Johnstone et al. 2011) F_{MSY}=69% (SAC 2011b)	
Quillayute - Fall	MSY range of 6,300 to 15,800 natural adult spawners (Lestelle et al. 1984)		6,300 (Johnston et al. 2011)	4,725 (Johnstone et al. 2011)	MFMT=65%; (Johnstone et al. 2011) F_{MSY}=59% (SAC 2011b)	
Strait of Juan de Fuca	Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 27,445; 0.40 for ocean age-3 abundance >11,679 and ≤27,445; 0.20 for ocean age-3 abundance ≤11,679		11,000 (Bowhay et al. 2009)	7,000 (Bowhay et al. 2009)	60% (Bowhay et al. 2009)	
Hood Canal	Total allowable MSY exploitation rate of: 0.65 for ocean age-3 abundance > 41,000; 0.45 for ocean age-3 abundance >19,545 and ≤41,000; 0.20 for ocean age-3 abundance ≤19,545		14,350 (Bowhay et al. 2009)	10,750 (Bowhay et al. 2009)	65% (Bowhay et al. 2009)	
Skagit	Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 62,500; 0.35 for ocean age-3 abundance >22,857 and ≤62,500; 0.20 for ocean age-3 abundance ≤22,857		25,000 (Bowhay et al. 2009)	14,857 (Bowhay et al. 2009)	60% (Bowhay et al. 2009)	
Stillaguamish	Total allowable MSY exploitation rate of: 0.50 for ocean age-3 abundance > 20,000; 0.35 for ocean age-3 abundance >9,385 and ≤20,000; 0.20 for ocean age-3 abundance ≤9,385		10,000 (Bowhay et al. 2009)	6,100 (Bowhay et al. 2009)	50% (Bowhay et al. 2009)	
Snohomish	Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 125,000; 0.40 for ocean age-3 abundance >51,667 and ≤125,000; 0.20 for ocean age-3 abundance ≤51,667		50,000 (Bowhay et al. 2009)	31,000 (Bowhay et al. 2009)	60% (Bowhay et al. 2009)	

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 7 of 7)

PINK (odd-numbered years)					
Stocks In The Fishery	**Conservation Objective**	SMSY	MSST	MFMT (FMSY)	ACL
Puget Sound	900,000 natural spawners or consistent with provisions of the Pacific Salmon Treaty (Fraser River Panel).	900,000	450,000	Undefined	Undefined - International exception to ACL requirements, deferred to PST management constraints

3.3 HARVEST CONTROLS

Control rules are used to manage the harvest of stocks to achieve optimum yield while preventing overfishing. Control rules specify the allowable harvest of stocks based on their abundance and are predicated on meeting conservation objectives in addition to relating those objectives to biological reference points such as MSY, maximum fishing mortality threshold (MFMT), overfishing limit (OFL), MSST, acceptable biological catch (ABC), and annual catch limit (ACL). For stocks with escapement based conservation objectives, the control rule limits exploitation to achieve escapement objectives. For stocks with exploitation rate-based conservation objectives, escapement targets vary annually depending on stock abundance.

Reference points defined by the MSA and/or National Standard 1 (NS1) Guidelines are used as benchmarks within the control rules. They are useful for evaluating and comparing control rules, and in some cases are triggers for management actions. There are several formulations of control rules for different stocks in the FMP, using various combinations of reference points. These stock-specific control rules are applied consistently from year to year.

3.3.1 Relationship to ESA consultation standards

The ESA requires federal agencies whose actions may adversely affect listed salmon to consult with NMFS. Because NMFS implements ocean harvest regulations, it is both the action and consulting agency for actions taken under the FMP. To ensure there is no jeopardy, NMFS conducts ESA consultations with respect to the effects of ocean harvest on listed salmon stocks. In cases where the biological consultation results in a “no jeopardy” opinion, NMFS issues an incidental take statement which authorizes a limited amount of take of listed species that would otherwise be prohibited under the ESA. In cases where a “jeopardy” opinion is reached, NMFS develops a reasonable, prudent alternative to the proposed action which authorizes a limited amount of take.

The constraints on take authorized under incidental take statements and reasonable, prudent alternatives are collectively referred to as consultation standards. These constraints take a variety of forms including FMP conservation objectives, limits on the time and area during which fisheries may be open, ceilings on fishery impact rates, and reductions from base period impact rates. NMFS may periodically revise consultation standards and the annual NMFS guidance letter reflects the most current information. Consultation standards that were in place in 2011 when Amendment 16 was completed are shown in the table of conservation objectives (Table 3-1), which is reproduced each year in the latest annual addition of Preseason Report I. .

ESA consultation standards represent another form of fishery control rule. Although NMFS consultation standards and recovery plans may not by themselves recover listed populations to historic S_{MSY} levels, they are sufficient to stabilize populations until freshwater habitats and their dependent populations can be restored and estimates of MSY developed consistent with recovered habitat conditions. As species are delisted, the Council will establish conservation objectives and associated reference points consistent with the MSA.

3.3.2 Relationship to the Pacific Salmon Treaty

The MSA provides an exception to the requirement for a fishery management plan to specify ACLs and Accountability Measures (AMs) for stocks managed under an international agreement in which the United States participates. Pacific salmon stocks subject to fisheries in both the US and Canada are managed under the provisions of the Pacific Salmon Treaty (PST). Natural stocks managed under the provisions of the PST include: (1) Puget Sound pink salmon stocks, (2) most non-ESA listed Chinook stocks from the mid-Oregon coast to the US/Canada border, and (3) all non-ESA listed coho stocks except Willapa Bay natural coho. For these stocks, the PST annually places overall limits on fishery impacts and allocates those impacts between the US and Canada. It allows the US and Canada to each manage their own fisheries to achieve domestic conservation and allocation priorities, while remaining within the overall limits determined under the PST. The PST also includes measures of accountability which take effect if annual limits established under the Treaty are exceeded, and further reduce these limits in response to depressed stock status.

Because of these provisions of the PST, and the exception provided by the MSA, it is unnecessary for the FMP to specify an ACL or associated reference points for these stocks. However, it is still necessary to specify MSY and SDC reference points for these stocks.

3.3.3 Acceptable Biological Catch

Specification of ABC is required for all stocks or stock complexes in the fishery that are not managed under an international agreement, listed under the ESA, or designated as hatchery stocks. For salmon, ABC is defined in terms of spawner escapement (S_{ABC}), which is consistent with the common practice of using spawner escapement to assess stock status for salmon. S_{ABC} is determined annually based on stock abundance, in spawner equivalent units, N, and the exploitation rate F_{ABC}.

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

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

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

The STT will apply the ABC control rule on an annual basis by making preseason forecasts of N, and applying the fixed F_{ABC}. Stock abundance forecasts and the resulting S_{ABC} estimates will be reported in Preseason Report I, and presented to the SSC at the March Council meeting. Following its review, the SSC will recommend stock abundance forecasts and S_{ABC} estimates to the Council in an oral and written statement provided at the March meeting.

The SSC will have an ongoing role in evaluating ABCs through their annual review of stock abundance forecasts and their prerogative to initiate re-evaluation of the ABC control rule. Abundance forecast methods are periodically revised and these revisions are evaluated by the SSC through the salmon methodology review process. The SSC could revisit the ABC control rule as needed during the salmon methodology review.

3.3.4 Annual Catch Limits

ACLs and OFLs, in addition to ABCs, are required for all stocks or stock complexes in the fishery that are not managed under an international agreement, listed under the ESA, or designated as hatchery stocks. For salmon, these reference points are defined in terms of spawner escapement (S_{ACL}, S_{OFL}).

S_{ACL} and S_{OFL} are calculated annually, both as preseason estimates and postseason values. Preseason estimates of these reference points are used for development of annual fishery management measures. Postseason values are used to identify whether accountability measures (AMs) are to be triggered, and to assess the performance of management.

S_{ACL} and S_{OFL} are determined based on stock abundance, in spawner equivalent units, (N) and the corresponding reference exploitation rates F_{ACL} and F_{OFL}, where the exploitation rates are fixed values that do not change on an annual basis. F_{OFL} is defined as being equal to F_{MSY}, and

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

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

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

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

3.3.4.1 Preseason ACLs

During the annual preseason salmon management process, S_{ACL} will be estimated using the fixed F_{ACL} exploitation rate and the preseason stock abundance forecast (N). Fishery management measures must result in an expected spawning escapement greater than or equal to this S_{ACL} estimate. In many years, the targeted exploitation rate will be lower than F_{ACL} as a result of stock-specific conservation objectives and the control rule used to specify F on an annual basis. Under the condition where $F < F_{ACL}$, the forecast escapement would exceed the estimated S_{ACL}.

3.3.4.2 Postseason ACLs

The postseason value of S_{ACL} will be determined annually using the fixed F_{ACL} exploitation rate and the postseason N. The postseason value of S_{ACL} will be compared to the realized spawner escapement for evaluation of whether the realized escapement fell below the S_{ACL}.

Postseason evaluation of S_{ACL} is necessary for determining whether AMs should be triggered and whether the S_{ACL} performance standard is met. AMs will be triggered if the realized escapement is below the S_{ACL} value in any one year. If the realized escapement is below the S_{ACL} value in more than one of four years, the ACL performance standard will not have been met, and a re-evaluation of the ACL framework will be undertaken, consistent with the NS1 Guidelines.

3.3.5 Accountability Measures

Accountability measures are required for all stocks and stock complexes in the Salmon FMP that are required to have ACLs. AMs are intended to prevent shortfalls in escapement below the S_{ACL} and to correct or mitigate for them if they occur. Some AMs are implemented during the preseason planning process and in-season. Others are implemented postseason through monitoring and reporting requirements. Additional accountability measures will be implemented, as required, if the ACL performance standard is not met as indicated by the realized escapement being below S_{ACL} in more than one in four consecutive years.

3.3.5.1 Preseason and In-season Accountability Measures

The following measures will be implemented during the preseason planning process or inseason to meet the intent of preseason management objectives and to help ensure compliance with ACLs.

- In-season authority to manage quota fisheries (FMP § 10.1) – allows NMFS to close fisheries on short notice when mixed stock quotas are projected to be met. As described above, quotas are designed to ensure that ACLs and conservation objectives for component stocks are met.
- Mixed stock quota monitoring (FMP § 7.1) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Quota partitioning (FMP § 5.3 and 10.2) – partitioning overall quota among fishery sectors and port areas and time periods allows finer scale management, thereby reducing the chance that overall quota will be exceeded.
- Quota trading (FMP § 5.3 and 10.2) – quota trading allows overages in one sector/time/area to be made up by reductions in others.

- Changes to gear/bag/size/trip limits (FMP § 6 and 10.2) – allow a measure of control over catch rates to reduce the chance of quotas being exceeded.
- Boundary modifications (FMP § 6 and 10.2) – allow limited control over catch composition to limit impacts on constraining stocks.
- Landing restrictions (FMP § 6 and 10.2) - allow better accounting of the location of catches and thus better estimates of catch composition.
- In-season monitoring and reporting requirements. (FMP § 7) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Annual catch targets - intended to account for management uncertainty.

An ACT may be adopted in any fishing year in which there is uncertainty in the ability to maintain compliance with the ACL or the applicable control rule for a given stock. The ACT would be specified at a level sufficiently above the S_{ACL} to address uncertainty in the ability to constrain catch for ACL compliance and uncertainty in quantifying the true catch amounts (i.e., estimation errors)[2].

3.3.5.2 Post-season Accountability Measures

The following postseason AMs will be implemented through the assessment and review phases of the salmon management process:

- Salmon Methodology Review Process (COP-15; PFMC 2008). - provides a process for re-evaluation of management objectives, reference points, and modification of models that relate mixed-stock impacts to stock-specific objectives and reference points.

Annual SAFE (Review of Ocean Salmon Fisheries) document (FMP § 8) - allows postseason assessment of objectives and performance. If the realized escapement is below the postseason S_{ACL} value, an AM will be to report on the escapement shortfall in the annual Council preseason reports and to notify state, tribal, and federal managers. If it is necessary to correct problems in the assessment or management methods, such changes can be considered during the annual salmon Methodology Review process.

3.3.5.3 Performance and Re-evaluation of the ACLs and AMs System

If the postseason-ACL evaluation for assessing compliance with ACLs determines that spawning escapement was not in compliance with the ACL more than once in four consecutive years, the Council will direct the STT to conduct an assessment of the cause and re-evaluate the ACL and AM system. The assessment will include consideration of the tiered buffers used to account for scientific uncertainty, and may include recommendations for changing the buffers. Any recommendations for changing the buffer between the ABC and OFL (i.e., ABC control rule) should be included, along with supporting analyses, in the annual Salmon Methodology Review process. Recommendations on changes to AMs or adding new AMs, including whether an ACT should be implemented, should also be provided in this report.

Pending the outcome of the STT re-evaluation of the ACLs and AMs system, an ACT could be implemented as an interim measure if it was determined that management uncertainty in the fishery was a substantial cause for non-compliance, and/or to reduce the likelihood of future non-compliance with the ACL until any new or updated measures are approved. For example, an additional 5 percent buffer could be used to establish an ACT control rule and to set an ACT below the ACL. The ACT control rule would be used until either additional measures are adopted to ensure an appropriate compliance with ACLs, or it has been demonstrated that the ACT control rule is not necessary to achieve an appropriate compliance level.

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[2] As explained in 50 CFR 600.310(f)(6)(i)

3.3.6 Specific Control Rules for Stocks, Indicator Stocks, and Complexes

3.3.6.1 Klamath River Fall Chinook, Sacramento River Fall Chinook

KRFC and SRFC have the same form of control rule, which is defined in terms of the reference points F_{ABC}, MSST, S_{MSY}, and two levels of *de minimis* exploitation rates, F = 0.10 and F = 0.25. The maximum allowable exploitation rate, F, in a given year, depends on the pre-fishery ocean abundance in spawner equivalent units, N. At high abundance the rule caps the exploitation rate at F_{ABC}, at moderate abundance the rule specifies an F that results in S_{MSY} spawners, and at low abundance the rule allows for *de minimis* exploitation rates as shown in Figure 3-1 with the abundance breakpoints defined as

$$A = \text{MSST} / 2$$

$$B = (\text{MSST} + S_{\text{MSY}}) / 2$$

$$C = S_{\text{MSY}} / (1 - 0.25)$$

$$D = S_{\text{MSY}} / (1 - F_{\text{ABC}}) .$$

For N between 0 and A, F increases linearly from 0 at N = 0, to 0.10 at N = A. For N between A and MSST, F is equal to 0.10. For N between MSST and B, F increases linearly from 0.10 at N = MSST, to 0.25 at N = B. For N between B and C, F is equal to 0.25. For N between C and D, F is the value that results in S_{MSY} spawners. For N greater than D, F is equal to F_{ABC}. The control rule may thus be summarized as follows.

$$F = \begin{cases} 0.10 \times (N / A), & \text{if} \quad 0 \leq N \leq A; \\ 0.10, & \text{if} \quad A < N \leq \text{MSST}; \\ 0.10 + (0.15 \times ((N - \text{MSST}) / (B - \text{MSST}))), & \text{if} \quad \text{MSST} < N \leq B; \\ 0.25, & \text{if} \quad B < N \leq C; \\ (N - S_{\text{MSY}}) / N, & \text{if} \quad C < N \leq D; \\ F_{\text{ABC}}, & \text{if} \quad D < N. \end{cases}$$

The control rule describes maximum allowable exploitation rates at any given level of abundance. The Council may recommend lower exploitation rates as needed to address uncertainties or other year specific circumstances. When recommending an allowable *de minimis* exploitation rate in a given year, the Council shall also consider the following circumstances:

- The potential for critically low natural spawner abundance, including considerations for substocks that may fall below crucial genetic thresholds;
- Spawner abundance levels in recent years;
- The status of co-mingled stocks;
- Indicators of marine and freshwater environmental conditions;
- Minimal needs for tribal fisheries;
- Whether the stock is currently in an approaching overfished condition;
- Whether the stock is currently overfished;
- Other considerations as appropriate.

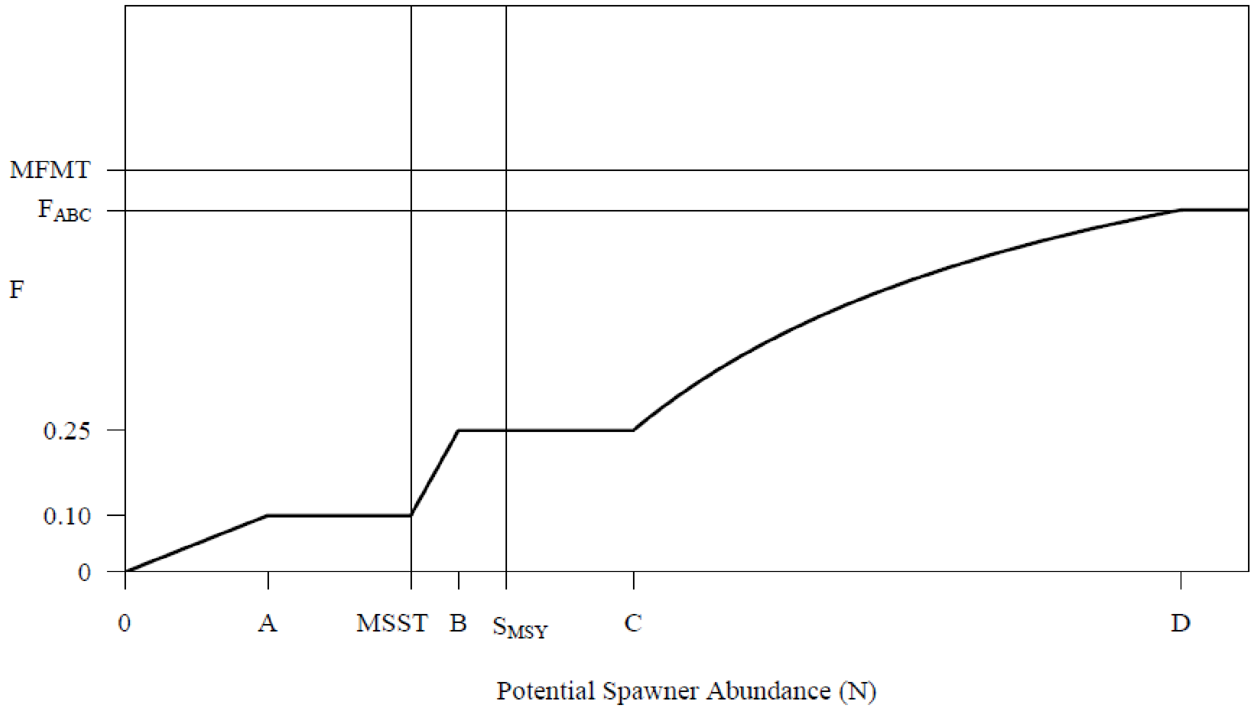

FIGURE 3-1. Control rule for SRFC and KRFC. Abundance is pre-fishery ocean abundance in spawner equivalent units, and F is the exploitation rate. Reference points in the control rule are defined in the text.

3.3.6.2 Washington Coast Chinook and Coho, Columbia River Summer Chinook, Upriver Bright Fall Chinook.

Most non-ESA-listed natural stocks originating north of the Elk River are managed under the terms of the PST with control rules designed to achieve MSY either by meeting S_{MSY} annually or by controlling fishing rates to achieve MSY over the long term. Chinook and coho stocks from the Washington coast, Columbia River summer Chinook, and upriver bright fall Chinook fall under this category, and share the same form of control rule, which can be negotiated annually through related federal court orders (Figure 3-2). Council area fisheries represent a minority of the harvest impacts on these stocks, with the majority of harvest impacts occurring in northern and/or inside fisheries. At low abundance levels, some *de minimis* level of fishing impacts are allowed by the provisions of the PST, negotiations through federal court orders, or reserved tribal fishing rights. The magnitude of the *de minimis* impacts, and the actual abundance level at which they occur, vary from stock to stock. At high abundance levels, the control rules are such that F may exceed MFMT in some years because management of some of these stocks is focused on attaining S_{MSY} on an annual basis. If the year specific exploitation rate on a stock exceeds MFMT, the Council will report this as overfishing according to the terms of the MSA and NS1 Guidelines.

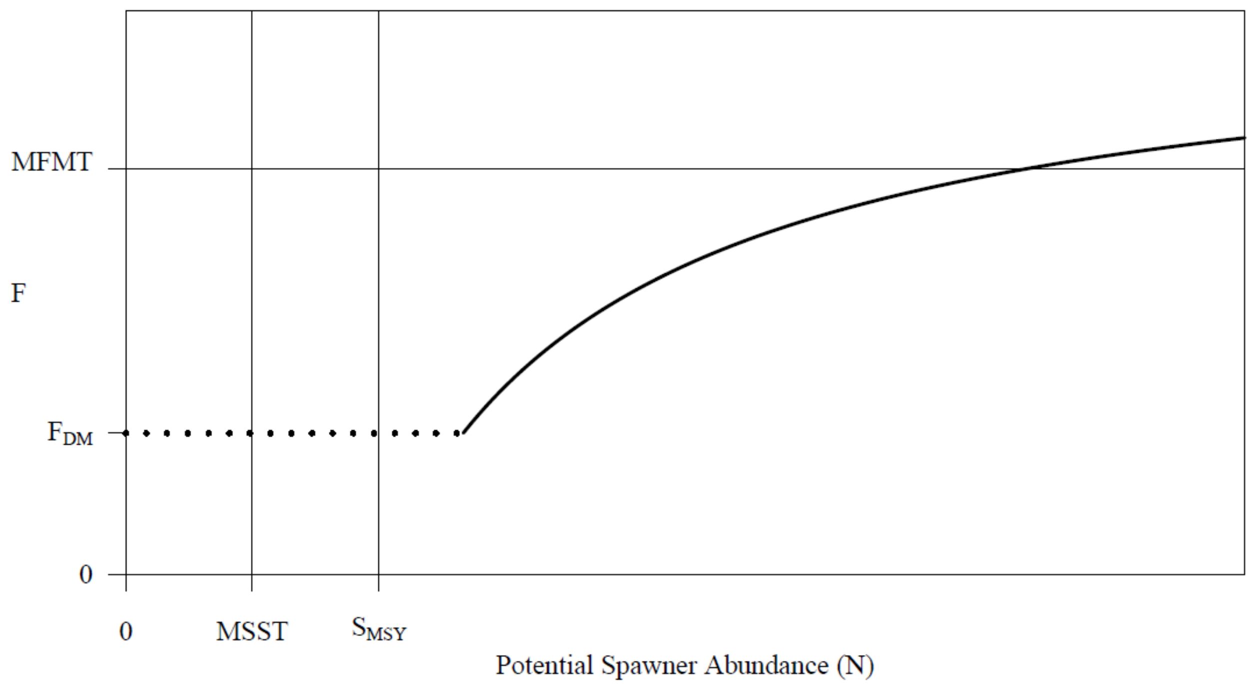

FIGURE 3-2. Control rule for several Chinook and coho stocks managed under the terms of the PST. Abundance is pre-fishery ocean abundance in spawner equivalent units, and F is the exploitation rate. Reference points in the control rule are defined in the text.

3.3.6.3 Puget Sound Coho

Puget Sound coho stocks are managed under the PST using a stepped harvest rate control rule (Figure 3-3) (Southern Coho Management Plan Chapter 5, Annex IV, Article XV, PST 2009). Under this control rule, exploitation rate ceilings are determined on the basis of abundance, where abundance is divided into three categories defined by two breakpoints defined as

$A = \frac{MSST}{1-F_{low}}$, breakpoint between critical and low abundance,

$B = \frac{S_{MSY}}{1-MFMT}$, breakpoint between low and normal abundance.

The exploitation rate ceiling has a maximum value of MFMT when N > B, is reduced to a low exploitation rate (F_{low}) when A < N < B, and further reduced to a critical exploitation rate ($F_{critical}$) to allow for *de minimis* impacts not to exceed 0.20 when N < A. For all Puget Sound coho stocks, the critical/low spawning escapement breakpoint and low exploitation rate are used to define MSST (Table 3.1).

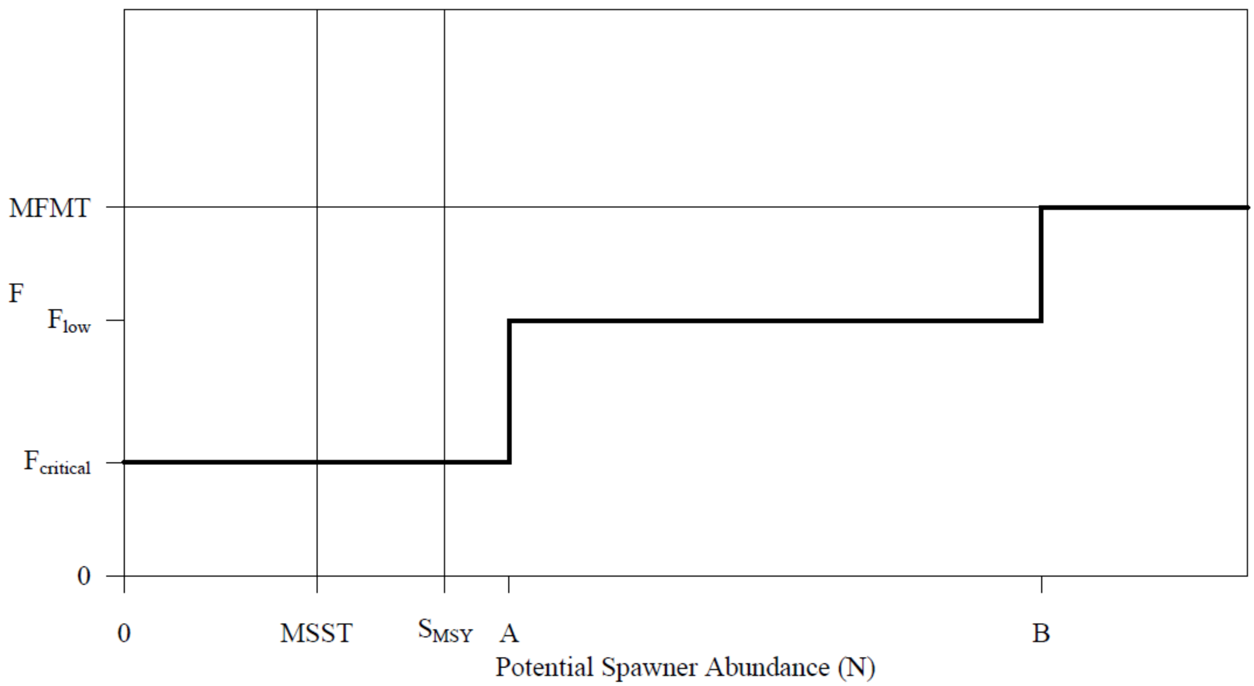

FIGURE 3-3. Control rule for Puget Sound coho. Abundance is pre-fishery ocean abundance in spawner equivalent units, and F is the exploitation rate. Reference points in the control rule are defined in the text.

3.3.6.4 Oregon Coastal Natural Coho

Oregon coastal natural coho (OCN) are currently listed as threatened under the ESA and are therefore managed under ESA consultation standards. Amendment 13 (PFMC 1999) established a recovery and rebuilding plan for OCN coho which (1) defines individual management criteria for four separate stock components, (2) sets overall harvest exploitation rate targets for OCN coho that significantly limit the impact of fisheries on the recovery of depressed stock components, (3) promotes stock rebuilding while allowing limited harvest of other abundant salmon stocks during critical rebuilding periods, (4) is consistent with the Oregon State recovery plan, and (5) has been adopted by NMFS as a consultation standard for OCN coho. Under the rebuilding program, the overall allowable fishery impact rate in any given year for each stock component is determined by the spawning abundance of the parents and grandparents of the returning adults and upon the marine survival expectations for the current maturing brood, as predicted by smolt-to-jack survival rates for hatchery coho.

The assessment of historic parent abundance utilized in Amendment 13 is based on the number of spawners in each of the four stock components that is projected to achieve full seeding of high quality freshwater habitat at low levels of marine survival. The full seeding estimates (in terms of stratified random sampling numbers) are derived from a model based on freshwater habitat assessment which incorporates measures of variability in the quality of the freshwater habitat and estimates of survival between life stages where numerical indicators have been measured (Nickelson and Lawson 1996). The assessment of marine survival status is based on a partitioning of the observed marine survival for Oregon hatchery reared coho from 1970-1996 (PFMC 1999).

Under the rebuilding plan, the allowable overall fishery impact (exploitation rate) for OCN coho represents all fishing related mortality, including marine and freshwater fisheries for both retention and catch-and-release fishing (Table 3-2). The maximum allowable exploitation rates range from less than 10 percent when parent abundance and/or marine survival is especially low, to a high of 35 percent if two generations of spawner rebuilding have occurred and marine survival is sufficient to expect continued improvements in spawner escapement for a third generation. Regardless of high parental spawning levels or projected favorable ocean conditions, a cap of 35percent in total stock impacts is maintained to provide insight as to the effects of high spawner levels on production. A limitation of 15 percent remains in effect even at the two highest tiers of parent escapement if ocean conditions are not favorable, so as to preserve rebuilding progress achieved to that point. The matrix in Table 3-2 illustrates specifically how spawner abundance and marine survival determine the maximum allowable stock exploitation rate objectives for each OCN coho stock component.

Each of the four OCN coho stock components will be managed in marine fisheries as a separate stock to the extent that the best scientific information allows. Because of apparent similarities in the marine distribution of the four components, little flexibility is expected in marine fishery intensities among the components. If some components begin rebuilding faster than others, but data are not available which allows the marine harvest of OCN coho components at different rates, opportunities for increased ocean harvest may be constrained by the weakest component. Any management flexibility for increased fisheries on any strong OCN coho component will likely be in freshwater or estuarine areas during the initial phase of the rebuilding process. In these areas, ODFW will base fishing opportunity on the status of populations in individual basins within a stock component, and directed fisheries on natural coho will be allowed only when spawners are expected to be at or above the full seeding level for high quality habitat. Actual seasons would be based on the presence of fin-clipped hatchery fish (e.g., mark selective fisheries), public comment, and other basin-specific factors. An intensive monitoring program will be implemented by ODFW to measure the overall management effectiveness toward the goal of increasing OCN spawner levels and consequent juvenile and adult progeny. The Environmental Assessment (EA) for Amendment 13 (PFMC 1999) contains further details of the monitoring plan and of the overall OCN coho management criteria and its basis.

Amendment 13 to the Salmon FMP was designed to ensure that fishery related impacts do no act as a significant impediment to the recovery of depressed OCN coho stocks. When the Council first adopted the amendment in November 1997, they stipulated that it should be reviewed and updated periodically with particular attention to the parameters in the matrix that triggered allowable fishery impacts. The OCN work group was formed in 1999 to consider concerns related to persistent observations of low marine survival and low spawner abundance. The work group provided a draft report to the Council in September 2000 (PFMC 2000b). The draft report recommended expanding the harvest matrix to include two new parental abundance categories and one new marine survival category thus expanding the original 3x3 matrix to a 4x5 matrix. The new parental spawner categories occur in the low end of the spawner abundance range and are designated as “Extremely Low” and “Critical.” The new marine survival category, designated as “Extremely Low,” is also in the low end of the range. The work group recommended lower exploitation rates when spawner abundance or marine survival are low and therefore provided a more conservative framework relative to the original Amendment 13 matrix. The recommendations of the work group report were adopted by the Council as expert biological advice for how to implement Amendment 13, and continue to be used by the Council as guidance for implementing Amendment 13.

TABLE 3-2. Allowable fishery impact rate criteria for OCN coho stock components.

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

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

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

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

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

3.3.7 Changes and Additions to Control Rules

The form of a control rule should only be changed by plan amendment, or as necessary to rebuild overfished stocks. However, the reference point values that define a particular control rule (e.g., S_{MSY})

may be periodically updated. Changes to these reference point values, or specification of reference points for stocks where estimates are currently lacking, may be made through a regulatory process without plan amendment if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification. Insofar as possible, a proposed change to the value of a reference point will only be reviewed and approved within the schedule established for salmon estimation methodology reviews (completed at the November meeting prior to the year in which the proposed change would be effective) and apart from the preseason planning process. Federal court-ordered changes will also be accommodated without a plan amendment.

3.4 Management for Hatchery and ESA-listed Stocks

"Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches."

Magnuson-Stevens Act, National Standard 6

The NS1 Guidelines provide flexibility under limited circumstances in the way reference points and management measures are specified. The NS1 Guidelines allow for flexibility in the management of ESA listed species, hatchery stocks, and stocks with unusual life history characteristics like Pacific salmon. Consistent with these provisions of the NS1 Guidelines, this plan takes an alternative approach to the specification of control rules and status determination criteria and subsequent Council actions for hatchery stocks, and stocks listed under the ESA that are in the fishery.

3.4.1 Hatchery Stocks

Salmon stocks important to ocean fisheries and comprised exclusively of hatchery production generally have conservation objectives expressed as an egg-take or the number of spawners returning to the hatchery to meet program objectives. This plan recognizes these objectives and strives to meet them. However, these artificially produced stocks generally do not need the protection of annual catch limits, status determination criteria, and special Council rebuilding programs to maintain long-term production. Because hatchery stocks can generally sustain significantly higher exploitation rates than natural stocks, ocean fisheries rarely present a threat to their long-term survival. In addition, it is often possible to make temporary program modifications at hatcheries to assure adequate production to sustain the stock during periods of low abundance (e.g., sharing brood stock with other hatcheries, arranging for trapping at auxiliary sites, etc.). If specialized hatchery programs are approved in the future to sustain ESA listed salmon stocks, the rebuilding programs would be developed and implemented under the ESA.

3.4.2 Stocks Listed Under the Endangered Species Act

The ESA requires federal agencies whose actions may adversely affect listed salmon to consult with NMFS. Because NMFS implements ocean harvest regulations, it is both the action and consulting agency for actions taken under the FMP. To ensure that ESA standards are met, NMFS conducts internal consultations with respect to the effects of ocean harvest on listed salmon. The Council implements NMFS' guidance as necessary to avoid jeopardy, and conform to the degree possible with recovery plans approved by NMFS. As a result of NMFS' consultation, an incidental take statement may be issued which authorizes take of listed stocks under the FMP that would otherwise be prohibited under the ESA.

The Council believes that the requirements of the ESA are sufficient to meet the intent of the Magnuson-Stevens Act overfishing provisions. Those provisions are structured to maintain or rebuild stocks to levels at or above MSY and require the Council to identify and develop rebuilding plans for overfished stocks. For many fish species regulated under the Magnuson-Stevens Act, the elimination of excess fishing pressure is often the sole action necessary to rebuild depressed stocks. This is, however, not the case for many salmon stocks and, in particular, for most listed populations.

Although harvest has certainly contributed to the depletion of West Coast salmon populations, the primary reason for their decline has been the degradation and loss of freshwater spawning, rearing, and migration habitats. The quality and quantity of freshwater habitat are key factors in determining the MSY of salmon populations. The Council has no control over the destruction or recovery of freshwater habitat nor is it able to predict the length of time that may be required to implement the habitat improvements necessary to recover stocks. While the Council could theoretically establish new MSY escapement goals consistent with the limited or degraded habitat available to listed species, adoption of revised goals would potentially result in an ESA-listed stock being classified as producing at MSY and; therefore, not overfished under the Magnuson-Stevens Act. As species are delisted, the Council may establish conservation objectives and associated reference points to manage stocks consistent with the MSA, or alternatively, remove the stock from the FMP through a plan amendment.

Since 1990, West Coast salmon fisheries have been modified to accommodate special requirements for the protection of salmon species listed under the federal ESA. The ESA listing of a salmon population may have profound consequences for the management of Council mixed-stock ocean fisheries since listed populations are often incidentally harvested with more abundant healthy populations. As additional stocks of salmon have been listed, the Council's preseason process has increasingly focused on protecting listed stocks. In applying the ESA to Pacific salmon, NMFS determined that a population segment of a salmon species must represent an evolutionarily significant unit (ESU) of that species in order to be eligible for listing. ESUs are characterized by their reproductive isolation and contribution to the genetic diversity of the species as a whole. NMFS establishes consultation standards for listed ESUs, which specify levels of incidental take that are not likely to jeopardize the continued existence of the ESU.

The Council must meet or exceed the requirements of the ESA, which is other applicable law. In addition to the stocks and conservation objectives in Table 3-1, the Council will manage all species listed under the ESA consistent with NMFS consultation standards or recovery plans to meet immediate conservation needs and to achieve the long-term recovery of the species. These standards are provided annually to the Council by NMFS at the start of the preseason planning process. In so far as is practical, while not compromising its ability to meet the requirements of the ESA, NMFS will endeavor to provide opportunity for Council and peer review of any proposed consultation standards, or the objectives of recovery plans, well prior to their implementation. Such review would ideally commence no later than the last Council meeting in the year immediately preceding the first salmon season in which the standards would be implemented.

Table 3-3 summarizes the relationships of the individual stocks and stock units managed under the FMP to the ESUs identified by NMFS in the course of ESA status reviews. With the exception of some hatchery stocks, the stocks managed under the FMP are generally representative of the range of life history features characteristic of most ESUs. The managed stocks therefore serve as indicators for ESUs and provide the information needed to monitor fishery impacts on ESUs as a whole. In some cases, the information necessary for stock specific management is lacking, leaving some ESUs without adequate representation. For these ESUs, it will be necessary in the immediate future to use conservative management principles and the best available information in assessing impacts in order to provide necessary protection. In the meantime, the responsible management entities should implement programs to ensure that data are collected for at least one stock representative of each ESU. Programs should be developed within five years of any ESA listing to provide the information that will permit the necessary stock specific management.

TABLE 3-3. Listing of evolutionarily significant units, their ESA status, and associated stocks managed under the FMP. (Page 1 of 2).		
ESU[a/]	**ESA Status Month and Year of Initial Listing**	**Stock Representation in FMP**
- - - CHINOOK - - -		
Central Valley Fall and Late Fall-run	Candidate Species Sept. 1999	! Sacramento River Fall
Central Valley Spring-run	Listed Threatened Sept. 1999	! Sacramento River Spring
Sacramento River Winter-run	Listed Endangered Aug. 1989	! Sacramento River Winter
California Coast	Listed Threatened Sept. 1999	! Eel, Mattole, and Mad Rivers
Southern Oregon/Northern California Coast	Not Warranted Sept. 1999	! Southern Oregon ! Smith River ! Klamath River Fall
Upper Klamath and Trinity Rivers	Not Warranted	! Klamath River Fall ! Klamath River Spring
Oregon Coast	Not Warranted	! Central and Northern Oregon
Washington Coast	Not Warranted	! Willapa Bay Fall ! Grays Harbor Fall ! Grays Harbor Spring ! Queets Fall ! Queets Spring/Summer ! Hoh Fall ! Hoh Spring/Summer ! Quillayute Fall ! Quilayute Spring/Summer ! Hoko Summer/Fall (Western Strait of Juan de Fuca)
Puget Sound	Listed Threatened May 1999	! Elwha Summer/Fall (Eastern Strait of Juan de Fuca) ! Skokomish Summer/Fall (Hood Canal) ! Nooksack Spring (early) ! Skagit Summer/Fall ! Skagit Spring ! Stillaguamish Summer/Fall ! Snohomish Summer/Fall ! Cedar River Summer/Fall (Lake Washington) ! White River Spring ! Green River Summer/Fall ! Nisqually River Summer/Fall (South Puget Sound)
Lower Columbia River	Listed Threatened May 1999	! Sandy, Kalama, and Cowlitz (fall and spring) ! North Lewis River Fall
Upper Willamette River	Listed Threatened May 1999	! Upper Willamette River
		!
Upper-Columbia River Summer/Fall	Not Warranted	! Upper River Bright ! Upper River Summer
Upper Columbia River Spring	Listed Endangered May 1999	! Upper River Spring
Snake River Fall	Listed Threatened May 1992	! Snake River Fall
Snake River Spring/Summer	Listed Threatened May 1992	! Snake River Spring/Summer
- - - COHO - - -		
Central California Coast	Listed Threatened Dec. 1996	! By proxy - Rogue/Klamath hatchery coho

Southern Oregon/Northern California Coasts	Listed Threatened May 1997	! Southern Oregon Coastal Natural ! Northern California
Oregon Coast	Listed Threatened Oct. 1998	! South Central Oregon Coast ! North Central Oregon Coast ! Northern Oregon Coastal
Lower Columbia River	Listed Threatened June 2005	! Columbia River Natural
Southwest Washington Coast	Candidate Species July 1995	! Grays Harbor
Olympic Peninsula	Not Warranted	! Queets ! Hoh ! Quillayute Fall ! Strait of Juan de Fuca (Western)
Puget Sound/Strait of Georgia	Candidate Species	! Strait of Juan de Fuca (Eastern) ! Hood Canal ! Skagit ! Stillaguamish ! Snohomish
	- - - PINK - - -	
Puget Sound, Odd Numbered Years	Not Warranted	! Puget Sound

a/ A description of the ESU boundaries may be found at 63 FR 11486 (March 9, 1998) for Chinook and 60 FR 38016 (July 25, 1995) for coho.

3.5 BYCATCH

AConservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.@

Magnuson-Stevens Act, National Standard 9

A...Establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priorityB
(A) minimize bycatch; and
(B) minimize the mortality of bycatch which cannot be avoided;@

Magnuson-Stevens Act , ' 303(a)(11)

3.5.1 Definition and Management Intent

“Bycatch” for the purposes of this fishery management plan is defined as fish caught in an ocean salmon fishery which are not sold or kept for personal use and includes economic discards, regulatory discards, and fishery mortality due to an encounter with fishing gear that does not result in capture of fish. Bycatch does not include any fish that legally are retained in a fishery and kept for personal, tribal, or cultural use, or that enter commerce through sale, barter, or trade. In addition, under the provisions of the Magnuson-Stevens Act, bycatch does not include targeted salmon released alive under a recreational catch-and-release fishery management program.

Under the salmon FMP, the primary bycatch that occurs is bycatch of salmon species. Therefore, the Council’s conservation and management measures shall seek to minimize salmon bycatch and bycatch mortality (drop off and hooking mortality) to the greatest extent practical in all ocean fisheries. When bycatch cannot be avoided, priority will be given to conservation and management measures that seek to minimize bycatch mortality and ensure the extended survival of such fish. These measures will be developed in consideration of the biological and ecological impacts to the affected species, the social and economic impacts to the fishing industry and associated communities, and the impacts upon the fishing, management, and enforcement practices currently employed in ocean salmon fisheries (see also Section 6.5.3).

3.5.2 Occurrence

The present bycatch and bycatch mortality estimates and methodologies for salmon in salmon fisheries are documented by the STT annually in the SAFE and Preseason Report III documents. Bycatch of salmon in Pacific Coast trawl fisheries is documented in Amendment 12 (PFMC 1997a). More recent information is reported in a Section 7 biological opinion regarding salmon bycatch in the groundfish fishery (NMFS 2006), and a subsequent report that summarizes the bycatch of salmon in recent years (Bellman et al. 2011). Salmon fisheries or fishery practices which lack or do not have recent observation data or estimates of bycatch composition and associated mortality rates will be identified by the Council for future research priority in their biannual Research and Data Needs Report to NMFS. Future changes in the procedures and methodologies will occur only if a comprehensive technical review of existing biological data justifies a modification and is approved by the STT, SSC, and Council. All of these changes will occur within the schedule established for salmon estimation methodology review and apart from the preseason planning process.

Bycatch of fish other than salmon in salmon fisheries is generally very limited. Only hook-and-line gear is allowed in ocean salmon fisheries and regulations allow for retention of most groundfish species and limited numbers of Pacific halibut that are caught incidentally while salmon fishing.

3.5.3 Standard Reporting Methodology

Within the salmon preseason planning process, management options will be assessed for the effects on the amount and type of salmon bycatch and bycatch mortality. Estimates of salmon bycatch and incidental mortalities associated with salmon fisheries will be included in the modeling assessment of total fishery impact and assigned to the stock or stock complex projected to be impacted by the proposed management measure. The resultant fishery impact assessment reports for the ocean salmon fisheries will specify the amount of salmon bycatch and bycatch mortality associated with each accompanying management option. The final analysis of Council-adopted management measures will contain an assessment of the total salmon bycatch and bycatch mortality for ocean salmon fisheries, and include the percentage that these estimates represent compared to the total harvest projected for each species, as well as the relative change from the previous year's total bycatch and bycatch mortality levels.

4 HABITAT AND PRODUCTION

AAny fishery management plan . . . shall . . . protect, restore, and promote the long-term health and stability of the fishery.

Magnuson-Stevens Act, '303(a)(1)

The Council will be guided by the principle that there should be no net loss of the productive capacity of marine, estuarine, and freshwater habitats which sustain commercial, recreational, and tribal salmon fisheries beneficial to the nation. Within this policy, the Council will assume an aggressive role in the protection and enhancement of anadromous fish habitat, especially essential fish habitat.

4.1 ESSENTIAL FISH HABITAT

A...Describe and identify essential fish habitat for the fishery . . . minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;@

Magnuson-Stevens Act, '303(a)(7)

Protecting, restoring, and enhancing the natural productivity of salmon habitat, especially the estuarine and freshwater areas, is an extremely difficult challenge which must be achieved if salmon fisheries are to remain healthy for future generations. Section 3(10) of the Magnuson-Stevens Act defines essential fish habitat (EFH) as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The following interpretations have been made by NMFS to clarify this definition: waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include historic areas if appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity covers a species full life cycle.

4.1.1 Identification and Description

Appendix A to the *Pacific Coast Salmon Plan* contains the Council's complete identification and description of Pacific coast salmon fishery EFH, along with a detailed assessment of adverse impacts and actions to encourage conservation and enhancement of EFH. The Pacific coast salmon fishery EFH includes those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. In the estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (200 nautical miles) offshore of Washington, Oregon, and California north of Point Conception. Foreign waters off Canada, while still salmon habitat, are not included in salmon EFH, because they are outside U.S. jurisdiction. The Pacific coast salmon fishery EFH also includes the marine areas off Alaska designated as salmon EFH by the North Pacific Fishery Management Council. In freshwater, the salmon fishery EFH includes all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon (except above certain impassable natural barriers) in Washington, Oregon, Idaho, and California as identified in Table 1-1 of Appendix A. Salmon EFH includes aquatic areas above all artificial barriers except the impassible barriers (dams) listed in Table A-2 of Appendix A. However, activities occurring above impassable barriers that are likely to adversely affect EFH below impassable barriers are subject to the consultation provisions of the Magnuson-Stevens Act. The identification and description of EFH may be modified in the future through salmon FMP amendments as new or better information becomes available.

4.1.2 Adverse Effects of Fishing on Essential Fish Habitat

To the extent practicable, the Council must minimize adverse impacts of fishing activities on salmon EFH. Fishing activities may adversely affect EFH if the activities cause physical, chemical, or biological alterations of the substrate, and loss of or injury to benthic organisms, prey species and their habitat, and other components of the ecosystem. The marine activities under Council management authority or influence that may impact EFH are effects of fishing gear, prey removal by other fisheries, and the effect of salmon fishing on the reduction of stream nutrients due to fewer salmon carcasses on the spawning grounds. Within its fishery management authority, the Council may use fishing gear restrictions, time and area closures, or harvest limits to reduce negative impacts on EFH. Section 3.1 of Appendix A provides a description of the potential impacts on EFH from fishing activities and measures to assess or reduce those impacts. The description and measures includes both fisheries within Council management authority and those under other management jurisdictions.

In determining actions to take to minimize any adverse effects from fishing, the Council will consider the nature and extent of the impact and the practicality and effectiveness of management measures to reduce or eliminate the impact. The consideration will include long- and short-term costs and benefits to the fishery and EFH along with other appropriate factors consistent with National Standard 7 ("Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.").

4.1.3 Adverse Effects of Non-Fishing Activities on Essential Fish Habitat

> *"Each Council shall comment on and make recommendations to the Secretary and any Federal or State agency concerning any such activity (authorized, funded, or undertaken, or proposed to be undertaken by any Federal or State agency) that, in the view of the Council, is likely to substantially affect the habitat, including essential fish habitat, of an anadromous fishery resource under its authority.". . . "Within 30 days . . . a Federal agency shall provide a detailed response in writing . . .."*
>
> *Magnuson-Stevens Act, §305(b)*

The Council will strive to assist all agencies involved in the protection of salmon habitat. This assistance will generally occur in the form of Council comments endorsing protection, restoration, or enhancement programs; requesting information on and justification for actions which may adversely impact salmon production; and in promoting salmon fisheries' needs among competing uses for the limited aquatic environment. In commenting on actions which may affect salmon habitat, the Council will seek to ensure implementation of consistent and effective habitat policies with other agencies having environmental control and resource management responsibilities over production and harvest in inside marine and fresh waters.

Specific recommendations for conservation and enhancement measures for EFH are listed in Appendix A. In implementing its habitat mandates, the Council will seek to achieve the following overall objectives:

1. Work to assure that Pacific salmon, along with other fish and wildlife resources, receive equal treatment with other purposes of water and land resource development.

2. Support efforts to restore Pacific salmon stocks and their habitat through vigorous implementation of federal and state programs.

3. Work with fishery agencies, tribes, land management agencies, and water management agencies to assess habitat conditions and develop comprehensive restoration plans.

4. Support diligent application and enforcement of regulations governing ocean oil exploration and development, timber harvest, mining, water withdrawals, agriculture, or other stream corridor uses by local, state, and federal authorities. It is Council policy that approved and permitted activities employ the best management practices available to protect salmon and their habitat from adverse effects of contamination from domestic and industrial wastes, pesticides, dredged material disposal, and radioactive wastes.

5. Promote agreements between fisheries agencies and land and water management agencies for the benefit of fishery resources and to preserve biological diversity.

6. Strive to assure that the standard operation of existing hydropower and water diversion projects will not substantially reduce salmon productivity.

7. Support efforts to identify and avoid cumulative or synergistic impacts in drainages where Pacific salmon spawn and rear. The Council will assist in the coordination and accomplishment of comprehensive plans to provide basin-wide review of proposed hydropower development and other water use projects. The Council encourages the identification of no-impact alternatives for all water resource development.

8. Support and encourage efforts to determine the net economic value of conservation by identifying the economic value of fish production under present habitat conditions and expected economic value under improved habitat conditions.

4.2 COMPENSATION FOR NATURAL PRODUCTION LOSSES

Whenever unavoidable fish population losses occur as a result of various development programs or other action, the Council will recommend compensatory measures that, to the extent practicable, meet the following guidelines:

1. Replacement of losses will be by an equivalent number of fish of the appropriate stock of the same fish species or by habitat capable of producing the equivalent number of fish of the same species that suffered the loss.

2. Mitigation or compensation programs will be located in the immediate area of loss.

3. In addition to direct losses of fish production, compensation programs will include consideration of the opportunity to fish and potential unrealized production at the time of the project.

4. Measures for replacement of runs lost due to construction of water control projects should be completed in advance of, or concurrent with, completion of the project.

4.3 ARTIFICIAL PRODUCTION

Artificial production programs can be an important component of healthy salmon fisheries. They may fall under one of four general categories: fishery enhancement, natural stock recovery, coded-wire tag indicator stock, or mitigation. To assure the effectiveness and maximize the benefits of artificial production programs, the Council recommends meeting the following objectives:

1. Maximize the continued production of hatchery stocks consistent with harvest management and stock conservation objectives.

2. Ensure that mitigation and enhancement programs, with a primary objective of producing hatchery origin salmon for harvest, minimize adverse ecological and genetic impacts to naturally producing

populations (e.g., straying and mixing on the spawning grounds, unbalanced exploitation rates, loss of genetic diversity). Further, the methods employed to produce salmon for harvest should ensure high survival and high contribution rates to the fisheries targeting the enhanced stock while meeting natural stock objectives.

3. Ensure that artificial production programs designed to perpetuate and/or rebuild depressed natural populations are designed to be short-term in duration, boost the abundance of targeted natural populations over a few generations, and terminate when the population is able to sustain itself naturally.

4. Support efforts to continually review and improve the effectiveness of artificial propagation.

5 HARVEST

> *"Conservation and management measures shall, consistent with the conservation requirements of this Act, … 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."*
>
> *Magnuson-Stevens Act, National Standard 8*

The Council process for determining the allowable ocean fishery harvest centers primarily around protecting weak or listed natural salmon stocks, while providing harvest opportunity on stronger natural and hatchery stocks in ways that conform to the plan's harvest allocation objectives. Achieving these multiple objectives is complicated by natural variability in annual stock abundance, variability in the ocean migratory routes and timing, the high degree of mixing of different salmon species and stocks in ocean fisheries, and imprecision in the estimation of these important parameters. Within this complexity and uncertainty, the Council attempts to achieve its fishery harvest objectives by using the various management tools described in Chapter 6.

Procedures for determining allowable ocean harvest vary by species, fishery complexity, available data, and the state of development of predictive tools. Descriptions of the various procedures in effect in 1984 have been documented (PFMC 1984). These procedures have and will change over time to incorporate the best science. Specific changes resulting from improvements in forecasting techniques or changes in outside/inside allocation procedures due to treaty or user-sharing revisions are anticipated by the plan's framework mechanism. Such changes may be adopted without formal amendment. Changes in procedures and the rationale for such changes are described in Council documents developed during the preseason regulatory process (see Chapter 9), in pertinent plan amendment documents, and in various methodology reviews by the SSC.

5.1 OVERALL FISHERY OBJECTIVES

The following objectives guide the Council in establishing fisheries against a framework of ecological, social, and economic considerations.

1. Establish ocean exploitation rates for commercial and recreational salmon fisheries that are consistent with requirements for stock conservation objectives and ACLs within Section 3, specified ESA consultation or recovery standards, or Council adopted rebuilding plans.

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

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

4. Minimize fishery mortalities for those fish not landed from all ocean salmon fisheries as consistent with optimum yield and the bycatch management specifications of Section 3.5.

5. Manage and regulate fisheries so that the optimum yield 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.

5.2 MANAGEMENT CONSIDERATIONS BY SPECIES AND AREA

Following, are brief descriptions of the stock management considerations which guide the Council in setting fishing seasons within the major subareas of the Pacific Coast.

5.2.1 Chinook Salmon

5.2.1.1 South of Horse Mountain

Within this area, considerable overlap of Chinook originating in Central Valley and northern California coastal rivers occurs between Point Arena and Horse Mountain. Ocean commercial and recreational fisheries are managed to address impacts on Chinook stocks originating from the Central Valley, California Coast, Klamath River, Oregon Coast, and the Columbia River. With respect to California stocks, ocean commercial and recreational fisheries operating in this area are managed to maximize natural production consistent with meeting the U.S. obligation to Indian tribes with federally recognized fishing rights, and recreational needs in inland areas. Special consideration must be given to meeting the consultation or recovery standards for endangered Sacramento River winter Chinook in the area south of Point Arena and for threatened Snake River fall Chinook north of Pigeon Point. Sacramento River spring Chinook and California coastal Chinook are also listed as threatened under the state ESA.

5.2.1.2 Horse Mountain to Humbug Mountain (Klamath Management Zone)

Major Chinook stocks contributing to this area originate in streams located along the southern Oregon/California coasts as well as the Central Valley. The primary Chinook run in this area is from the Klamath River system, including its major tributary, the Trinity River. Ocean commercial and recreational fisheries operating in this area are managed to maximize natural production of Klamath River fall and spring Chinook consistent with meeting the U.S. obligations to Indian tribes with federally recognized fishing rights, and recreational needs in inland areas. Ocean fisheries operating in this area must balance management considerations for stock-specific conservation objectives for Klamath River, Central Valley, California coast, Oregon coast, and Columbia River Chinook stocks.

5.2.1.3 Humbug Mountain to Cape Falcon

The major Chinook stocks contributing to this area primarily originate in Oregon coastal rivers located north of Humbug Mountain, as well as from the Rogue, Klamath, and Central Valley systems. Allowable ocean harvests in this area are an annual blend of management considerations for impacts on Chinook stocks originating from the Central Valley, California Coast, Klamath River, Oregon Coast, Columbia River, and the Washington Coast.

5.2.1.4 North of Cape Falcon

The majority of the ocean Chinook harvest in this area primarily originates from the Columbia River, with additional contributions from Oregon and Washington coastal areas, Puget Sound and some California stocks. Bonneville Pool (Spring Creek hatchery tule) fall and lower Columbia River (tule) fall and spring (Cowlitz) Chinook, all primarily of hatchery-origin, comprise a majority of the ocean Chinook harvest between Cape Falcon, Oregon and the U.S.-Canada border. Hatchery production escapement goals of these stocks are established according to long-range production programs and/or mitigation requirements associated with displaced natural stocks. Allowable ocean harvest in this area is directed at Columbia River stocks with contributions from the Oregon Coast, Washington Coast, and Puget Sound.

5.2.2 Coho Salmon

5.2.2.1 South of Cape Falcon

Columbia River, Oregon, and California coho are managed together within the framework of the Oregon Production Index (OPI) since these fish are essentially intermixed in the ocean fishery. These coho contribute to ocean fisheries off the southern Washington coast as well as to fisheries off the coasts of Oregon and northern California. Ocean fishery objectives for the OPI area address the following (1) conservation and recovery of Oregon and California coastal coho, including consultation or recovery standards for OCN and California coastal coho; (2) the desire for viable fisheries inside the Columbia River; and (3) impacts on conservation objectives for other key stocks.

The OPI is used as a measure of the annual abundance of adult three-year-old coho salmon resulting from production in the Columbia River and Oregon and California coastal basins. The index itself is simply the combined number of adult coho that can be accounted for within the general area from Leadbetter Point, Washington to as far south as coho are found. Currently, it is the sum of (1) ocean sport and troll fishery impacts in the ocean south of Leadbetter Point, Washington, regardless of origin; (2) Oregon and California coastal hatchery returns; (3) the Columbia River inriver runs; (4) Oregon coastal natural spawner escapement and (5) Oregon coastal inside fishery impacts. Most of the California production is from hatcheries which provide a very small portion of the total hatchery production in the OPI area.

5.2.2.2 North of Cape Falcon

Management of ocean fisheries for coho north of Cape Falcon is complicated by the overlap of OCN stocks and other stocks of concern in the vicinity of the Columbia River mouth. Allowable harvests in the area between Leadbetter Point, Washington and Cape Falcon, Oregon will be determined by an annual blend of OCN and Washington coho management considerations including:

1. Abundance of contributing stocks.
2. Stock specific conservation objectives (as found in Table 3-1).
3. Consultation standards of the Endangered Species Act.
4. Relative abundance of Chinook and coho.
5. Allocation considerations of concern to the Council.

Coho occurring north of Cape Falcon, Oregon are comprised of a composite of coho stocks originating in Oregon, Washington, and southern British Columbia. Ocean fisheries operating in this area must balance management considerations for stock-specific conservation objectives for Southern Oregon/Northern California, Oregon Coast, Southwest Washington, Olympic Peninsula, and Puget Sound.

5.2.3 Pink Salmon

Ocean pink salmon harvests occur off the Washington coast and are predominantly of Fraser River origin. Pink salmon of Puget Sound origin represent a minor portion of the ocean harvest although ocean impacts can be significant in relation to the terminal return during years of very low abundance.

The Fraser River Panel of the PSC manages fisheries for pink salmon in the Fraser River Panel Area (U.S.) north of 48E N latitude to meet Fraser River natural spawning escapement and U.S./Canada allocation requirements. The Council manages pink salmon harvests in that portion of the EEZ which is not in the Fraser River Panel Area (U.S.) waters consistent with Fraser River Panel management intent and in accordance with the conservation objectives for Puget Sound pink salmon.

Pink salmon management objectives must address meeting natural spawning escapement objectives, allowing ocean pink harvest within fixed constraints of coho and Chinook harvest ceilings and providing for treaty allocation requirements.

5.3 ALLOCATION

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

Magnuson-Stevens Act, National Standard 4

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

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

5.3.1.1 Goal, Objectives, and Priorities

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

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

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

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

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

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

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

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

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

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

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

5.3.1.2 Allocation Schedule Between Gear Types

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

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

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

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

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

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

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

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

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

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

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

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

5.3.1.3 Recreational Subarea Allocations

Coho

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

In years with no Area 4B fishery, the distribution of coho north of Leadbetter Point (50 percent of the total recreational TAC) will be divided to provide 74 percent to the area between Leadbetter Point and the Queets River (Westport), 5.2 percent to the area between Queets River and Cape Flattery (La Push), and 20.8 percent to the area north of the Queets River (Neah Bay). In years when there is an Area 4B (Neah Bay) fishery under state management, the allocation percentages north of Leadbetter Point will be modified to maintain more equitable fishing opportunity among the ports by decreasing the ocean harvest share for Neah Bay. This will be accomplished by adding 25 percent of the numerical value of the Area 4B fishery to the recreational TAC north of Leadbetter Point prior to calculating the shares for Westport and La Push. The increase to Westport and La Push will be subtracted from the Neah Bay ocean share to maintain the same total harvest allocation north of Leadbetter Point. Table 5-2 displays the resulting percentage allocation of the total recreational coho catch north of Cape Falcon among the four recreational port areas (each port area allocation will be rounded to the nearest hundred fish, with the largest quotas rounded downward if necessary to sum to the TAC).

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

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

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

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

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

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

Chinook

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

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

5.3.2 Commercial and Recreational Fisheries South of Cape Falcon

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

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

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

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

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

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

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

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

1. abundance of contributing stocks
2. allocation considerations of concern to the Council
3. relative abundance in the fishery between Chinook and coho
4. escapement goals
5. maximizing harvest potential

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

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

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

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

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

   b. South of Humbug Mountain - 30%

   In addition,

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

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

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

5.3.3 Tribal Indian Fisheries

5.3.3.1 California

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

5.3.3.2 Columbia River

Pursuant to a September 1, 1983 Order of the U.S. District Court, the allocation of harvest in the Columbia River was established under the "Columbia River Fish Management Plan" which was implemented in 1988 by the parties of U.S. v. Oregon. This plan replaced the original 1977 plan (pages 16-20 of the 1978 FMP). Since the Columbia River Fishery Management Plan expired on December 31, 1998, fall Chinook in Columbia River fisheries were managed through 2007 under the guidance of annual management agreements among the U.S. versus Oregon parties. In 2008, a new 10 year management agreement was negotiated through the U.S. versus Oregon process, which included revisions to some inriver objectives. This most recent plan is the "2008-2017 U.S. v Oregon Management Agreement". The plan provides a framework within which the relevant parties may exercise their sovereign powers in a coordinated and systematic manner in order to protect, rebuild, and enhance upper Columbia River fish runs while providing harvest for both treaty Indian and non-Indian fisheries. The parties to the agreement are the United States, the states of Oregon, Washington, and Idaho, and four Columbia River treaty Indian tribes-Warm Springs, Yakama, Nez Perce, and Umatilla.

5.3.3.3 U.S. v. Washington Area

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

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

5.4 U.S. HARVEST AND PROCESSING CAPACITY AND ALLOWABLE LEVEL OF FOREIGN FISHING

> *"... Assess and specify . . . (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield . . . (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing, and (C) the capacity and extent to which United States processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States."*
>
> *Magnuson-Stevens Act, §303(a)(4)*

At the highest conceivable level of recent past, present, or expected future abundance, the total allowable harvest of salmon stocks can be fully taken by U.S. fisheries. There is no recent record of processors in the Council area refusing fish from fishermen because of inadequate processing capacity. Because shore-based processors can fully utilize all the salmon that can be harvested in marine waters, joint venture processing is fixed as zero.

In view of the adequacy of the domestic fisheries to harvest the highest conceivable level of abundance, the total allowable level of foreign fishing also is fixed as zero. The United States allowed Canadian fishing in U.S. waters under a reciprocal agreement until 1978. Negotiations between the two governments, including those within the context of the PSC, continue to seek a resolution of all transboundary salmon issues. These negotiations are aimed at stabilizing and reducing, where possible, the interception of salmon originating from one country by fishermen of the other. No U.S./Canada reciprocal salmon fishing is contemplated in the foreseeable future.

6 MEASURES TO MANAGE THE HARVEST

A number of management controls are available to manage the ocean fisheries each season, once the allowable ocean harvests and the basis for allocation among user groups have been determined. Among these are management boundaries, seasons, quotas, minimum harvest lengths, fishing gear restrictions, and recreational daily bag limits. Natural fluctuations in salmon abundance require that annual fishing periods, quotas, and bag limits be designed for the conditions of each year. What is suitable one year probably will not be suitable the next. New information on the fisheries and salmon stocks also may require other adjustments to the management measures. The Council assumes these ocean harvest controls also apply to territorial seas or any other areas in state waters specifically designated in the annual regulations.

Some of the more common measures that have been applied to manage ocean salmon fisheries since 1977 under the MSA are described below, along with a clarification of the process and flexibility in implementing the measures. The Framework Amendment (PFMC 1984) provides a more detailed history of salmon harvest controls and rationale for their designation as fixed or flexible elements of the salmon FMP.

6.1 MANAGEMENT BOUNDARIES AND MANAGEMENT ZONES

Management boundaries and zones will be established during the preseason regulatory process or adjusted inseason (Section 10.2) as necessary to achieve a conservation or management objective. A conservation or management objective is one that protects a fish stock, simplifies management of a fishery, or results in the sustainable use of the resources. For example, management boundaries and management zones can be used to separate fish stocks, facilitate enforcement of regulations, separate conflicting fishing activities, or facilitate harvest opportunities. Management boundaries and zones will be described in the annual regulations by geographical references, coordinates (latitude and longitude), depth contours, distance from shore, or similar criteria. Figure 6-1 displays management boundaries in common use in 2000-2010.

While there are many specific reasons for utilizing management boundaries or zones which may change from year to year, some boundaries or zones have purposes that remain relatively constant. The boundary used to separate management of Columbia River Chinook from those stocks to the south and to divide the Council's harvest allocation schedules has always been at or near Cape Falcon, Oregon. The Klamath management zone (beginning in 1990, the area between Humbug Mountain, Oregon and Horse Mountain, California) has been used to delineate the area where primary concern is the management of Klamath River fall Chinook. A closed zone at the mouth of the Columbia River has been used for several years to eliminate fishing in an area believed to generally contain a high percentage of sublegal "feeder" Chinook. A similar zone has been established at the mouth of the Klamath River to allow fish undisturbed access to the river. Changes to these boundaries or zones may require special justification and documentation. However, the basis of establishing most other management boundaries and zones depends on the annual management needs as determined in the preseason process.

6.2 MINIMUM HARVEST LENGTHS FOR OCEAN COMMERCIAL AND RECREATIONAL FISHERIES

Minimum size limits for ocean commercial and recreational fisheries may be changed each year during the preseason regulatory process or modified inseason under the procedures of Section 10.2. Recommended changes must serve a useful purpose which is clearly described and justified, and projections made of the probable impacts resulting from the change.

Minimum size limits have been relatively stable since the Council began management in 1977 and any changes are expected to occur infrequently. From 1977 through 1995 there were no changes in the size limits for non-Indian commercial fisheries except for the decision to use the California coho minimum length for the entire Klamath management area which extends into Oregon. Recreational minimum size limits did not change between 1988 and 1995. However, since the mid 2000's, size limits have changed more frequently to reduce impact on stocks of concern. The minimum size limits listed below (total length in inches) have been consistently used by the Council with only infrequent modifications in limited areas to address special needs or situations.

TABLE 6-1.Minimum size limits.

	Chinook		Coho		Pink	
	Troll	Sport	Troll	Sport	Troll	Sport
North of Cape Falcon	28.0	24.0	16.0	16.0	None	None
Cape Falcon to OR/CA Border	28.0	24.0	16.0	16.0	None	None
South of OR/CA Border.	26.0	20.0	-	-	None	24

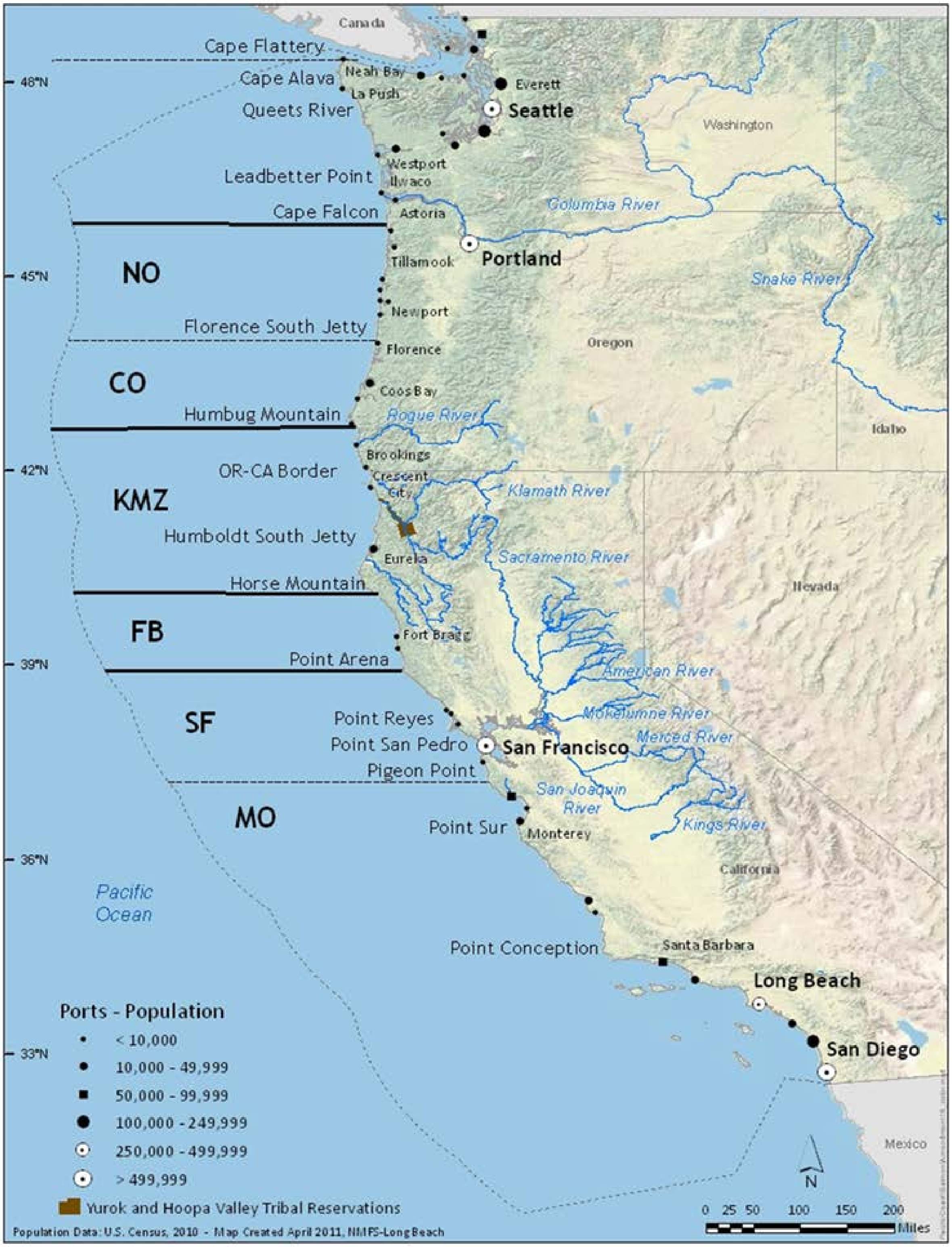

FIGURE 6-1. Management boundaries in common use in 2000-2010.

6.3 RECREATIONAL DAILY BAG LIMIT

Recreational daily bag limits for each management area may be set during the preseason regulatory process or modified inseason (Section 10.2). They will be set to maximize the length of the fishing season consistent with the allowable level of harvest. In recent years, bag limits of one or two salmon have been commonplace.

In general, for every fishing area, the level of allowable ocean harvest will be determined for the recreational fishery; next, the fishing season will be set to be as long as practicable, including the Memorial Day and/or Labor Day weekends if feasible, consistent with the allowable level of harvest; and, bag limits will be simultaneously set to accommodate that fishing season. In years of low salmon abundance, the season will be short and the bag limits will be low; in years of high salmon abundance, the season will be long and the bag limits will be higher.

6.4 FISHING GEAR RESTRICTIONS

Gear restrictions may be changed annually during the preseason regulatory process and inseason as provided in Section 10.2 Recommended changes must serve one or more useful purposes while being consistent with the goals of the plan. For example, changes could be made to facilitate enforcement, reduce hooking mortality, or reduce gear expenses for fishermen. Annual gear restriction changes in previous years have included the requirement for barbless hooks in both the troll and recreational fisheries, and a limit to the number of spreads per line in the troll fishery. Both of these gear changes were instituted to reduce total hook-and-release mortality. Other restrictions have included bait size, number of rods per recreational fisher, and requirements for the number of lines or the attachment of lines to the vessel in the commercial fishery.

6.5 SEASONS AND QUOTAS

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

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

6.5.1 Preferred Course of Action

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

6.5.2 Procedures for Calculating Seasons

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

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

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

6.5.3 Species-Specific and Other Selective Fisheries

6.5.3.1 Guidelines

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

1. Harvestable fish of the target species are available.

2. Harvest impacts on incidental species will not exceed allowable levels determined in the management plan.

3. Proven, documented, selective gear exists (if not, only an experimental fishery should be considered).

4. Significant wastage of incidental species will not occur or a written economic analysis demonstrates the landed value of the target species exceeds the potential landed value of the wasted species.

5. The species specific or ratio fishery will occur in an acceptable time and area where wastage can be minimized and target stocks are maximally available.

6. Implementation of selective fisheries for marked or hatchery fish must be in accordance with U.S. v. Washington stipulation and order concerning co-management and mass marking (Case No. 9213, Subproceeding No. 96-3) and any subsequent stipulations or orders of the U.S. District Court, and consistent with international objectives under the Pacific Salmon Treaty (e.g., to ensure the integrity of the coded-wire tag program).

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

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

1. Selective fisheries will first be considered during the months of August and/or September. However, the Council may consider selective fisheries at other times, depending on year to year circumstances identified in the preceding paragraph.

2. The total impacts within each port area or gear group on the critical natural stocks of management concern are not greater than those under the original allocation without the selective fisheries.

3. Other allocation objectives (i.e., treaty Indian, or ocean and inside allocations) are satisfied during negotiations in the North of Cape Falcon Forum.

4. The selective fishery is assessed against the guidelines in Section 6.5.3.1.

5. Selective fishery proposals need to be made in a timely manner in order to allow sufficient time for analysis and public comment on the proposal before the Council finalizes its fishery recommendations.

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

1. Allocate the TAC among the gear groups and port areas according to the basic FMP allocation process described in Section 5.3.1 without the selective fishery.

2. Each gear group or port area may utilize the critical natural stock impacts allocated to its portion of the TAC to access additional harvestable, marked fish, over and above the harvest share established in step one, within the limits of the management constraints listed in the preceding paragraph.

6.5.4 Procedures for Calculating Quotas

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

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

1. For coho, private hatchery contribution to the ocean fisheries in the OPI area.

2. Unanticipated loss of shakers (bycatch mortality of undersized fish or unauthorized fish of another species that have to be returned to the water) during the season. (Adjustment for coho hooking mortality during any all-salmon-except-coho season will be made when the quotas are established.)

3. Any catch that take place in fisheries within territorial waters that are inconsistent with federal regulations in the EEZ.

4. If the ability to update inseason stock abundance is developed in the future, adjustments to total allowable harvest could be made, where appropriate.

5. The ability to redistribute quotas between subareas depending on the performance toward achieving the overall quota in the area.

Changes in the quotas as a result of the inseason adjustment process will be avoided unless the changes are of such magnitude that they can be validated by the STT and Council, given the precision of the original estimates.

The basis for determining the private hatchery contribution in (1) above will be either coded-wire tag analysis or analysis of scale patterns, whichever is determined by the STT to be more accurate, or another more accurate method that may be developed in the future, as determined by the STT and Council.

In reference to (4) and (5) above, if reliable techniques become available for making inseason estimates of stock abundance, and provision is made in any season for its use, a determination of techniques to be applied will be made by the Council and discussed during the preseason regulatory process.

6.5.5 Procedures for Regulating Ocean Harvests of Pink and Sockeye

Sockeye salmon are only very rarely caught in Council-managed ocean salmon fisheries and no specific procedures have been established to regulate their harvest. Procedures for pink salmon are as follows:

1. All-species seasons will be planned such that harvest of pink salmon can be maximized without exceeding allowable harvests of Chinook and/or coho and within conservation and allocation constraints of the pink stocks.

2. Species specific or ratio fisheries for pink salmon will be considered under the guidelines for species specific fisheries presented in Section 6.5.3, and allocation constraints of the pink stocks.

6.6 OTHER MANAGEMENT MEASURES

6.6.1 Treaty Indian Ocean Fishing

Since 1977 the Council has adopted special measures for the treaty Indian ocean troll fisheries off the Washington Coast. The Makah, Quileute, Hoh, and Quinault tribes are entitled by federal judicial determination to exercise their treaty rights in certain ocean areas. In addition, Lower S'Klallam, Jamestown S'Klallam, and Port Gamble S'Klallam tribes are entitled by federal judicial determination to exercise their treaty rights in ocean salmon Area 4B, the entrance to the Strait of Juan de Fuca.

The treaty Indian ocean salmon fishing regulations will be established annually during the preseason regulatory process. The affected tribes will propose annual treaty Indian ocean fishing regulations at the March meeting of the Council. After a review of the proposals, the Council will adopt treaty Indian regulations along with non-treaty ocean fishing regulations for submission to the Secretary of Commerce at the April Council meeting.

The specific timing and duration of the treaty Indian ocean salmon season varies with expected stock abundance and is limited by quotas for both Chinook and coho. Within these constraints, the general season structure has been a Chinook-directed fishery in May and June, followed by an all-salmon season from July through the earliest of quota attainment or October 31.

6.6.1.1 Seasons

Given that the traditional tribal ocean season has changed in recent years and because it is largely up to the tribes to recommend annual ocean management measures applicable to their ocean fishery, a flexible mechanism for setting fishing seasons is proposed so that desired changes can be made in the future without the need for plan amendment.

The treaty Indian troll season will be established based upon input from the affected tribes, but would not be longer than that required to harvest the maximum allowable treaty Indian ocean catch. The maximum allowable treaty Indian ocean catch will be computed as the total treaty harvest that would occur if the tribes chose to take their total entitlement of the weakest stock in the ocean, assuming this level of harvest did not create conservation or allocation problems on other stocks.

6.6.1.2 Quotas

Fixed or adjustable quotas by area, season, or species may be employed in the regulation of treaty Indian ocean fisheries, provided that such quotas are consistent with established treaty rights. The maximum size of quotas shall not exceed the harvest that would result if the entire treaty entitlement to the weakest run were to be taken by treaty ocean fisheries. Any quota established does not represent a guaranteed ocean harvest, but a maximum ceiling on catch. Catches in ocean salmon Area 4B are counted within the tribal ocean harvest quotas during the May 1-September 30 ocean management period.

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

1. Unanticipated shaker loss during the season.

2. Catches by treaty ocean fisheries that are inconsistent with federal regulations in the EEZ.

3. If an ability to update inseason stock abundance is developed in the future, adjustments to quotas could be made where appropriate.

4. Ability to redistribute quotas between subareas depending upon performance toward catching the overall quota for treaty ocean fisheries in the area.

Procedures for the above inseason adjustments will be made in accordance with Section 10.2.

Changes in the quotas as a result of the inseason adjustment process will be avoided unless the changes are of such magnitude that they are scientifically valid as determined by the STT and Council, given the precision of the original estimates.

Harvest guidelines may be used within overall quotas to trigger inseason management actions which were established during the preseason regulatory process.

6.6.1.3 Areas

Current tribal ocean fishing areas in the EEZ (subject to change by court order) are as follows:

Makah - north of 48E02'15" N to the U.S./Canada border and east of 125E44'00".

Hoh - south of 47E54'18" N and north of 47E21'00" N and east of 125E44'00".

Quileute - south of 48E07'36" N and north of 47E31'42" N and east of 125E44'00".

Quinault - south of 47E40'06" N and north of 46E54'03" N and east of 125E44'00".

In addition, a portion of the usual and accustomed fishing areas for the Lower Elwha, Jamestown, and Port Gamble S'Klallam tribes is in ocean salmon Area 4B at the entrance to the Strait of Juan de Fuca (Bonilla-Tatoosh line east to the Sekiu River).

Area restrictions may be employed in the regulation of treaty ocean fisheries, consistent with established treaty rights. For example, in 1982 treaty fishing was prohibited within a six-mile radius around the Queets and Hoh River mouths when the area was closed to non-treaty salmon fishing.

6.6.1.4 Size Limits and Gear Restrictions

Regulations for size limits and gear restrictions for treaty ocean fisheries will be based on recommendations of the affected treaty tribes.

6.6.2 Net Prohibition

No person shall use nets to fish for salmon in the EEZ except that a hand-held net may be used to bring hooked salmon on board a vessel. Salmon caught incidentally in trawl nets while legally fishing under the groundfish FMP are a prohibited species as defined by the groundfish regulations (50 CFR Part 660, Subpart G). However, in cases where the Council determines it is beneficial to the management of the groundfish and salmon resources, salmon bycatch may be retained under the provisions of a Council-approved program which defines the handling and disposition of the salmon. The provisions must specify that salmon remain a prohibited species and, as a minimum, include requirements that allow accurate monitoring of the retained salmon, do not provide incentive for fishers to increase salmon bycatch, and assure fish do not reach commercial markets. In addition, during its annual regulatory process for groundfish, the Council must consider regulations which would minimize salmon bycatch in the monitored fisheries.

6.6.3 Prohibition on Removal of Salmon Heads

No person shall remove the head of any salmon caught in the EEZ, nor possess a salmon with the head removed if that salmon has been marked by removal of the adipose fin to indicate that a coded-wire tag has been implanted in the head of the fish.

6.6.4 Steelhead Prohibition

Persons, other than Indians with judicially-declared rights to do so and legally licensed recreational fishermen, may not take and retain, or possess any steelhead within the EEZ.

6.6.5 Prohibition on Use of Commercial Troll Fishing Gear for Recreational Fishing

No person shall engage in recreational fishing for salmon while aboard a vessel engaged in commercial fishing.

6.6.6 Experimental Fisheries

The Council may recommend that the Secretary allow experimental fisheries in the EEZ for research purposes that are proposed by the Council, federal government, state government, or treaty Indian tribes having usual and accustomed fishing grounds in the EEZ.

The Secretary may not allow any recommended experimental fishery unless he or she determines that the purpose, design, and administration of the experimental fishery are consistent with the goals and objectives of the Council's fishery management plan, the national standards of the Magnuson Fishery Conservation and Management Act, and other applicable law. Each vessel that participates in an approved experimental fishery will be required to carry aboard the vessel the letter of approval, with specifications and qualifications (if any), issued and signed by the Regional Director of NMFS.

6.6.7 Scientific Research

This plan neither inhibits nor prevents any scientific research in the EEZ by a scientific research vessel. The Secretary will acknowledge any notification received regarding scientific research on salmon being conducted by a research vessel. The Regional Director of NMFS will issue to the operator/master of that vessel a letter of acknowledgment, containing information on the purpose and scope (locations and schedules) of the activities. Further, the Regional Director will transmit copies of such letters to the Council and to state and federal fishery and enforcement agencies to ensure that all concerned parties are aware of the research activities.

7 DATA NEEDS, DATA COLLECTION METHODS, AND REPORTING REQUIREMENTS

Successful management of the salmon fisheries requires considerable information on the fish stocks, the amount of effort for each fishery, the harvests by each fishery, the timing of those harvests, and other biological, social, and economic factors. Much of the information must come from the ocean fisheries; other data must come from inside fisheries, hatcheries, and spawning grounds. Some of this information needs to be collected and analyzed daily, whereas other types need to be collected and analyzed less frequently, maybe only once a year. In general, the information can be divided into that needed for inseason management and that needed for annual and long-term management. The methods for reporting, collecting, analyzing, and distributing information can be divided similarly.

7.1 INSEASON MANAGEMENT

7.1.1 Data Needs

Managers require certain information about the fisheries during the season if they are to control the harvests to meet established quotas and goals. If conditions differ substantially from those expected, it may be necessary to modify the fishing seasons, quotas, or other management measures. The following information is useful for inseason management:

a. harvest of each species by each fishery in each fishing area by day and by cumulative total;

b. number of troll day boats and trip boats fishing;

c. estimated average daily catch for both day and trip boats;

d. distribution and movement of fishing effort;

e. average daily catch and effort for recreational fishery;

f. estimates of expected troll fishing effort for the remainder of the season;

g. information on the contribution of various fish stocks, determined from recovered coded-wire tags, scales, or other means.

7.1.2 Methods for Obtaining Inseason Data

Inseason management requires updating information on the fisheries daily. Thus, data will be collected by sampling the landings, aerial surveys, radio reports, and telephone interviews.

In general, data necessary for inseason management will be gathered by one or more of the following methods. Flights over the fishing grounds will be used to obtain information on the distribution, amount, and type of commercial fishing effort. Data on the current harvests by commercial and Indian ocean fishermen will be obtained by telephoning selected (key) fish buyers, by sampling the commercial landings on a daily basis, and from radio reports. Data on the current effort of, and harvests by, the recreational fisheries will be obtained by telephoning selected charter boat and boat rental operators and by sampling landings at selected ports. Analyses of fish scales, recovered fish tags, and other methods will provide information on the composition of the stocks being harvested.

7.2 ANNUAL AND LONG-TERM MANAGEMENT

7.2.1 Data Needs

In addition to the data used for inseason management, a considerable amount of information is used for setting the broad measures for managing the fishery, evaluating the success of the previous year's management, and evaluating the effectiveness of the plan in achieving the long-term goals. Such data include landings, fishing effort, dam counts, smolt migration, returns to hatcheries and natural spawning areas, stock contribution estimates, and economic information.

7.2.2 Methods for Obtaining Annual and Long-Term Data

In addition to those methods used for collecting data for in-season management, the longer term data will be collected by the use of (a) fish tickets (receipts a fish buyer completes upon purchasing fish from a commercial fisherman), (b) log books kept by commercial fishermen and submitted to the state fishery management agencies at the end of the season, and (c) catch record cards completed by a recreational fisherman each time he catches a fish to show location, date, and species and submitted to the state agency, either when the whole card is completed or at the end of the season.

The local fishery management authorities (states, Indian tribes) will collect the necessary catch and effort data and will provide the Secretary with statistical summaries adequate for management. The local management authorities, in cooperation with the National Marine Fisheries Service, will continue the ongoing program of collecting and analyzing data from salmon processors.

Data on spawning escapements and jack returns to public and private hatcheries, other artificial production facilities, and natural spawning grounds will be collected by the accepted methods now being used by those authorities. The methods used to collect these data should be identified and available to the public.

7.3 REPORTING REQUIREMENTS

This plan authorizes the local management authorities to determine the specific reporting requirements for those groups of fishermen under their control and to collect that information under existing state data-collection provisions. With one exception, no additional catch or effort reports will be required of fishermen or processors as long as the data collection and reporting systems operated by the local authorities continue to provide the Secretary with statistical information adequate for management. The one exception would be to meet the need for timely and accurate assessment of inseason management data. In that instance the Council may annually recommend implementation of regulations requiring brief radio reports from commercial salmon fishermen who leave a regulatory area in order to land their catch in another regulatory area open to fishing. The federal or state entities receiving these radio reports would be specified in the annual regulations.

8 SCHEDULE AND PROCEDURES FOR ANALYZING THE EFFECTIVENESS OF THE SALMON FMP

To effectively manage the salmon fisheries, the Council must monitor the status of the resource and the fisheries harvesting that resource to make sure that the goals and objectives of the plan are being met. Fishery resources vary from year to year depending on environmental factors, and fisheries vary from year to year depending on the state of the resource and social and economic factors. The Council must ensure that the plan is flexible enough to accommodate regulatory changes that will allow the Council to achieve its biological, social, and economic goals.

Annually, the STT will review the previous season's commercial, recreational, and tribal Indian fisheries and evaluate the performance of the plan with respect to achievement of the framework management objectives (Chapters 2, 3, and 5). Consideration will be given by the STT to the following areas:

1. Allowable harvests
2. Escapement goals, natural and hatchery
3. Mixed-stock management
4. Federally recognized tribal fishing rights
5. Allocation goals
6. Mortality factors, including bycatch
7. Achievement of optimum yield
8. Effort management systems
9. Coordination with all management entities
10. Consistency with international treaties
11. Comparison with previous seasons
12. Progress of any Council-adopted recovery plan
13. ESA consultation standards
14. Annual catch limits
15. Stock status based on the SDC identified in this FMP

This evaluation will be submitted annually for review by the Salmon Advisory Subpanel, SSC, and the Council.

Additionally, at various Council meetings, the Habitat Committee and state and tribal management entities will help keep the Council apprised of achievements and problems with regard to the protection and improvement of the environment (i.e., essential fish habitat) and the restoration and enhancement of natural production.

During the Council's annual preseason salmon management process, issues may arise which indicate a need to consider changes to the fixed elements of the FMP. Such issues may be considered in FMP amendments on an as needed basis under the guidelines of Chapter 11.

9 SCHEDULE AND PROCEDURES FOR PRESEASON MODIFICATION OF REGULATIONS

The process for establishing annual or preseason management measures under the framework FMP contains a nearly equivalent amount of analysis, public input, and review to that provided under the former annual amendment process and will not require annual preparation of a supplemental environmental impact statement (SEIS) and regulatory impact review/regulatory flexibility analysis (RIR/RFA). This allows the Salmon Technical Team to wait to prepare its report until all of the data are available, thus eliminating the need to discuss an excessively broad range of options as presented prior to the framework plan.

The process and schedule for setting the preseason regulations will be approximately as follows:

Approximate Date	Action
First week of March	Notice published in the Federal Register announcing the availability of team and Council documents, the dates and location of the two Council meetings, the dates and locations of the public hearings, and publishing the complete schedule for determining proposed and final modifications to the management measures. Salmon Technical Team reports which review the previous salmon season, project the expected salmon stock abundance for the coming season, and describe any changes in estimation procedures, are available to the public from the Council office.
First or second full week of March[a/]	Council and advisory entities meet to adopt a range of season regulatory options for formal public hearing. Proposed options are initially developed by the Salmon Advisory Subpanel and further refined after analysis by the STT, public comment, and consideration by the Council.
Following March Council meeting	Council newsletter, public hearing announcement, and STT/Council staff report are released which outline and analyze Council-adopted options. The STT/staff report includes a description of the options, brief rationale for their selection, and an analysis of expected biological and economic impacts.
Last week of March or first week of April	Formal public hearings on the proposed salmon management options.
First or second full week of April[a/]	Council and advisory entities meet to adopt final regulatory measure recommendations for implementation by the Secretary of Commerce.
First week of May	Final notice of Secretary of Commerce decision and final management measures in Federal Register.
May 15	Close of public comment period.

a/ Scheduling of the March and April Council meetings is determined by the need to allow for complete availability of pertinent management data, provide time for adequate public review and comment on the proposed options, and afford time to process the Council's final recommendations into federal regulations by May 1. Working backward from the May 1 implementation date, the April Council meeting is generally set as late as possible while not extending past April 12 for approval of final salmon management recommendations. The March Council meeting is set as late as possible while ensuring no less than three to four weeks between the end of the March meeting and beginning of the April meeting.

The actions by the Secretary after receiving the preseason regulatory modification recommendations from the Council will be limited to accepting or rejecting in total the Council's recommendations. If the Secretary rejects such recommendations he or she will so advise the Council as soon as possible of such action along with the basis for rejection, so that the Council can reconsider. Until such time as the Council and the Secretary can agree upon modifications to be made for the upcoming season, the previous year's regulations will remain in effect. This procedure does not prevent the Secretary from exercising his authority under Sections 304(c) or 305(c) of the Magnuson Act and issuing emergency regulations as appropriate for the upcoming season.

Preseason actions by the Secretary, following the above procedures and schedule, would be limited to the following:

1. Specify the annual abundance, total allowable harvest, and allowable ocean harvest.

2. Allocate ocean harvest to commercial and recreational fishermen and to treaty Indian ocean fishermen where applicable.

3. Review ocean salmon harvest control mechanism from previous year; make changes as required in:

   a. Management area boundaries
   b. Minimum harvest lengths
   c. Recreational daily bag limits
   d. Gear requirements (i.e., barbless hooks, etc.)
   e. Seasons and/or quotas
   f. Ocean regulations for treaty Indian fishermen
   g. Inseason actions and procedures to be employed during the upcoming season

Because the harvest control measures and restrictions remain in place until modified, superseded, or rescinded, changes in all of the items listed in "3" above may not be necessary every year. When no change is required, intent not to change will be explicitly stated in preseason decision documents.

The Framework Amendment (1984) provides further rationale for the current preseason procedures and the replacement of the old process of annual plan amendments to establish annual regulations.

10 INSEASON MANAGEMENT ACTIONS AND PROCEDURES

Inseason modifications of the regulations may be necessary under certain conditions to fulfill the Council's objectives. Inseason actions include "fixed" or "flexible" actions as described below.

10.1 FIXED INSEASON ACTIONS

Three fixed inseason actions may be implemented routinely as specifically provided in the subsections below.

10.1.1 Automatic Season Closures When the Quotas Are Reached

The Salmon Technical Team will attempt to project the date a quota will be reached in time to avoid exceeding the quota and to allow adequate notice to the fishermen. The State Directors and the Council Chairman will be consulted by the NMFS Regional Director before action is taken to close a fishery. Closures will be coordinated with the states so that the effective time will be the same for EEZ and state waters. A standard closure notice will be used and will specify areas that remain open as well as those to be closed. To the extent possible, all closures will be effective at midnight and a 48-hour notice will be given of any closure. When a quota is reached, the Regional Director will issue a notice of closure of the fishery through local news media at the same time that a notice of fishery closure is published in the *Federal Register*.

10.1.2 Rescission of Automatic Closure

If, following the closing of a fishery after a quota is reached, it is discovered that the actual catch was over-estimated and the season was closed prematurely, the Secretary is authorized to reopen the fishery if:

1. The shortfall is sufficient to allow at least one full day's fishing (24 hours) based on the best information available concerning expected catch and effort; and

2. The unused portion of the quota can be taken before the scheduled season ending.

10.1.3 Adjustment for Error in Preseason Estimates

The Secretary may make changes in seasons or quotas if a significant computational error or errors made in calculating preseason estimates of salmon abundance have been identified; provided that such correction to a computational error can be made in a timely fashion to affect the involved fishery without disrupting the capacity to meet the objectives of the management plan. Such correction and adjustments to seasons and quotas will be based on a Council recommendation and Salmon Technical Team analysis.

10.2 FLEXIBLE INSEASON ACTIONS

Fishery managers must determine that any inseason adjustment in management measures is consistent with ocean escapement goals, conservation of the salmon resource, any federally recognized Indian fishing rights, and the ocean allocation scheme in the framework FMP. In addition, all inseason adjustments must be based on consideration of the following factors:

- Predicted sizes of salmon runs

- Harvest quotas and hooking mortality limits for the area and total allowable impact limitations if applicable

- Amount of the recreational, commercial, and treaty Indian fishing effort and catch for each species in the area to date

- Estimated average daily catch per fisherman
- Predicted fishing effort for the area to the end of the scheduled season
- Other factors as appropriate (particularly, fisher safety affected by weather or ocean conditions as noted in Amendment 8)

Flexible inseason provisions must take into consideration the factors and criteria listed above and would include, but not be limited to, the following.

1. Modification of quotas and/or fishing seasons would be permitted. Redistribution of quotas between recreational and commercial fisheries would be allowed if the timing and procedure are described in preseason regulations. If total quotas or total impact limitations by fishery are established, subarea quotas north and south of Cape Falcon, Oregon can be redistributed within the same fishery. Other redistributions of quotas would not be authorized. Also allowable would be the establishment of new quotas and/or seasons, and establishment of, or changes to, hooking mortality and/or total allowable impact limitations during the season. Action based on revision of preseason abundance estimates during the season would be dependent on development of a Council approved methodology for inseason abundance estimation.

2. Modifications in the species which may be caught and landed during specific seasons and the establishment or modification of limited retention regulations would be permitted (e.g., changing from an all-species season to a single-species season, or requiring a certain number of one species to be caught before a certain number of another species can be retained).

3. Changes in the recreational bag limits and recreational fishing days per calendar week would be allowed.

4. Establishment or modification of gear restrictions would be authorized.

5. Modification of boundaries, including landing boundaries, and establishment of closed areas would be permitted.

6. Temporary adjustments for fishery access due to weather, adverse oceanic conditions or other safety considerations (see Council policy of September 18, 1992 regarding implementation of this action).

The flexibility of these inseason management provisions requires responsibility to assure that affected users are adequately informed and have had the opportunity for input into potential inseason management changes.

10.3 PROCEDURES FOR INSEASON ACTIONS

1. Prior to taking any inseason action, the Regional Director will consult with the Chairman of the Council and the appropriate State Directors.

2. As the actions are taken by the Secretary, the Regional Director will compile, in aggregate form, all data and other information relevant to the action being taken and shall make them available for public review during normal office hours at the Northwest Regional Office, National Marine Fisheries Service, 7600 Sand Point Way NE, Seattle, Washington 98115.

3. Inseason management actions taken under both the "fixed" and "flexible" procedures will become effective by announcement in designated information sources (rather than by filing with the Office of

the Federal Register [OFR]). Notice of inseason actions will still be filed with the OFR as quickly as possible.

The following information sources will provide actual notice of inseason management actions to the public: (1) the U.S. Coast Guard "Notice to Mariners" broadcast (announced over Channel 16 VHF-FM and 2182 KHZ); (2) state and federal telephone hotline numbers specified in the annual regulations and (3) filing with the *Federal Register*. Identification of the sources will be incorporated into the preseason regulations with a requirement that interested persons periodically monitor one or more source. In addition, all the normal channels of informing the public of regulatory changes used by the state agencies will be used.

4. If the Secretary determines, for a good cause, that a notice must be issued without affording a prior opportunity for public comment, public comments on the notice will be received by the Secretary for a period of 15 days after the effective date of the notice.

11 SCHEDULE AND PROCEDURES FOR FMP AMENDMENT AND EMERGENCY REGULATIONS

Modifications not covered within the framework mechanism will require either an FMP amendment or emergency Secretarial action. The amendment process generally requires at least a year from the date of the initial development of the draft amendment by the Council. In order for regulations implementing an amendment to be in place at the beginning of the general fishing season (May 1), the Council will need to begin the process by no later than April of the previous season. It is not anticipated that amendments will be processed in an accelerated December-to-May schedule and implemented by emergency regulations.

Emergency regulations may be promulgated without an FMP or FMP amendment. Depending upon the level of controversy associated with the action, the Secretary can implement emergency regulations within 20 days to 45 days after receiving a request from the Council. Emergency regulations can include non-resource emergencies and are generally in effect for 180 days. A second 180-day extension is possible if the public has had an opportunity to comment on the emergency regulation and the Council is actively preparing a plan amendment or proposed regulations to address the emergency on a permanent basis.

Part of the process for evaluating all future FMP amendment proposals will be to consider whether they will result in the need for temporary adjustments for fishery access due to weather, adverse oceanic conditions, or other safety considerations.

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PACIFIC COAST
SALMON ~~PLAN~~

FISHERY MANAGEMENT PLAN

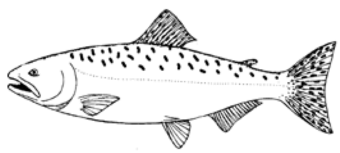
FOR

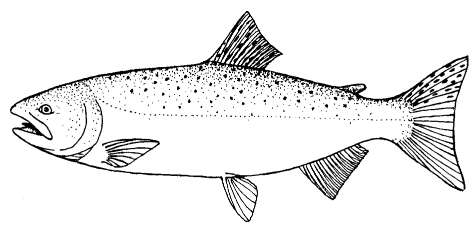
COMMERCIAL AND RECREATIONAL SALMON FISHERIES

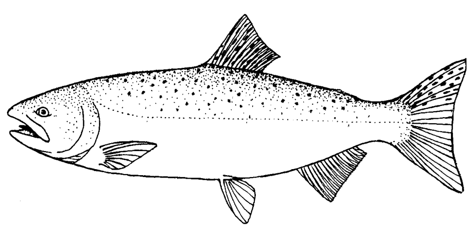
OFF THE COASTS OF WASHINGTON, OREGON, AND CALIFORNIA

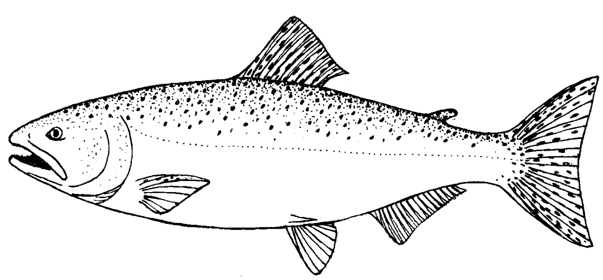
AS REVISED THROUGH AMENDMENT ~~15~~16

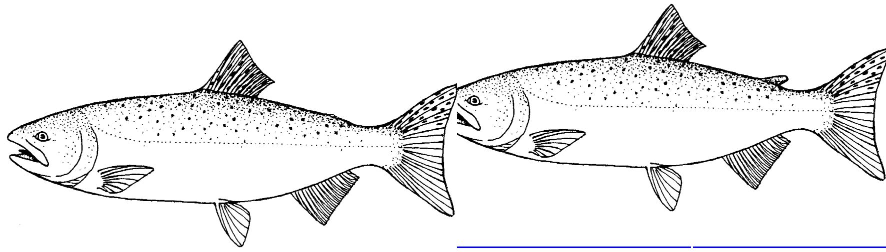
(Effective ~~February 2008~~January 2012)

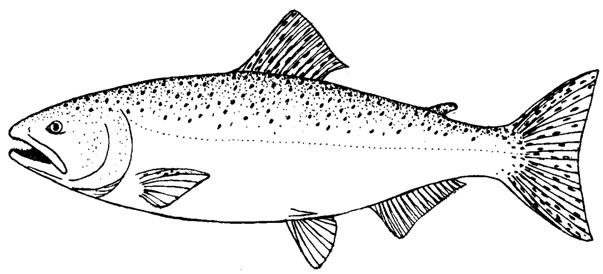












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LIST OF ACRONYMS AND ABBREVIATIONS

ABC	acceptable biological catch
ACL	annual catch limit
AEQ	adult equivalent
AM	accountability measure
ASETF	Anadromous Salmonid Environmental Task Force
~~CDFG~~	~~California Department of Fish and Game~~
CRFMP	Columbia River Fish Management Plan
Council	Pacific Fishery Management Council
CVF	Central Valley fall (Chinook stock complex)
EA	Environmental Assessment
EEZ	exclusive economic zone (three to 200 miles offshore)
EIS	Environmental Impact Statement
ESA	Endangered Species Act
EFH	essential fish habitat
ESU	Evolutionarily significant unit
F	instantaneous rate of fishing mortality
FAB	Fisheries Advisory Board (established in *U.S. v. Washington*)
FNMC	far-north migrating coastal (Chinook stock complex)
FMP	fishery management plan
FR	Federal Register
FRAM	Fishery Regulation Assessment Model
HC	Habitat Committee
~~KMZ~~	~~Klamath Management Zone~~
~~KRSMG~~KRFC	Klamath River ~~Salmon Management Plan~~fall Chinook
KRTT	Klamath River Technical Team
~~Magnuson-Stevens Act~~	~~Magnuson-Stevens Fishery Conservation and Management Act~~
MFMT	maximum fishing mortality threshold
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSP	maximum sustainable production
MSST	minimum stock size threshold
MSY	maximum sustainable yield
N	abundance of fish in numbers
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
~~NPPA~~	~~Northwest Power Planning Act~~
OCN	Oregon coastal natural coho
ODFW	Oregon Department of Fish and Wildlife
OFL	overfishing limit
OFR	Office of the Federal Register
OPI	Oregon Production Index
OY	optimum yield
PFMC	Pacific Fishery Management Council
PSC	Pacific Salmon Commission
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
S	number of adult spawners
SAS	Salmon Advisory Subpanel

Secretary	Secretary of Commerce
SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
SONC	Southern Oregon/Northern California (Chinook stock complex)
SRFC	Sacramento River fall Chinook

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

SRFCRT	Sacramento River Fall Chinook Review Team
SSC	Scientific and Statistical Committee
STT	Salmon Technical Team
TAC	total allowable catch
~~TALFF~~	~~total allowable level of foreign fishing~~
WDF	Washington Department of Fisheries
WDFW	Washington Department of Fish and Wildlife

INTRODUCTION

This document is the *Pacific Coast Salmon Fishery Management Plan*, a fishery management plan (FMP) of the Pacific Fishery Management Council (Council or PFMC) as revised and updated for implementation in ~~2008.~~2012 and beyond. It guides management of commercial and recreational salmon fisheries off the coasts of Washington, Oregon, and California.

Since 1977, salmon fisheries in the exclusive economic zone (EEZ) (three to 200 miles offshore) off Washington, Oregon, and California have been managed under salmon ~~fishery management plans (FMP)~~FMPs of the Council. Creation of the Council and the subsequent development and implementation of these plans were initially authorized under the Fishery Conservation and Management Act of 1976. This act, now known as the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; MSA), was amended by the Sustainable Fisheries Act (SFA) in 1996, and most recently amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA) in 2007. The plan presented in this document contains or references all the elements required for an FMP under the MSA. It completely replaces the 1999 version of the *Pacific Coast Salmon Plan*.

The Council's first salmon FMP and its environmental impact statement (EIS) were issued to govern the 1977 salmon season. A new salmon management plan and EIS were issued in 1978 to replace the 1977 documents. To establish management measures from 1979 through 1983, the 1978 FMP was amended annually and published along with a supplemental EIS (SEIS) and Regulatory Impact Review/Regulatory Flexibility Analysis (RIR/RFA). This annual process was lengthy, complex, and costly. It lacked a long-range perspective and was too cumbersome to allow for timely implementation of the annual regulations and efficient fishery management. Therefore, in 1984, the Council adopted a comprehensive framework amendment that was designed to end the need for annual plan amendments and supplemental EISs (PFMC 1984).

The comprehensive framework plan amendment of 1984 (Amendment 6) replaced the 1978 plan as the base FMP document and established a framework of fixed management objectives with flexible elements to allow annual management measures to be varied to reflect changes in stock abundance and other critical factors. Subsequently, at irregular intervals, the Council has developed various amendments to portions of the framework plan to address specific management issues raised by participants in the salmon management process or as necessary to respond to reauthorization of the ~~original Fishery Conservation and Management Act of 1976.~~MSA. The next seven amendments adopted since implementation of the framework FMP in 1984 were accompanied by an environmental assessment (EA). Amendment 14 was accompanied by an SEIS. ~~The most recent, Amendment 15, was~~Amendments 15 and 16 were accompanied by an EA.

The primary amendment issues since 1984 have included specific spawner escapement goals for Oregon coastal natural (OCN) coho and Klamath River fall Chinook (Amendments 7, 9, 11, 13, and 15), non-Indian harvest allocation (Amendments 7, 9, 10, and 14), inseason management criteria (Amendment 7), habitat and essential fish habitat (EFH) definition (Amendments 8 and 14), safety (Amendment 8), ~~a definition of overfishing~~status determination criteria (SDC) (Amendments 10, 14, and ~~14~~16), management objectives for stocks listed under the Endangered Species Act (ESA) (Amendments 12 and 14), bycatch reporting and priorities for avoiding bycatch (Amendment 14), ~~and~~ selective fisheries (Amendment 14), stock classification (Amendment 16), annual catch limits (ACLs) and accountability measures (AMs) (Amendment 16), *de minimis* fishing provisions (Amendments 15 and 16).

In 1996, as part of Amendment 12, the Council made an editorial update to the framework FMP that included incorporating all of the amendments after 1984 into the *Pacific Coast Salmon Plan* (PFMC

1997b). Subsequently, the Council modified the OCN coho management goals under Amendment 13 in 1999 (PFMC 1999~~).~~) and established *de minimis* fishing provisions for Klamath river fall Chinook under Amendment 15 (PFMC 2007). The current salmon FMP incorporates changes through Amendment ~~15~~16, including ~~Amendment~~Amendments 14 (PFMC 2000a~~), an~~) and 16 (PFMC 2011e) extensive ~~revision~~revisions of the FMP primarily to respond to reauthorization of the ~~SFA~~MSA and to improve the readability and organization of the plan. Table 1 contains a complete listing of the issues in each amendment through Amendment ~~15~~16.

This document is the current salmon FMP. Appendix A contains the complete description of essential fish habitat, Appendix B provides a description of the fishery, and Appendix C, which will always be the ~~Council=s~~Council's most current annual review of the ocean fisheries, provides an annual updating of the fishery information. The reader may wish to refer to the original salmon FMP and individual amendment documents for more background and explanatory information, including the environmental impact assessments, EISs, and examples of management options not adopted by the Council.

TABLE 1. Record of salmon FMP documents.

DOCUMENT	CONTENT SUMMARY
Final 1977 Plan	Initial FMP/EIS document for the 1977 salmon season.
Final 1978 Plan (43 FR 29791, July 11, 1978) Effective July 11, ~~1978~~[1] 1978[a/]	Initial, comprehensive FMP/EIS document. Amended each year to establish annual management measures for 1979-1983.
Final Framework Amendment (49 FR 43679, Oct. 31, 1984) Effective Nov. 25, ~~1984~~[1] 1984[b/]	Comprehensive amendment and SEIS that replaced the 1978 Plan as a multi-year FMP document.
Technical amendments:	1) Spawner escapement goals, procedures to modify spawner goals, and inseason modification of daily bag limits (50 FR 812, Jan. 7, 1985) 2) Inseason rescission of automatic closures (50 FR 4977, Feb. 5, 1985) 3) Season opening and closing dates (50 FR 42529, Oct. 21, 1985)
Amendment 7 (52 FR 4146, Feb. 10, 1987) Effective Mar. 8, 1987	1) Sliding scale OCN coho spawner escapement goal 2) Inseason management actions and procedures 3) Coho harvest allocation south of Cape Falcon
Amendment 8 (53 FR 30285, Aug. 11, 1988) Effective Aug. 8, 1988; required no implementing regulations	1) Habitat policy and objectives 2) Consideration of temporary season adjustments for vessels precluded from harvesting due to unsafe weather
Amendment 9 (54 FR 19185, May 4, 1989) Effective May 1, 1989; except radio report section implemented July 13, 1989 (54 FR 29730, July 14, 1989)	1) Klamath River fall Chinook harvest rate spawner escapement goal 2) Commercial/recreational harvest allocation north of Cape Falcon 3) Inseason notice procedures 4) Steelhead management intent 5) Radio reporting requirements for commercial fishers 6) Deleted limitations on season opening and closing dates
Clarifying letter:	to Mr. Rolland Schmitten re harvest allocation, Issue 2; Feb. 27, 1989
Technical amendment:	Minor modification of Klamath spawner goal based on Council recommendation, March 8, 1989 (54 FR 19800, May 8, 1989 and 59 FR 23000, May 4, 1994)
Amendment 10 (56 FR 26774, June 11, 1991) Effective July 11, 1991	1) Inseason reallocation objectives for commercial and recreational fisheries south of Cape Falcon 2) Criteria guiding non-Indian catch allocation north of Cape Falcon, especially concerning recreational port allocation 3) Definition of overfishing
Amendment 11 (59 FR 23013, May 4, 1994) Effective April 29, 1994	OCN coho spawner escapement goal of 42 spawners/mile, incidental exploitation rate of 20% or less on OCN coho at low stock sizes and sport coho harvest allocation criteria at low harvest levels.
Clarifying letter:	to Mr. Gary Smith re incidental harvest and sport allocation; Apr. 15, 1994
Technical amendment:	Minor modification of Klamath spawner goal to meet tribal allocation based on Council recommendation of April 11, 1996 (61 FR 20186, May 6, 1996)
Amendment 12 (62 FR 35450, July 1, 1997) Effective July 31, 1997	1) Procedures governing retention of salmon bycatch in trawl nets 2) Management objectives for ESA listed salmon species 3) Update of the salmon FMP (no change in management objectives)

DOCUMENT	CONTENT SUMMARY
Amendment 13 (64 FR 26328, May 14, 1999) Effective June 14, 1999)	Revision of management objectives for OCN coho to increase the probability of recovery and to prevent listing under the ESA.
Amendment 14 66 FR 29238, May 30, 2001; Effective June 29, 2001)	5) Update of the EIS and editorial improvements in the plan 6) New requirements of the SFA, including essential fish habitat, optimum yield, overfishing, and bycatch 7) Clarification of the stocks managed and management objectives 8) Minor revision of allocation north of Cape Falcon to allow more harvest in selective fisheries
Amendment 15 (73 FR 9960, February 25, 2008; Effective March 26, 2008)	Revision of Council action required under a Conservation Alert for Klamath River fall Chinook to allow *de minimis* fisheries.
Amendment 16 (Effective January 1, 2012)	8) Application of new requirements of the MSA as amended in 2007 and revised NS1 Guidelines 9) Stock classification 10) Establishment of ACLs and AMs 11) Acceptable biological catch and incorporating scientific uncertainty 12) Revision of status determination criteria 13) Characterization of stock conservation objectives related to reference points 14) Development and modification of *de minimis* fishing provisions.

a/ Implemented by emergency regulation on April 14, 1978 (43 FR 15629) and May 24, 1978 (43 FR 22214).
b/ Implemented by emergency regulation on May 3, 1984 (49 FR 18853; May 3, 1984).

1 WHAT THE PLAN COVERS

> ~~A~~"*It is therefore declared to be the purposes of the Congress in this Act*~~*B(*~~ *(1) to take immediate action to conserve and manage the fishery resources found off the coasts of the United States, and the anadromous species and Continental Shelf Fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone . . ., and (B) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species and Continental Shelf fishery resources . . .(7) to promote the protection of essential fish habitat in the review of projects conducted under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat*~~*.@*~~*."*
>
> *Magnuson-Stevens Act, ' 2*(b)

This fishery management plan (FMP) covers the coastwide aggregate of natural and hatchery salmon species that is contacted by salmon fisheries in the exclusive economic zone (EEZ) off the coasts of Washington, Oregon, and California. Salmon of U.S. and Canadian origin are included except when specific species are managed in those waters by another management entity with primary jurisdiction (i.e., sockeye and pink salmon by the Fraser River Panel of the Pacific Salmon Commission (PSC) in the Fraser River Panel Area (U.S.) between 49~~E~~°N latitude and 48~~E~~°N latitude). In addition, the plan contains requirements and recommendations with regard to essential fish habitat for the managed stocks as described in Chapter~~-~~ 4 and Appendix A. The essential fish habitat includes marine areas within the EEZ as well as estuarine and freshwater habitat within the internal waters of Washington, Oregon, California, and Idaho.

Chinook or king salmon (*Oncorhynchus tshawytscha*) and coho or silver salmon (*O. kisutch*) are the main species caught in Council-managed ocean salmon fisheries. In odd-numbered years, catches of pink salmon (*O. gorbuscha*) can also be significant, primarily off Washington and Oregon (~~Salmon Technical Team [STT] 1999a).~~PFMC 2011a). Therefore, while all species of salmon fall under the jurisdiction of this plan, it currently contains fishery management objectives only for Chinook, coho, pink (odd-numbered years only), and any salmon species listed under the Endangered Species Act (ESA) that is measurably impacted by Council fisheries. ~~To the extent practicable, the Council has partitioned this coastwide aggregate of Chinook, coho, and pink salmon into various stock components with specific conservation objectives. A detailed listing of the individual stocks or stock complexes managed under this plan, along with pertinent stock information and conservation objectives, is provided in Chapter 3.~~

The plan contains no fishery management objectives for even-numbered year pink salmon, chum (*O. keta*), sockeye (*O. nerka*), steelhead (*O. mykiss*), ~~or~~ sea-run cutthroat (*O. clarki*) or spring run Chinook from the mid-Columbia River tributaries (White Salmon, Klickitat, Yakima, Deschutes, John Day, Umatilla, and Walla Walla basins). The Council does not manage fisheries for these species and incidental catches are inconsequential (low hundreds of fish each year) to very rare (~~Appendix A of STT 1997).~~PFMC 2011e). In the event this situation should change, management objectives for these species could be developed and incorporated by plan amendment. The incidental harvest of these salmon species can be allowed or restricted under existing federal fishery regulations.

1.2 STOCK CLASSIFICATION

The MSA requires that an FMP describe the species of fish involved in the fishery. The NS1 Guidelines provide a structure for classifying stocks in and around the fishery, and organizing stock complexes. This classification scheme helps conceptualize how the fishery operates, which stocks are affected by various fishery sectors, and how SDC and ACL provisions, among other MSA Section 303(a) provisions, may be applied.

The stocks identified in an FMP are classified as in or out of the fishery, and as target or non-target stocks. Target stocks and some non-target stocks are in the fishery; ecosystem component (ECs) stocks are non-target stocks that are not in the fishery. Individual stocks can also be formed into stock complexes for management and assessment purposes. Stock complexes are groups of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impacts of management actions on the stocks are similar. Stock complexes may be formed to facilitate management requirements such as setting ACLs in a mixed stock fishery. Each stock complex could have one or more indicator stocks to establish annual harvest constraints based on status of those indicator stocks.

To the extent practicable, the Council has partitioned the coastwide aggregate of Chinook, coho, and pink salmon into various stock components and complexes with specific conservation objectives. A detailed listing of the individual stocks and stock complexes managed under this plan are provided in Tables 1-1, 1-2, and 1-3. Stocks designated as hatchery stocks rely on artificial production exclusively, while those designated as natural stocks have at least some component of the stock that relies on natural production, although hatchery production and naturally spawning hatchery fish may contribute to abundance and spawning escapement estimates.

1.2 Changes or Additions

The following classification actions will require an FMP amendment: adding stocks to the FMP either to the fishery or as EC species, removing stocks from the FMP, and reclassifying stocks as either in the fishery or as an EC species. The following actions will not require an FMP amendment as long as the stocks and complex remain in their original designation (in the fishery or EC): composition of stock complexes, specification of indicator stocks for complexes, identification as target or non-target stocks. All of these actions require a comprehensive technical review of the best scientific information available providing evidence that, in the view of the Salmon Technical Team (STT), Scientific and Statistical Committee (SSC), and the Council, such modifications are justified. Insofar as possible, proposed changes noted above that do not require a plan amendment will be reviewed and approved within the schedule established for salmon estimation methodology reviews and prior to the preseason planning process. The following actions will not require an FMP amendment: changes or additions involving ESA-listed stocks upon the recommendation of NMFS, changes or additions involving hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities; and Federal court-ordered changes.

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 1of 4)

Stocks and Complexes In The Fishery		**Description**	**Target/Non-Target**
Stock or Stock Complex	**Component Stocks**		
Central Valley Fall Chinook Stock Complex		Fall and late fall Chinook from the Sacramento and San Joaquin basins; the indicator stock is Sacramento River Fall Chinook.	-
-	Sacramento River Fall	Primarily hatchery stock with smaller natural component. Single largest contributor to ocean fisheries off California, a significant contributor off southern and central Oregon, and present north into British Columbia. Primary impact south of Pt. Arena; considerable overlap with coastal and Klamath River fall Chinook between Pt. Arena and Horse Mt.	Target
	Sacramento River Late Fall	Natural and hatchery components from upper Sacramento basin. Minor contributions to ocean fisheries.	Target
	San Joaquin River Fall	Natural and hatchery components. Minor contributions to ocean fisheries.	Target
Sacramento River Spring		ESA listed Threatened. Minor contributions to ocean fisheries off California, also known to occur off Oregon.	Non-Target ESA
Sacramento River Winter		ESA listed Endangered. Minor contributions to ocean fisheries south of Pt. Arena.	Non-Target ESA
California Coastal Chinook		ESA listed Threatened. Eel, Mattole, Mad Rivers fall and spring stocks. Minor contributions to ocean fisheries off northern California and southern Oregon.	Non-Target ESA
Southern Oregon Northern California Chinook Stock Complex		Natural and hatchery stocks south of the Elk River, Oregon to, and including, the Klamath River, plus Umpqua River spring Chinook; the indicator stock is Klamath River fall Chinook.	-
-	Klamath River Fall	Natural and hatchery components from the Klamath basin. Major contributions to ocean fisheries from Humbug Mt. to Horse Mt. and to Klamath River tribal and recreational fisheries. Significant contributions to ocean fisheries from Cape Falcon to Pt. Sur.	Target
	Klamath River - Spring	Natural and hatchery components from the Klamath basin. Minor contributions to ocean fisheries from Cape Falcon to Pt. Sur.	Non-Target
	Smith River	Natural spring and fall stocks from the Smith River basin. Minor contributions to ocean fisheries off northern California and Oregon.	Non-Target
	Southern Oregon	Aggregate of natural and hatchery fall and spring stocks in all streams south of Elk River, plus Umpqua spring stock; Rogue River fall stock is used to indicate relative abundance and ocean contribution rates. Significant contributions to ocean fisheries off northern California and Oregon.	Target

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 2 of 4)

Stocks and Complexes In The Fishery		Description	Target/Non-Target
Stock or Stock Complex	Component Stocks		
Far-North-Migrating Coastal Chinook Stock Complex		Spring/summer and fall stocks from the Central and Northern Oregon Coast (from the Elk River north, except Umpqua River spring Chinook), and spring/summer and fall coastal stocks north of the Columbia River. Indicator stocks for this complex are Quillayute, Hoh, Queets, and Grays Harbor fall Chinook. These stocks are subject to provisions of the Pacific Salmon Treaty.	
	Central and Northern Oregon	Aggregate of natural and hatchery fall and spring stocks in all streams from the Elk River to just south of the Columbia River. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off northern Oregon and Washington.	Non-Target
	Willapa Bay Fall (natural)	Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Willapa Bay Fall (hatchery)	Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Grays Harbor Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Grays Harbor Spring	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Quinault Fall	Hatchery stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Queets Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Queets Sp/Su	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Hoh Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Hoh Spring/Summer	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Quillayute Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Quillayute Spring/Summer	Hatchery and natural stocks. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target
	Hoko Summer/Fall	Natural stock. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington.	Non-Target

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 3 of 4)

Stocks and Complexes In The Fishery			
Stock or Stock Complex	**Component Stocks**	**Description**	**Target/Non-Target**
North Lewis River Fall		Natural stock. Component of Lower Columbia Chinook ESU - ESA listed Threatened. Significant contribution to Alaska and Canada ocean fisheries. Minor contribution to ocean fisheries off Washington and northern Oregon.	Non-Target ESA
Columbia Lower River Hatchery Fall		Significant contribution to ocean fisheries north of Cape Falcon and Canada. Minor contribution to ocean fisheries south of Cape Falcon.	Target
Columbia Lower River Hatchery Spring		Minor contribution to ocean fisheries north of Cape Falcon and Canada.	Non-Target
Upper Willamette Spring		Natural and hatchery stock. ESA listed Threatened. Minor contribution to ocean fisheries north of Cape Falcon, Canada, and Alaska.	Non-Target ESA
Columbia Mid-River Bright Hatchery Fall		Hatchery stock, Significant contribution to ocean fisheries off Canada and Alaska.	Non-Target
Columbia Spring Creek Hatchery Fall		Significant contribution to ocean fisheries north of Cape Falcon and Canada. Minor contribution to ocean fisheries south of Cape Falcon.	Target
Snake River Fall		Natural and hatchery stock. ESA listed Threatened. Significant contributions to Alaska and Canada ocean fisheries. Minor contributions to ocean fisheries off Washington and Oregon.	Non-Target ESA
Snake River - Spring/Summer		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Columbia Upper River Bright Fall		Natural and hatchery stock. Significant contribution to Alaska and Canada ocean fisheries. Minor contribution to ocean fisheries off Washington and northern Oregon. Subject to Pacific Salmon Treaty provisions.	Non-Target
Columbia Upper River Summer		Natural and hatchery stock. Significant contribution to Alaska and Canada ocean fisheries. Minor contribution to ocean fisheries off Washington and northern Oregon. Subject to Pacific Salmon Treaty provisions.	Non-Target
Columbia Upper River Spring		Natural and hatchery stock. ESA listed Endangered. Negligible contributions to ocean fisheries.	Non-Target ESA

TABLE 1-1. Chinook stocks and stock complexes identified in the Salmon FMP. (Page 4 of 4)

Stocks and Complexes In The Fishery		**Description**	**Target/Non-Target**
Stock or Stock Complex	**Component Stocks**		
Eastern Strait of Juan de Fuca Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Skokomish Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Nooksack Spring early		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Skagit Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Skagit Spring		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Stillaguamish Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Snohomish Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Cedar River Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
White River Spring		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Green River Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA
Nisqually River Summer/Fall		Natural and hatchery stock. ESA listed Threatened. Negligible contributions to ocean fisheries.	Non-Target ESA

TABLE 1-2. Coho stocks and stock complexes identified in the Salmon FMP. (Page 1 of 2)

Stocks and Complexes In The Fishery **Stock or Stock Complex**	**Description**	**Target/Non-Target**
Central California Coast	ESA Threatened. ~~Very minor component of OPI area fisheries,~~ limited contribution to ocean and inland fisheries. Current impacts incidental in ocean fisheries off California.	Non-Target ESA
Southen Oregon/Northern California Coast	ESA Threatened. Very minor natural component of OPI area fisheries, minor contribution to ocean fisheries off California and southern Oregon, and inland California fisheries.	Non-Target ESA
Oregon Coastal Natural	ESA Threatened. Major natural component of OPI area, significant contribution to ocean fisheries off ~~California,~~ Oregon, and Washington south of Leadbetter Pt., and freshwater fisheries in Oregon coastal streams.	Non-Target ESA
Lower Columbia Natural	ESA Threatened. Minor natural component of OPI area minor contribution to ocean fisheries off Oregon and Washington, and mainstem Columbia River fisheries.	Non-Target ESA
Oregon Coast Hatchery	Minor component of OPI area; minor contributtion to ocean fisheries off Oregon and Washington south of Leadbetter Pt., and freshwater fisheries in Oregon coastal streams.	Target
Columbia River Late Hatchery	Hatchery stock. Major component of ocean fisheries north of Cape Falcon. Significant contribution to ocean fisheries off Oregon north into Canada and Columbia River fisheries	Target
Columbia River Early Hatchery	Hatchery stock. Major component of OPI area fisheries. Significant contributions to ocean fisheries off California and north to Leadbetter Pt., Washington and to Columbia River fisheries.	Target
Willapa Bay - Hatchery	Minor component of ocean fisheries off northern Oregon north into Canada. Significant contribution to inside commercial net and recreational fisheries.	Target
Willapa Bay Natural	Minor component of ocean fisheries off northern Oregon north into Canada.	Target
Grays Harbor	Minor contribution to ocean fisheries off Oregon and north into Canada. Significant contribution to Washington inside tribal fishery, minor contribution to inside recreational fishery.	Target
Quinault - Hatchery	Contribution to ocean fisheries off Washington and north into British Columbia; present south to central Oregon; significance to Puget Sound and tribal fisheries.	Target
Queets	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon; significance to Puget Sound and tribal fisheries.	Target
Quillayute - Summer Hatchery	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon.	Target
Quillayute - Fall	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon.	Target
Hoh	Contribution to ocean fisheries off Washington north into British Columbia; present south to central Oregon.	Target

Table 1-2. Coho stocks and stock complexes identified in the Salmon FMP. (Page 2 of 2)

Stocks and Complexes In The Fishery		
Stock or Stock Complex	**Description**	**Target/Non-Target**
Strait of Juan de Fuca	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Hood Canal	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Skagit	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Stillaguamish	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
Snohomish	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target
South Puget Sound Hatchery	Contribution to U.S. ocean fisheries north of Cape Falcon; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target

TABLE1-3. Pink salmon stocks and stock complexes identified in the Salmon FMP.

Stocks and Complexes In The Fishery		
Stock or Stock Complex	**Description**	**Target/Non-Target**
Puget Sound	Contribution to U.S. ocean fisheries north of Leadbetter Point; significant contribution to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries.	Target

2 ACHIEVING OPTIMUM YIELD

~~A~~"Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery~~@~~"

Magnuson-Stevens Act, National Standard I

This chapter explains the ~~Council=s~~Council's means of meeting the requirements of the Magnuson-Stevens Act to achieve the optimum yield from the salmon fishery.

2.1 THEORY

~~A~~Optimum yield~~@~~ (OY) means the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account protection of marine ecosystems. It is prescribed on the basis of the maximum sustainable yield (MSY) from the fishery, reduced by any relevant economic, social, or ecological factors, and provides for rebuilding of an overfished stock, taking into account the effects of uncertainty and management imprecision.

~~A~~MSY~~@~~ is a theoretical concept that, for the purposes of the Magnuson-Stevens Act, is defined as the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions~~.~~ and fishery technological characteristics, and distribution of catch among fleets. In Council management of naturally spawning salmon stocks, MSY is usually approached in terms of ~~annually achieving~~ the number of adult spawners ~~(conservation objective)~~ associated with this goal~~.~~ (S_{MSY}). Often, data are insufficient to directly estimate ~~the number of spawners resulting in MSY~~S_{MSY}. In these cases, the Council may use MSY proxies derived from more general estimates of productive capacity and implement harvest strategies that may be expected to result in a long-term average catch approximating MSY.

~~MSY can be a difficult concept to use for management purposes for several reasons. First, it is based on a long-term average that can generally only be calculated from historic data, which may not accurately reflect the MSY under present or future ecological and environmental conditions. When negative changes in environmental conditions (both natural and human caused) reduce a stock=s productivity and prevent it from attaining historic MSY levels (even with no harvest impacts), it is difficult to know whether this is simply normal variation or a long-term change. In addition, uncertainties in run-size projections, fishery impacts, and overall management imprecision combine to complicate the estimation and achievement of MSY. To deal with this uncertainty, the Council may establish conservation objectives based on conservative harvest rates with minimum spawner escapement provisions set at the estimated MSY or MSY proxy level, or set the conservation objective at maximum sustainable production (MSP) rather than MSY (e.g., Puget Sound Chinook stocks). In some cases of limited information or significant changes in habitat conditions, the Council may use stepped harvest rates with very limited exploitation rates at low population sizes and/or spawner floors to support conservation and recovery of the stocks while providing data from which to better ascertain the probable MSY or MSY proxy. Conservation objectives for Oregon coastal natural (OCN) coho and Klamath River fall Chinook are examples of this kind of management.~~

2.2 IMPLEMENTATION

The optimum yield to be achieved for species covered by this plan is the total salmon catch and mortality (expressed in numbers of fish) resulting from fisheries within the EEZ adjacent to the States of Washington, Oregon, and California, and in the waters of those states (including internal waters), and

Idaho, that, to the greatest practical extent within pertinent legal constraints, fulfill the ~~plan=s~~plan's conservation and harvest objectives. On an annual basis, the Council recommends management measures to comply with annual catch limits (ACLs) and to achieve the stock conservation objectives for each stock or stock complex, based on the estimated MSY, MSY proxy, ~~MSP,~~maximum sustainable production (MSP), rebuilding schedule, or ESA consultation standard (Chapter 3), while simultaneously seeking to fulfill, to the extent practicable, the harvest and allocation objectives (Chapter 5) that reflect the ~~Council=s~~Council's social and economic considerations. The subsequent catch and mortality resulting under the ~~Council=s~~Council's management recommendations will embody the optimum yield~~ and will be equal to or less than MSY from the fishery~~. The level of total allowable harvest, the relative harvest levels in various management areas, and the species and stock composition of optimum yield will vary annually, depending on the relative abundance and distribution of the various stocks and contingencies in allocation formulas.

The ~~Council=s~~Council's annual ~~ocean~~ Review of Ocean Salmon Fisheries (stock assessment and fishery ~~reviews~~evaluation; SAFE) document and preseason reports (e.g., STT ~~2009a, 2009b, 2009c~~2011a, 2011b, 2011c, and ~~2009d~~2011d) assess and specify the present and historical range of harvests and harvest related mortalities that represent the optimum yield. A similar range of yields can be expected in the future, though further stock declines and listings under the ESA could result in even lower levels than experienced prior to 2009.

3 CONSERVATION

~~A~~"Conservation and management measures shall be based upon the best scientific information available~~.@~~."

Magnuson-Stevens Act, National Standard 2

Conservation of salmon stocks includes determining and reporting individual stock status and establishing conservation objectives and control rules to manage harvest. To facilitate these processes, reference points, defined by the MSA and/or National Standard 1 (NS1) Guidelines are used as benchmarks.

Reference points used in the FMP include:

MFMT: Maximum Fishing Mortality Threshold. Defined in NS1 Guidelines as the level of fishing mortality (F) on an annual basis, above which overfishing is occurring. MFMT is generally less than or equal to F_{MSY}.

OFL: Overfishing Limit. Defined in NS1 Guidelines as the annual amount of catch that corresponds to the estimate of MFMT applied to a stock or complex's abundance, expressed in terms of numbers or weight of fish, and is the catch level above which overfishing is occurring

F_{MSY}: MSY fishing mortality rate. The fishing mortality rate that will, if applied over the long term, would result in MSY. Generally corresponds to MFMT.

ABC: Acceptable Biological Catch. Required by the MSA and defined in the NS1 Guidelines as the level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of OFL and other scientific uncertainty, and should be specified based on the ABC control rule. ABC may not exceed OFL and should be reduced from OFL to prevent overfishing.

F_{ABC}: ABC fishing mortality rate. The annual exploitation rate associated with the ABC.

ACL: Annual Catch Limit. Required by the MSA and defined in the NS1 Guidelines as the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures. The ACL cannot exceed the ABC.

F_{ACL}: ACL fishing mortality rate. The annual exploitation rate associated with the ACL.

S_{MSY}: MSY spawner abundance. The abundance of adult spawners that is expected, on average, to produce MSY.

MSST: Minimum Stock Size Threshold. Defined in the NS1 Guidelines as level of biomass below which the stock or stock complex is considered to be overfished. The MSST should be no less than one-half of S_{MSY}.

ACT: Annual Catch Target. Defined in the NS1 Guidelines as an amount of annual catch of a stock or stock complex that is the management target of the fishery. It should usually be less than its ACL. It is an optional accountability measure that may be adopted to account for management uncertainty in complying with the ACL (see section 3.3.5.3).

3.1 STATUS DETERMINATION CRITERIA

"Any fishery management plan . . . shall . . . specify objective and measurable criteria for identifying when the fishery . . . is overfished . . . and, . . . contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;"

Magnuson-Stevens Act, '§303(a)(10)

"Overfishing (to overfish) occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis"

NS1Gs (600.310 (e)(2)(i)(B))

"Overfished. A stock or stock complex is considered ''overfished'' when its biomass has declined below a level that jeopardizes the capacity of the stock or stock complex to produce MSY on a continuing basis."

NS1Gs (600.310 (e)(2)(i)(E))

"Approaching an overfished condition. A stock or stock complex is approaching an overfished condition when it is projected that there is more than a 50 percent chance that the biomass of the stock or stock complex will decline below the MSST within two years."

NS1Gs (600.310(e)(2)(i)(G)

In establishing criteria by which to determine the status of salmon stocks, the Council must consider the uncertainty and theoretical aspects of MSY as well as the complexity and variability unique to naturally producing salmon populations. These unique aspects include the interaction of a short-lived species with frequent, sometimes protracted, and often major variations in both the freshwater and marine environments. These variations may act in unison or in opposition to affect salmon productivity in both positive and negative ways. In addition, variations in natural populations may sometimes be difficult to measure due to masking by hatchery produced salmon.

3.1.1 General Application to Salmon Fisheries

In establishing criteria from which to judge the conservation status of salmon stocks, the unique life history of salmon must be considered. Chinook, coho, and pink salmon are short-lived species (generally two to six years) that reproduce only once shortly before dying. Spawning escapements of coho and pink salmon are dominated by a single-year class and Chinook spawning escapements may be dominated by no more than one or two-year classes. The abundance of year classes can fluctuate dramatically with combinations of natural and human-caused environmental variation. Therefore, it is not unusual for a healthy and relatively abundant salmon stock to produce occasional spawning escapements which, even with little or no fishing impacts, may be significantly below the long-term average associated with the production of MSY.

Numerous West Coast salmon stocks have suffered, and continue to suffer, from ~~3.1 SALMON STOCK CONSERVATION OBJECTIVES~~

~~A~~nonfishing activities that severely reduce natural survival by such actions as the elimination or degradation of freshwater spawning and rearing habitat. The consequence of this man-caused, habitat-based variation is twofold. First, these habitat changes increase large scale variations in stock productivity and associated stock abundances, which in turn complicate the overall determination of MSY and the specific assessment of whether a stock is producing at or below that level. Second, as the productivity of the freshwater habitat is diminished, the benefit of further reductions in fishing mortality to improve stock abundance decreases. Clearly, the failure of several stocks managed under this FMP to produce at an historic or consistent MSY level has little to do with current fishing impacts and often cannot be rectified with the cessation of all fishing.

To address the requirements of the Magnuson-Stevens Act, the Council has established criteria based on biological reference points associated with MSY exploitation rate and MSY spawning escapement. The criteria are based on the unique life history of salmon and the large variations in annual stock abundance due to numerous environmental variables. They also take into account the uncertainty and imprecision surrounding the estimates of MSY, fishery impacts, and spawner escapements. In recognition of the unique salmon life history, the criteria differ somewhat from the general guidance in the National Standard 1 Guidelines (§600.310).

3.1.2 Overfishing

A stock will be considered subject to overfishing when the postseason estimate of F_t exceeds the MFMT, where the MFMT is generally defined as less than or equal to F_{MSY}. Stock-specific estimates of F_{MSY} based on spawner-recruit data will be used if available. Otherwise, a species-specific proxy value of F_{MSY}= 0.78 for Chinook based on species-specific meta-analyses, will be used (PFMC 2011e). Stock-specific overfishing determinations will be made annually and are based on exploitation during a single biological year.

3.1.2.1 Council Action

Because salmon are exploited in multiple fisheries, it is necessary to determine fishery specific contribution to the total exploitation rate to determine the actions necessary to end and prevent future overfishing. As the Council has no jurisdiction over river fisheries and ocean fisheries north of the U.S./Canada border, it also may be necessary for other responsible entities to take action to end ongoing and prevent future overfishing.

The STT will report postseason exploitation rates in the annual SAFE document, and when overfishing occurs, the Council shall:

1) notify the NMFS NWR administrator of the STT's findings;
2) direct the STT to assess the mortality rates in fisheries impacting the stock of concern and report their findings;
3) immediately take action to ensure Council area fisheries are not contributing to overfishing, and;
4) notify pertinent management agencies of the stock's status and the contribution of various fisheries to the total exploitation rate.

3.1.3 Approaching an Overfished Condition

An approaching overfished determination will be made if the geometric mean of the two most recent postseason estimates of spawning escapement, and the current preseason forecast of spawning escapement, is below the MSST. Stock-specific approaching overfished determinations will be made annually following development of the preseason spawning escapement forecasts.

3.1.3.1 Council Action

When a stock is approaching an overfished condition the Council shall:

1) notify the NMFS NWR administrator of this situation;
2) notify pertinent management entities, and;
3) structure Council area fisheries to avoid the stock becoming overfished and to mitigate the effects on stock status.

3.1.4 Overfished

> *"For a fishery that is overfished, any fishery management plan, amendment, or proposed regulations… for such fishery shall (A) specify a time period for ending overfishing and rebuilding the fishery that shall:(i) be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of the fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem; and (ii) not exceed 10 years, except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise…."*
>
> *Magnuson-Stevens Act, §304(e)(4)*

A stock will be considered overfished if the 3-year geometric mean of annual spawning escapements falls below the MSST, where MSST is generally defined as $0.5*S_{MSY}$ or $0.75*S_{MSY}$, although there are some exceptions (Table 3-1). Overfished determinations will be made annually using the three most recently available postseason estimates of spawning escapement.

3.1.4.1 Council Action

When the overfished status determination criteria set forth in this FMP have been triggered, the Council shall:

1) notify the NMFS NWR administrator of this situation;
2) notify pertinent management entities;
3) structure Council area fisheries to reduce the likelihood of the stock remaining overfished and to mitigate the effects on stock status;
4) direct the STT to propose a rebuilding plan for Council consideration within one year.

Upon formal notification from NMFS to the Council of the overfished status of a stock, a rebuilding plan must be developed and implemented within two years.

The STT's proposed rebuilding plan shall include:

1) an evaluation of the roles of fishing, marine and freshwater survival in the overfished determination;
2) any modifications to the criteria set forth in section 3.1.6 below for determining when the stock has rebuilt,
3) recommendations for actions the Council could take to rebuild the stock to S_{MSY}, including modification of control rules if appropriate, and;
4) a specified rebuilding period.

In addition, the STT may consider and make recommendations to the Council or other management entities for reevaluating the current estimate of S_{MSY}, modifying methods used to forecast stock abundance or fishing impacts, improving sampling and monitoring programs, or changing hatchery practices.

Based on the results of the STT's recommended rebuilding plan, the Council will adopt a rebuilding plan for recommendation to the Secretary. Adoption of a rebuilding plan will require implementation either through an FMP amendment or notice and comment rule-making process. Subject to Secretarial approval, the Council will implement the rebuilding plan with appropriate actions to ensure the stock is rebuilt in as short a time as possible based on the biology of the stock but not to exceed ten years, while taking into consideration the needs of the commercial, recreational and tribal fishing interests and coastal communities. The existing control rules provide a default rebuilding plan that targets spawning escapement at or above MSY, provided sufficient recruits are available, and targets a rebuilding period of one generation (two years for pink salmon, 3 years for coho, and 5 years for Chinook). If sufficient recruits are not available to achieve spawning escapement at or above MSY in a particular year, the control rules provide for the potential use of *de minimis* exploitation rates that allow continued participation of fishing communities while minimizing risk of overfishing. However, the Council should consider the specific circumstances surrounding an overfished determination and ensure that the adopted rebuilding plan addresses all relevant issues.

Even if fishing is not the primary factor in the depression of the stock, the Council must act to limit the exploitation rate of fisheries within its jurisdiction so as not to limit rebuilding of the stock or fisheries. In cases where no action within Council authority can be identified which has a reasonable expectation of contributing to the rebuilding of the stock in question, the Council will identify the actions required by other entities to recover the depressed stock. Due to a lack of data for some stocks, environmental variation, economic and social impacts, and habitat losses or problems beyond the control or management authority of the Council, it is possible that rebuilding of depressed stocks in some cases could take much longer than ten years. The Council may change analytical or procedural methodologies to improve the accuracy of estimates for abundance, harvest impacts, and MSY escapement levels, and/or reduce ocean harvest impacts when it may be effective in stock recovery. For those causes beyond Council control or expertise, the Council may make recommendations to those entities which have the authority and expertise to change preseason prediction methodology, improve habitat, modify enhancement activities, and re-evaluate management and conservation objectives for potential modification through the appropriate Council process.

In addition to the STT assessment, the Council may direct its Habitat Committee (HC) to work with federal, state, local, and tribal habitat experts to review the status of the essential fish habitat affecting the overfished stock and, as appropriate, provide recommendations to the Council for restoration and enhancement measures within a suitable time frame. However, this action would be a priority only if the STT evaluation concluded that freshwater survival was a significant factor leading to the overfished determination. Upon review of the report from the HC, the Council will consider appropriate actions to promote any solutions to the identified habitat problems.

3.1.5 Not Overfished-Rebuilding

After an overfished status determination has been triggered, once the stock's 3-year geometric mean of spawning escapement exceeds the MSST, but remains below S_{MSY}, or other identified rebuilding criteria, the stock status will be recognized as "not overfished-rebuilding". This status level requires no Council action, but rather is used to indicate that stock's status has improved from the overfished level but the stock has not yet rebuilt.

3.1.6 Rebuilt

The default criterion for determining that an overfished stock is rebuilt is when the 3-year geometric mean spawning escapement exceeds S_{MSY}; the Council may consider additional criteria for rebuilt status when developing a rebuilding plan and recommend such criteria, to be implemented subject to Secretarial approval.

Because abundance of salmon populations can be highly variable, it is possible for a stock to rebuild from an overfished condition to the default rebuilding criterion in as little as one year, before a proposed rebuilding plan could be brought before the Council.

In some cases it may be important to consider other factors in determining rebuilt status, such as population structure within the stock designation. The Council may also want to specify particular strategies or priorities to achieve rebuilding objectives. Specific objectives, priorities, and implementation strategies should be detailed in the rebuilding plan.

3.1.6.1 Council Action

When a stock is determined to be rebuilt, the Council shall:
1) notify the NMFS NWR administrator of its finding, and;
2) notify pertinent management entities.

3.1.7 Changes or Additions to Status Determination Criteria

Status determination criteria are defined in terms of quantifiable, biologically-based reference points, or population parameters, specifically, S_{MSY}, MFMT (F_{MSY}), and MSST. These reference points are generally regarded as fixed quantities and are also the basis for the harvest control rules, which provide the operative guidance for the annual preseason planning process used to establish salmon fishing seasons that achieve optimum yield and are used for status determinations as described above. Changes to how these status determination criteria are defined, such as MSST = $0.50*S_{MSY}$, must be made through a plan amendment. However, if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification of the estimated values of these reference points, changes to the values may be made without a plan amendment. Insofar as possible, proposed reference point changes for natural stocks will only be reviewed and approved within the schedule established for salmon methodology reviews and completed at the November meeting prior to the year in which the proposed changes would be effective and apart from the preseason planning process. SDC reference points that may be changed without an FMP amendment include: reference point objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities; and Federal court-ordered changes. All modifications would be documented through the salmon methodology review process, and/or the Council's preseason planning process.

3.2 SALMON STOCK CONSERVATION OBJECTIVES

> *”To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination~~@~~”*
>
> *Magnuson-Stevens Act, National Standard 3*

To achieve optimum yield, prevent overfishing, and assure rebuilding of salmon stocks whose abundance ~~have~~has been depressed to an overfished level, this plan establishes~~, to the extent practicable,~~ conservation objectives to perpetuate the coastwide aggregate of salmon stocks covered by the plan (Chapter 1). The ~~Council=s~~Council's stock conservation objectives (to be achieved annually) and other pertinent stock management information are contained in Table 3-1~~ (following Section 3.2).~~. Specific objectives are listed for natural and hatchery stocks that are part of the ~~Council=s~~Council's preseason fishery ~~option~~alternative development process (Chapter 9), including all relevant stocks listed under the Federal ESA. The objectives may be applicable to a single stock independently or to an indicator stock or stocks for a stock complex~~ of interrelated stocks (those sharing similarities in life-history traits, geographic distribution, habitat preferences, or genetic characteristics).~~. Stocks that are not included in the preseason analyses may lack specific conservation objectives because the stock is not significantly impacted by ocean fisheries or insufficient ~~management~~ information is available ~~from which~~ to assess ocean fishery impacts directly. In the latter case, the stock will be included in a stock complex and the conservation objective for ~~a managed~~an indicator stock ~~may serve to~~will provide for the conservation of ~~a~~ closely related ~~stock~~stocks unless, or until, more specific management information can be developed.

3.~~1~~2.1 Basis

The ~~Council=s~~Council's conservation objectives for natural stocks may (1) be based on estimates for achieving MSY~~,~~ or an MSY proxy~~, or MSP~~, or (2) represent special data gathering or rebuilding strategies to approach MSY and to eventually develop MSY ~~or MSP~~ objectives. The objectives have generally been developed through extensive analysis by the fishery management entities with direct management authority for the stock, or through joint efforts coordinated through the Council, or with other state, tribal, or federal entities. Most of the objectives for stocks north of Cape Falcon have been included in U.S. District Court orders. Under those orders for Washington coastal and Puget Sound stocks ~~-~~(Hoh v. Baldrige No. 81-742 [R] C and U.S. v. Washington, 626 F. Supp. 1405 [1985]), the treaty tribes and WDFW may agree to annual spawner targets or other objectives that differ from the ~~MSP or MSY~~FMP objectives. Details of the conservation objectives in effect at the time this FMP was approved are available in PFMC (1984), in individual amendment documents (see Table 1 in the Introduction), and as referenced in Table 3-1. Updated conservation objectives and ESA consultation standards are available in Appendix A of the most recent Preseason Report I, ~~(Appendix A, Table A-1),~~ and Table 5 of the most recent Preseason Report III ~~(Table 5)~~ produced each year by the STT.

The ~~Council=s fixed~~Council's conservation objectives are generally expressed in terms of an annual fishery or spawning escapement ~~believed~~estimated to be optimum for producing MSY over the long-term. The escapement objective may be (1) a specific number or a range for the desired number of adult spawners (spawner escapement), ~~or~~ (2) a specific number or range for the desired escapement of a stock from the ocean or at another particular location, such as a dam, that may be expected to result in the target number of spawners~~. The current data gathering and rebuilding objectives~~, or (3) based on the exploitation rate that would produce MSY over the long-term. Objectives may be expressed as fixed or stepped exploitation or harvest rates and may include spawner floors or ~~severely~~substantially reduced harvest rates at low abundance levels~~ (e.g., Klamath River fall Chinook),~~, or as special requirements provided in ~~National Marine Fisheries Service (~~the Pacific Salmon Treaty or NMFS~~)~~ consultation standards for stocks listed under the ESA.

3.~~1~~2.2 Changes or Additions

Conservation objectives generally are fixed ~~measures of the FMP~~quantities intended to provide the necessary guidance during the course of the annual preseason planning process to establish salmon fishing seasons that achieve optimum yield. ~~However, changes~~Changes or additions to ~~the stock complexes and~~ conservation objectives ~~for most natural stocks~~ may be made ~~without~~ either through a plan amendment or notice and comment rulemaking if a comprehensive technical review of the best scientific information available provides ~~conclusive~~ evidence that, in the view of the ~~Salmon Technical Team, Scientific and Statistical Committee (~~STT, SSC~~),~~, and the Council, justifies a modification.~~ An exception is the 35,000 natural spawner floor for Klamath River fall Chinook which may only be changed by FMP amendment. The Council may change objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities. Federal court-ordered changes in objectives will also be accommodated without a plan amendment.~~ Insofar as possible, proposed changes for natural stocks will only be reviewed and approved within the schedule established for salmon estimation methodology reviews ~~(~~completed ~~at the November meeting~~ prior to the ~~season in which they are effective) and apart from the~~ preseason planning process. The Council may change conservation objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities. Federal court-ordered changes in conservation objectives will also be accommodated without a plan amendment. The applicable annual objectives of Council-adopted rebuilding programs ~~developed in response to an overfishing concern or~~and the requirements of consultation standards promulgated by NMFS under the ESA may be employed without plan amendment to assure timely implementation. All of these changes will be documented during the ~~Council=s~~Council's preseason planning process.

The Council considers established conservation objectives to be stable and a technical review of biological data must provide substantial evidence that a modification is necessary. The Council's approach to conservation objectives purposely discourages frequent changes for short-term economic or social reasons at the expense of long-term benefits from the resource. However, periodic review and revision of established objectives is anticipated as additional data become available for a stock or stock complex.

~~3.2 OVERFISHING CRITERIA~~

> *~~AAny fishery management plan . . . shall . . . specify objective and measurable criteria for identifying when the fishery . . . is overfished . . . and, . . . contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;@~~*
>
> *~~Magnuson-Stevens Act, ' 303(a)(10)~~*

> *~~AThe terms overfishing and overfished mean a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis.@~~*
>
> *~~Magnuson-Stevens Act, ' 3(29)~~*

~~In applying the Magnuson-Stevens Act definition of overfishing to salmon fisheries and establishing criteria by which to identify it, the Council must consider the uncertainty and theoretical aspects of MSY as well as the complexity and variability unique to naturally producing salmon populations. These unique aspects include the interaction of a short-lived species with frequent, sometimes protracted, and often major variations in both the freshwater and marine environments. These variations may act in unison or in opposition to affect salmon productivity in both positive and negative ways. In addition, variations in natural populations may sometimes be difficult to measure due to masking by artificially produced salmon.~~

~~3.2.1 General Application to Salmon Fisheries~~

~~In setting criteria from which to judge the conservation status of salmon stocks, the unique life history of salmon must be considered. Chinook, coho, and pink salmon are short-lived species (generally two to six years) that reproduce only once shortly before dying. Spawning escapements of coho and pink salmon are dominated by a single-year class and Chinook spawning escapements may be dominated by no more than one or two year classes. The abundance of year classes can fluctuate dramatically with combinations of natural and human-caused environmental variation. Therefore, it is not unusual for a healthy and relatively abundant salmon stock to produce occasional spawning escapements which, even with little or no fishing impacts, may be significantly below the long-term average associated with the production of MSY. This phenomenon has been observed in recent years for numerous salmon stocks, including Klamath River fall Chinook and several Washington coho stocks.~~

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 1 of 7)

CHINOOK						
Stocks In The Fishery	**Conservation Objective**	S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Sacramento River Fall Indicator stock for the Central Valley fall (CVF) Chinook stock complex.	122,000-180,000 natural and hatchery adult spawners (MSY proxy adopted 1984). This objective is intended to provide adequate escapement of natural and hatchery production for Sacramento and San Joaquin fall and late-fall stocks based on habitat conditions and average run-sizes as follows: Sacramento River 1953-1960; San Joaquin River 1972-1977 (ASETF 1979; PFMC 1984; SRFCRT 1994). The objective is less than the estimated basin capacity of 240,000 spawners (Hallock 1977), but greater than the 118,000 spawners for maximum production estimated on a basin by basin basis before Oroville and Nimbus Dams (Reisenbichler 1986).	122,000	91,500	78% Proxy (SAC 2011a)	Based on F_{ABC} and annual ocean abundance. F_{ABC} is F_{MSY} reduced by Tier 2 (10%) uncertainty
Sacramento River Spring ESA Threatened	NMFS ESA consultation standard/recovery plan: Conform to Sacramento River Winter Chinook ESA consultation standard (no defined objective for ocean management prior to listing).	Undefined	Undefined	Undefined	Undefined - Deferred to ESA consultation standard.
Sacramento River Winter ESA Endangered	NMFS ESA consultation standard/recovery plan: Recreational seasons: Point Arena to Pigeon Point between the first Saturday in April and the second Sunday in November; Pigeon Point to the U.S./Mexico Border between the first Saturday in April and the first Sunday in October. Minimum size limit ≥ 20 inches total length. Commercial seasons: Point Arena to the U.S./Mexico border between May 1 and September 30, except Point Reyes to Point San Pedro between October 1 and 15 (Monday through Friday). Minimum size limit ≥ 26 inches total length. Guidance from NMFS in 2010 and 2011 required implementation of additional closures and/or increased sized limits in the recreational fishery South of Point Arena. A new winter-run management framework and consultation standard is expected to be in place for the 2012 fishing season, or no later than March 1, 2012. (NMFS ESA Guidance for 2011).	Undefined	Undefined	Undefined	
California Coastal Chinook ESA Threatened	NMFS ESA consultation standard/recovery plan: Limit ocean fisheries to no more than a 16.0% age-4 ocean harvest rate on Klamath River fall Chinook.	Undefined	Undefined	Undefined	
Klamath River Fall Indicator stock for the Southern Oregon Northern California (SONC) Chinook stock complex.	At least 32% of potential adult natural spawners, but no fewer than 40,700 naturally spawning adults in any one year. Brood escapement rate must average at least 32% over the long-term, but an individual brood may vary from this range to achieve the required tribal/nontribal annual allocation. Natural area spawners to maximize catch estimated at 40,700 adults (Salmon Technical Team, 2005).	40,700	30,525	72% (STT 2005)	Based on F_{ABC} and annual ocean abundance. F_{ABC} is F_{MSY} reduced by Tier 1 (5%) uncertainty
Klamath River - Spring	Undefined	Undefined	Undefined	Undefined	Undefined - Deferred to SONC complex indicator stock(s)
Smith River	Undefined	Undefined	Undefined	Undefined	
Southern Oregon	Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982) measured by 60-90 fish per mile in index streams. ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council.	60 fish per mile in index streams	30 fish per mile in index streams	Undefined	

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 2 of 7

CHINOOK						
Stocks In The Fishery	**Conservation Objective**		S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Central and Northern Oregon	Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982) measured by 60-90 fish per mile in index streams. ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council.		60 Fish per mile in index streams	30 Fish per mile in index streams	Undefined	Undefined - Deferred to FNMC complex indicator stock(s)
Willapa Bay Fall	Undetermined in FMP. WDFW spawning escapement objective of 4,350.		Undefined	Undefined	Undefined	
Grays Harbor Fall Indicator stock for the Far North Migrating Coastal (FNMC) Chinook stock complex	14,600 natural adult spawners--MSP based on full seeding of spawning and rearing habitat (WDF 1979).	Annual natural spawning escapement targets may vary from FMP conservation objectives if agreed to by WDFW and treaty tribes under the provisions of Hoh v. Baldrige and subsequent U.S. District Court orders.	14,600	7,300	78% Proxy (SAC 2011a)	Undefined - International exception to ACL requirements, deferred to PST management constraints.
Queets Fall Indicator stock for the FNMC Chinook stock complex	Manage terminal fisheries for 40% harvest rate, but no less than 2,500 natural adult spawners, the MSY level estimated by Cooney (1984).		2,500	1,250	78% Proxy (SAC 2011a)	
Hoh Fall Indicator stock for the FNMC Chinook stock complex	Manage terminal fisheries for 40% harvest rate, but no less than 1,200 natural adult spawners, the MSY level estimated by Cooney (1984).		1,200	600	78% Proxy (SAC 2011a)	
Quillayute Fall Indicator stock for the FNMC Chinook stock complex	Manage terminal fisheries for 40% harvest rate, but no less than 3,000 natural adult spawners, the MSY level estimated by Cooney (1984).		3,000	1,500	78% Proxy (SAC 2011a)	
Hoko Summer/Fall Indicator stock for the FNMC Chinook stock complex	850 natural adult spawners, the MSP level estimated by Ames and Phinney (1977). May include adults used for supplementation program.		850	425	78% Proxy (SAC 2011a)	
Grays Harbor Spring	1,400 natural adult spawners.		1,400	700	78% Proxy (SAC 2011a)	Undefined - Deferred to FNMC complex indicator stock(s)
Queets Sp/Su	Manage terminal fisheries for 30% harvest rate, but no less than 700 natural adult spawners.		700	350	78% Proxy (SAC 2011a)	
Hoh Spring/Summer	Manage terminal fisheries for 31% harvest rate, but no less than 900 natural adult spawners.		900	450	78% Proxy (SAC 2011a)	
Quillayute Spring/Summer	1,200 natural adult spawners for summer component (MSY).		1,200	600	Undefined	
Willapa Bay Fall (hatchery)	8,200 adult return to hatchery. WDFW spawning escapement objective of 9,800 hatchery spawners.		Not applicable to hatchery stocks			
Quinault Fall (hatchery)	Hatchery production.					

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 3 of 7)

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

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 4 of 7)

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

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 5 of 7)

COHO						
Stocks In The Fishery	**Conservation Objective**		S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Central California Coast ESA Threatened	NMFS ESA consultation standard/recovery plan: No retention of coho south of the OR/CA border.		Undefined	Undefined	Undefined	Undefined - Deferred to ESA consultation standard.
Southen Oregon/Northern California Coast ESA Threatened	NMFS ESA consultation standard/recovery plan: No more than a 13.0% AEQ exploitation rate in ocean fisheries on Rogue/Klamath hatchery coho.		Undefined	Undefined	Undefined	
Oregon Coastal Natural ESA Threatened	NMFS ESA consultation standard/recovery plan: Total AEQ exploitation rate limit based on parental seeding level and marine survival matrix in FMP Table 3-2.		Undefined	Undefined	Undefined	
Lower Columbia Natural ESA Threatened	NMFS ESA consultation standard/recovery plan: AEQ exploitation rate limit on ocean and mainstem Columbia fisheries indentified in annual NMFS guidance.		Undefined	Undefined	Undefined	
Oregon Coast Hatchery	Hatchery production.		Not applicable to hatchery stocks			
Columbia River Late Hatchery	Hatchery rack return goal of 14,200 adults.					
Columbia River Early Hatchery	Hatchery rack return goal of 6,200 adults.					
Willapa Bay - Hatchery	Hatchery rack return goal of 6,100 adults.					
Quinault - Hatchery	Hatchery production.					
Quillayute - Summer Hatchery	Hatchery production.					
South Puget Sound Hatchery	Hatchery rack return goal of 52,000 adults.					
Willapa Bay Natural	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 6 of 7)

COHO						
Stocks In The Fishery	**Conservation Objective**		S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Grays Harbor	35,400 natural adult spawners (MSP based on WDF [1979])	Annual natural spawning escapement targets may vary from FMP conservation objectives if agreed to by WDFW and treaty tribes under the provisions of Hoh v. Baldrige, U.S. v. Washington, or subsequent U.S. District Court orders	24,426 S_{MSP} (FMP) $*F_{SMY}$ (SAC 2010b)	18,320 (Johnstone and Pattillo 2011)	MFMT=65% (Johnstone and Pattillo 2011) F_{MSY}=69% (SAC 2011b)	Undefined - International exception to ACL requirements, deferred to PST management constraints
Queets	MSY range of 5,800 to 14,500 natural adult spawners (Lestelle et al 1984)		5,800 (Johnston et al. 2011)	4,350 (Johnstone and Pattillo 2011)	MFMT=65% (Johnstone and Pattillo 2011) F_{MSY}=68% (SAC 2011b)	
Hoh	MSY range of 2,000 to 5,000 natural adult spawners (Lestelle et al. 1984)		2,520 (SAC 2010b)	1,890 S_{MSY}*0.75	MFMT=65% (Johnstone and Pattillo 2011) F_{MSY}=69% (SAC 2011b)	
Quillayute - Fall	MSY range of 6,300 to 15,800 natural adult spawners (Lestelle et al. 1984)		6,300 (Johnston et al. 2011)	4,725 (Johnstone et al. 2011)	MFMT=65%; (Johnstone and Pattillo 2011) F_{MSY}=59% (SAC 2011b)	
Strait of Juan de Fuca	Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 27,445; 0.40 for ocean age-3 abundance >11,679 and ≤27,445; 0.20 for ocean age-3 abundance ≤11,679		11,000 (Bowhay et al. 2009)	7,000 (Bowhay et al. 2009)	60% (Bowhay et al. 2009)	
Hood Canal	Total allowable MSY exploitation rate of: 0.65 for ocean age-3 abundance > 41,000; 0.45 for ocean age-3 abundance >19,545 and ≤41,000; 0.20 for ocean age-3 abundance ≤19,545		14,350 (Bowhay et al. 2009)	10,750 (Bowhay et al. 2009)	65% (Bowhay et al. 2009)	
Skagit	Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 62,500; 0.35 for ocean age-3 abundance >22,857 and ≤62,500; 0.20 for ocean age-3 abundance ≤22,857		25,000 (Bowhay et al. 2009)	14,857 (Bowhay et al. 2009)	60% (Bowhay et al. 2009)	
Stillaguamish	Total allowable MSY exploitation rate of: 0.50 for ocean age-3 abundance > 20,000; 0.35 for ocean age-3 abundance >9,385 and ≤20,000; 0.20 for ocean age-3 abundance ≤9,385		10,000 (Bowhay et al. 2009)	6,100 (Bowhay et al. 2009)	50% (Bowhay et al. 2009)	
Snohomish	Total allowable MSY exploitation rate of: 0.60 for ocean age-3 abundance > 125,000; 0.40 for ocean age-3 abundance >51,667 and ≤125,000; 0.20 for ocean age-3 abundance ≤51,667		50,000 (Bowhay et al. 2009)	31,000 (Bowhay et al. 2009)	60% (Bowhay et al. 2009)	

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 7 of 7)

PINK (odd-numbered years)					
Stocks In The Fishery	**Conservation Objective**	SMSY	MSST	MFMT (FMSY)	ACL
Puget Sound	900,000 natural spawners or consistent with provisions of the Pacific Salmon Treaty (Fraser River Panel).	900,000	450,000	Undefined	Undefined - International exception to ACL requirements, deferred to PST management constraints

3.3 HARVEST CONTROLS

Control rules are used to manage the harvest of stocks to achieve optimum yield while preventing overfishing. Control rules specify the allowable harvest of stocks based on their abundance and are predicated on meeting conservation objectives in addition to relating those objectives to biological reference points such as MSY, maximum fishing mortality threshold (MFMT), overfishing limit (OFL), MSST, acceptable biological catch (ABC), and annual catch limit (ACL). For stocks with escapement based conservation objectives, the control rule limits exploitation to achieve escapement objectives. For stocks with exploitation rate-based conservation objectives, escapement targets vary annually depending on stock abundance.

Reference points defined by the MSA and/or National Standard 1 (NS1) Guidelines are used as benchmarks within the control rules. They are useful for evaluating and comparing control rules, and in some cases are triggers for management actions. There are several formulations of control rules for different stocks in the FMP, using various combinations of reference points. These stock-specific control rules are applied consistently from year to year.

3.3.1 Relationship to ESA consultation standards

The ESA requires federal agencies whose actions may adversely affect listed salmon to consult with NMFS. Because NMFS implements ocean harvest regulations, it is both the action and consulting agency for actions taken under the FMP. To ensure there is no jeopardy, NMFS conducts ESA consultations with respect to the effects of ocean harvest on listed salmon stocks. In cases where the biological consultation results in a "no jeopardy" opinion, NMFS issues an incidental take statement which authorizes a limited amount of take of listed species that would otherwise be prohibited under the ESA. In cases where a "jeopardy" opinion is reached, NMFS develops a reasonable, prudent alternative to the proposed action which authorizes a limited amount of take.

The constraints on take authorized under incidental take statements and reasonable, prudent alternatives are collectively referred to as consultation standards. These constraints take a variety of forms including FMP conservation objectives, limits on the time and area during which fisheries may be open, ceilings on fishery impact rates, and reductions from base period impact rates. NMFS may periodically revise consultation standards and the annual NMFS guidance letter reflects the most current information. Consultation standards that were in place in 2011 when Amendment 16 was completed are shown in the table of conservation objectives (Table 3-1), which is reproduced each year in the latest annual addition of Preseason Report I. .

ESA consultation standards represent another form of fishery control rule. Although NMFS consultation standards and recovery plans may not by themselves recover listed populations to historic S_{MSY} levels, they are sufficient to stabilize populations until freshwater habitats and their dependent populations can be restored and estimates of MSY developed consistent with recovered habitat conditions. As species are delisted, the Council will establish conservation objectives and associated reference points consistent with the MSA.

3.3.2 Relationship to the Pacific Salmon Treaty

The MSA provides an exception to the requirement for a fishery management plan to specify ACLs and Accountability Measures (AMs) for stocks managed under an international agreement in which the United States participates. Pacific salmon stocks subject to fisheries in both the US and

Canada are managed under the provisions of the Pacific Salmon Treaty (PST). Natural stocks managed under the provisions of the PST include: (1) Puget Sound pink salmon stocks, (2) most non-ESA listed Chinook stocks from the mid-Oregon coast to the US/Canada border, and (3) all non-ESA listed coho stocks except Willapa Bay natural coho. For these stocks, the PST annually places overall limits on fishery impacts and allocates those impacts between the US and Canada. It allows the US and Canada to each manage their own fisheries to achieve domestic conservation and allocation priorities, while remaining within the overall limits determined under the PST. The PST also includes measures of accountability which take effect if annual limits established under the Treaty are exceeded, and further reduce these limits in response to depressed stock status.

Because of these provisions of the PST, and the exception provided by the MSA, it is unnecessary for the FMP to specify an ACL or associated reference points for these stocks. However, it is still necessary to specify MSY and SDC reference points for these stocks.

3.3.3 Acceptable Biological Catch

Specification of ABC is required for all stocks or stock complexes in the fishery that are not managed under an international agreement, listed under the ESA, or designated as hatchery stocks. For salmon, ABC is defined in terms of spawner escapement (S_{ABC}), which is consistent with the common practice of using spawner escapement to assess stock status for salmon. S_{ABC} is determined annually based on stock abundance, in spawner equivalent units, N, and the exploitation rate F_{ABC}.

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

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

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

The STT will apply the ABC control rule on an annual basis by making preseason forecasts of N, and applying the fixed F_{ABC}. Stock abundance forecasts and the resulting S_{ABC} estimates will be reported in Preseason Report I, and presented to the SSC at the March Council meeting. Following its review, the SSC will recommend stock abundance forecasts and S_{ABC} estimates to the Council in an oral and written statement provided at the March meeting.

The SSC will have an ongoing role in evaluating ABCs through their annual review of stock abundance forecasts and their prerogative to initiate re-evaluation of the ABC control rule. Abundance forecast methods are periodically revised and these revisions are evaluated by the SSC through the salmon methodology review process. The SSC could revisit the ABC control rule as needed during the salmon methodology review.

3.3.4 Annual Catch Limits

ACLs and OFLs, in addition to ABCs, are required for all stocks or stock complexes in the fishery that are not managed under an international agreement, listed under the ESA, or designated as hatchery stocks. For salmon, these reference points are defined in terms of spawner escapement (S_{ACL}, S_{OFL}).

S_{ACL} and S_{OFL} are calculated annually, both as preseason estimates and postseason values. Preseason estimates of these reference points are used for development of annual fishery management measures. Postseason values are used to identify whether accountability measures (AMs) are to be triggered, and to assess the performance of management.

S_{ACL} and S_{OFL} are determined based on stock abundance, in spawner equivalent units, (N) and the corresponding reference exploitation rates F_{ACL} and F_{OFL}, where the exploitation rates are fixed values that do not change on an annual basis. F_{OFL} is defined as being equal to F_{MSY}, and

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

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

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

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

3.3.4.1 Preseason ACLs

During the annual preseason salmon management process, S_{ACL} will be estimated using the fixed F_{ACL} exploitation rate and the preseason stock abundance forecast (N). Fishery management measures must result in an expected spawning escapement greater than or equal to this S_{ACL} estimate. In many years, the targeted exploitation rate will be lower than F_{ACL} as a result of stock-specific conservation objectives and the control rule used to specify F on an annual basis. Under the condition where $F < F_{ACL}$, the forecast escapement would exceed the estimated S_{ACL}.

3.3.4.2 Postseason ACLs

The postseason value of S_{ACL} will be determined annually using the fixed F_{ACL} exploitation rate and the postseason N. The postseason value of S_{ACL} will be compared to the realized spawner escapement for evaluation of whether the realized escapement fell below the S_{ACL}.

Postseason evaluation of S_{ACL} is necessary for determining whether AMs should be triggered and whether the S_{ACL} performance standard is met. AMs will be triggered if the realized escapement is below the S_{ACL} value in any one year. If the realized escapement is below the S_{ACL} value in more than one of four years, the ACL performance standard will not have been met, and a re-evaluation of the ACL framework will be undertaken, consistent with the NS1 Guidelines.

3.3.5 Accountability Measures

Accountability measures are required for all stocks and stock complexes in the Salmon FMP that are required to have ACLs. AMs are intended to prevent shortfalls in escapement below the S_{ACL} and to correct or mitigate for them if they occur. Some AMs are implemented during the preseason planning process and in-season. Others are implemented postseason through monitoring and reporting requirements. Additional accountability measures will be implemented, as required, if the ACL performance standard is not met as indicated by the realized escapement being below S_{ACL} in more than one in four consecutive years.

3.3.5.1 Preseason and In-season Accountability Measures

The following measures will be implemented during the preseason planning process or inseason to meet the intent of preseason management objectives and to help ensure compliance with ACLs.

- In-season authority to manage quota fisheries (FMP § 10.1) – allows NMFS to close fisheries on short notice when mixed stock quotas are projected to be met. As described above, quotas are designed to ensure that ACLs and conservation objectives for component stocks are met.
- Mixed stock quota monitoring (FMP § 7.1) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Quota partitioning (FMP § 5.3 and 10.2) – partitioning overall quota among fishery sectors and port areas and time periods allows finer scale management, thereby reducing the chance that overall quota will be exceeded.
- Quota trading (FMP § 5.3 and 10.2) – quota trading allows overages in one sector/time/area to be made up by reductions in others.
- Changes to gear/bag/size/trip limits (FMP § 6 and 10.2) – allow a measure of control over catch rates to reduce the chance of quotas being exceeded.
- Boundary modifications (FMP § 6 and 10.2) – allow limited control over catch composition to limit impacts on constraining stocks.
- Landing restrictions (FMP § 6 and 10.2) - allow better accounting of the location of catches and thus better estimates of catch composition.
- In-season monitoring and reporting requirements. (FMP § 7) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Annual catch targets - intended to account for management uncertainty.

An ACT may be adopted in any fishing year in which there is uncertainty in the ability to maintain compliance with the ACL or the applicable control rule for a given stock. The ACT would be specified at a level sufficiently above the S_{ACL} to address uncertainty in the ability to constrain catch for ACL compliance and uncertainty in quantifying the true catch amounts (i.e., estimation errors)[3].

3.3.5.2 Post-season Accountability Measures

The following postseason AMs will be implemented through the assessment and review phases of the salmon management process:

- Salmon Methodology Review Process (COP-15; PFMC 2008). - provides a process for re-evaluation of management objectives, reference points, and modification of models that relate mixed-stock impacts to stock-specific objectives and reference points.

[3] As explained in 50 CFR 600.310(f)(6)(i)

Annual SAFE (Review of Ocean Salmon Fisheries) document (FMP § 8) - allows postseason assessment of objectives and performance. If the realized escapement is below the postseason S_{ACL} value, an AM will be to report on the escapement shortfall in the annual Council preseason reports and to notify state, tribal, and federal managers. If it is necessary to correct problems in the assessment or management methods, such changes can be considered during the annual salmon Methodology Review process.

3.3.5.3 Performance and Re-evaluation of the ACLs and AMs System

If the postseason-ACL evaluation for assessing compliance with ACLs determines that spawning escapement was not in compliance with the ACL more than once in four consecutive years, the Council will direct the STT to conduct an assessment of the cause and re-evaluate the ACL and AM system. The assessment will include consideration of the tiered buffers used to account for scientific uncertainty, and may include recommendations for changing the buffers. Any recommendations for changing the buffer between the ABC and OFL (i.e., ABC control rule) should be included, along with supporting analyses, in the annual Salmon Methodology Review process. Recommendations on changes to AMs or adding new AMs, including whether an ACT should be implemented, should also be provided in this report.

Pending the outcome of the STT re-evaluation of the ACLs and AMs system, an ACT could be implemented as an interim measure if it was determined that management uncertainty in the fishery was a substantial cause for non-compliance, and/or to reduce the likelihood of future non-compliance with the ACL until any new or updated measures are approved. For example, an additional 5 percent buffer could be used to establish an ACT control rule and to set an ACT below the ACL. The ACT control rule would be used until either additional measures are adopted to ensure an appropriate compliance with ACLs, or it has been demonstrated that the ACT control rule is not necessary to achieve an appropriate compliance level.

3.3.6 Specific Control Rules for Stocks, Indicator Stocks, and Complexes

3.3.6.1 Klamath River Fall Chinook, Sacramento River Fall Chinook

KRFC and SRFC have the same form of control rule, which is defined in terms of the reference points F_{ABC}, MSST, S_{MSY}, and two levels of *de minimis* exploitation rates, F = 0.10 and F = 0.25. The maximum allowable exploitation rate, F, in a given year, depends on the pre-fishery ocean abundance in spawner equivalent units, N. At high abundance the rule caps the exploitation rate at F_{ABC}, at moderate abundance the rule specifies an F that results in S_{MSY} spawners, and at low abundance the rule allows for *de minimis* exploitation rates as shown in Figure 3-1 with the abundance breakpoints defined as

$A = \mathrm{MSST} / 2$

$B = (\mathrm{MSST} + S_{MSY}) / 2$

$C = S_{MSY} / (1 - 0.25)$

$D = S_{MSY} / (1 - F_{ABC})$.

For N between 0 and A, F increases linearly from 0 at N = 0, to 0.10 at N = A. For N between A and MSST, F is equal to 0.10. For N between MSST and B, F increases linearly from 0.10 at N = MSST, to 0.25 at N = B. For N between B and C, F is equal to 0.25. For N between C and D, F is the value that results in S_{MSY} spawners. For N greater than D, F is equal to F_{ABC}. The control rule may thus be summarized as follows.

$$F = \begin{cases} 0.10 \times (N / A), & \text{if } 0 \le N \le A; \\ 0.10, & \text{if } A < N \le MSST; \\ 0.10 + (0.15 \times ((N - MSST) / (B - MSST))), & \text{if } MSST < N \le B; \\ 0.25, & \text{if } B < N \le C; \\ (N - S_{MSY}) / N, & \text{if } C < N \le D; \\ F_{ABC}, & \text{if } D < N. \end{cases}$$

The control rule describes maximum allowable exploitation rates at any given level of abundance. The Council may recommend lower exploitation rates as needed to address uncertainties or other year specific circumstances. When recommending an allowable *de minimis* exploitation rate in a given year, the Council shall also consider the following circumstances:

- The potential for critically low natural spawner abundance, including considerations for substocks that may fall below crucial genetic thresholds;
- Spawner abundance levels in recent years;
- The status of co-mingled stocks;
- Indicators of marine and freshwater environmental conditions;
- Minimal needs for tribal fisheries;
- Whether the stock is currently in an approaching overfished condition;
- Whether the stock is currently overfished;
- Other considerations as appropriate.

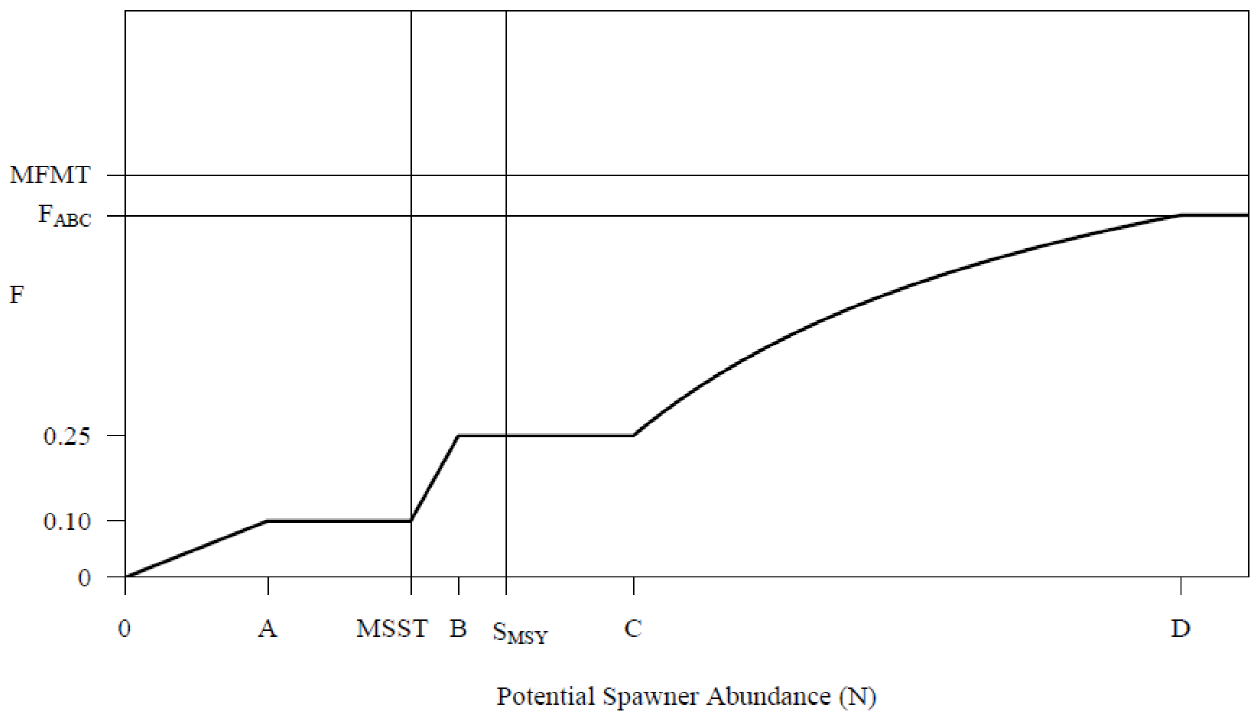


FIGURE 3-1. Control rule for SRFC and KRFC. Abundance is pre-fishery ocean abundance in spawner equivalent units, and F is the exploitation rate. Reference points in the control rule are defined in the text.

3.3.6.2 Washington Coast Chinook and Coho, Columbia River Summer Chinook, Upriver Bright Fall Chinook.

Most non-ESA-listed natural stocks originating north of the Elk River are managed under the terms of the PST with control rules designed to achieve MSY either by meeting S_{MSY} annually or by controlling fishing rates to achieve MSY over the long term. Chinook and coho stocks from the Washington coast, Columbia River summer Chinook, and upriver bright fall Chinook fall under this category, and share the same form of control rule, which can be negotiated annually through related federal court orders (Figure 3-2). Council area fisheries represent a minority of the harvest impacts on these stocks, with the majority of harvest impacts occurring in northern and/or inside fisheries. At low abundance levels, some *de minimis* level of fishing impacts are allowed by the provisions of the PST, negotiations through federal court orders, or reserved tribal fishing rights. The magnitude of the *de minimis* impacts, and the actual abundance level at which they occur, vary from stock to stock. At high abundance levels, the control rules are such that F may exceed MFMT in some years because management of some of these stocks is focused on attaining S_{MSY} on an annual basis. If the year specific exploitation rate on a stock exceeds MFMT, the Council will report this as overfishing according to the terms of the MSA and NS1 Guidelines.

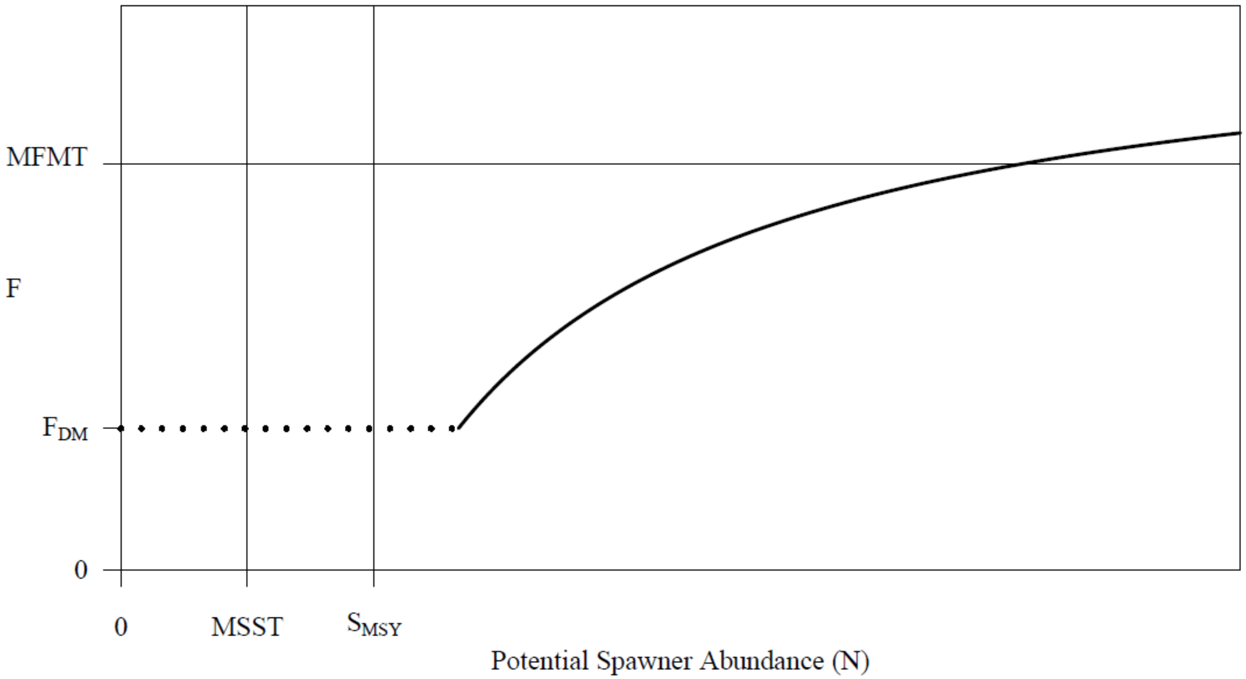


FIGURE 3-2. Control rule for several Chinook and coho stocks managed under the terms of the PST. Abundance is pre-fishery ocean abundance in spawner equivalent units, and F is the exploitation rate. Reference points in the control rule are defined in the text.

3.3.6.3 Puget Sound Coho

Puget Sound coho stocks are managed under the PST using a stepped harvest rate control rule (Figure 3-3) (Southern Coho Management Plan Chapter 5, Annex IV, Article XV, PST 2009). Under this control rule, exploitation rate ceilings are determined on the basis of abundance, where abundance is divided into three categories defined by two breakpoints defined as

$A = \frac{MSST}{1-F_{low}}$, breakpoint between critical and low abundance,

$B = \frac{S_{MSY}}{1-MFMT}$, breakpoint between low and normal abundance.

The exploitation rate ceiling has a maximum value of MFMT when N > B, is reduced to a low exploitation rate (F_{low}) when A < N < B, and further reduced to a critical exploitation rate ($F_{critical}$) to allow for *de minimis* impacts not to exceed 0.20 when N < A. For all Puget Sound coho stocks, the critical/low spawning escapement breakpoint and low exploitation rate are used to define MSST (Table 3.1).

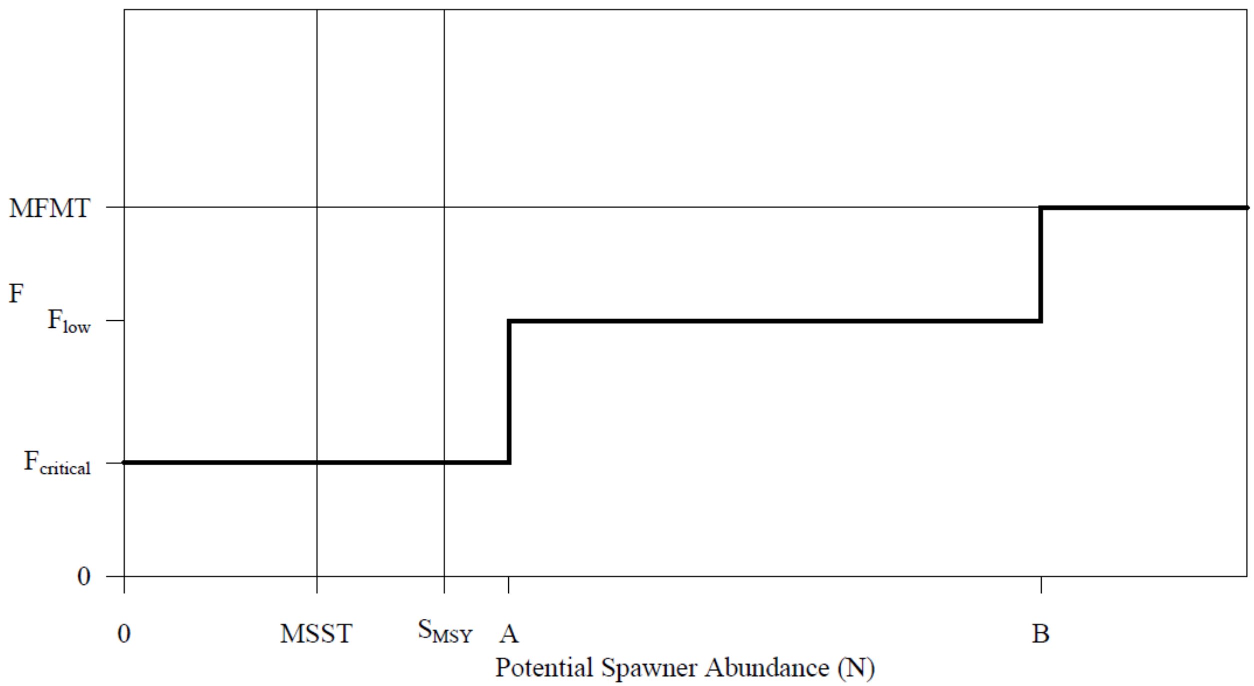


FIGURE 3-3. Control rule for Puget Sound coho. Abundance is pre-fishery ocean abundance in spawner equivalent units, and F is the exploitation rate. Reference points in the control rule are defined in the text.

3.3.6.4 Oregon Coastal Natural Coho

Oregon coastal natural coho (OCN) are currently listed as threatened under the ESA and are therefore managed under ESA consultation standards. Amendment 13 (PFMC 1999) established a recovery and rebuilding plan for OCN coho which (1) defines individual management criteria for four separate stock components, (2) sets overall harvest exploitation rate targets for OCN coho that significantly limit the impact of fisheries on the recovery of depressed stock components, (3) promotes stock rebuilding while allowing limited harvest of other abundant salmon stocks during critical rebuilding periods, (4) is consistent with the Oregon State recovery plan, and (5) has been adopted by NMFS as a consultation standard for OCN coho.

~~Numerous West Coast salmon stocks have suffered, and continue to suffer, from an onslaught of nonfishing activities that severely reduce natural survival by such actions as the elimination or degradation of freshwater spawning and rearing habitat. The consequence of this man-caused, habitat-based variation is two fold.~~ Under the rebuilding program, the overall allowable fishery impact rate in any given year for each stock component is determined by the spawning abundance of the parents and grandparents of the returning adults and upon the marine survival expectations for the current maturing brood, as predicted by smolt-to-jack survival rates for hatchery coho.

The assessment of historic parent abundance utilized in Amendment 13 is based on the number of spawners in each of the four stock components that is projected to achieve full seeding of high quality freshwater habitat at low levels of marine survival. The full seeding estimates (in terms of stratified random sampling numbers) are derived from a model based on freshwater habitat assessment which incorporates measures of variability in the quality of the freshwater habitat and estimates of survival between life stages where numerical indicators have been measured (Nickelson and Lawson 1996). The assessment of marine survival status is based on a partitioning of the observed marine survival for Oregon hatchery reared coho from 1970-1996 (PFMC 1999).

Under the rebuilding plan, the allowable overall fishery impact (exploitation rate) for OCN coho represents all fishing related mortality, including marine and freshwater fisheries for both retention and catch-and-release fishing (Table 3-2). The maximum allowable exploitation rates range from less than 10% when parent abundance and/or marine survival is especially low, to a high of 35% if two generations of spawner rebuilding have occurred and marine survival is sufficient to expect continued improvements in spawner escapement for a third generation. Regardless of high parental spawning levels or projected favorable ocean conditions, a cap of 35% in total stock impacts is maintained to provide insight as to the effects of high spawner levels on production. A limitation of 15% remains in effect even at the two highest tiers of parent escapement if ocean conditions are not favorable, so as to preserve rebuilding progress achieved to that point. The matrix in Table 3-2 illustrates specifically how spawner abundance and marine survival determine the maximum allowable stock exploitation rate objectives for each OCN coho stock component.

Each of the four OCN coho stock components will be managed in marine fisheries as a separate stock to the extent that the best scientific information allows. Because of apparent similarities in the marine distribution of the four components, little flexibility is expected in marine fishery intensities among the components. If some components begin rebuilding faster than others, but data are not available which allows the marine harvest of OCN coho components at different rates, opportunities for increased ocean harvest may be constrained by the weakest component. Any management flexibility for increased fisheries on any strong OCN coho component will likely be in freshwater or estuarine areas during the initial phase of the rebuilding process. In these areas, ODFW will base fishing opportunity on the status of populations in individual basins within a stock component, and directed fisheries on natural coho will be allowed only when spawners are expected to be at or above the full seeding level for high quality habitat. Actual seasons would be based on the presence of fin-clipped hatchery fish (e.g., mark selective fisheries), public comment, and other basin-specific factors. An intensive monitoring program will be implemented by ODFW to measure the overall management effectiveness toward the goal of increasing OCN spawner levels and consequent juvenile and adult progeny. The Environmental Assessment (EA) for Amendment 13 (PFMC 1999) contains further details of the monitoring plan and of the overall OCN coho management criteria and its basis.

Amendment 13 to the PFMC FMP was designed to ensure that fishery related impacts do no act as a significant impediment to the recovery of depressed OCN coho stocks. When the Council first adopted the amendment in November 1997, they stipulated that it should be reviewed and updated periodically with particular attention to the parameters in the matrix that triggered allowable fishery impacts. The OCN work group was formed in 1999 to considered concerns related to persistent observations of low marine survival and low spawner abundance. The work group provided a draft report to the Council in September 2000 (PFMC 2000b). The draft report recommended expanding the harvest matrix to include two new parental abundance categories and one new marine survival category thus expanding the original 3x3 matrix to a 4x5 matrix. The new parental spawner categories occur in the low end of the spawner abundance range and are designated as “Extremely Low” and “Critical.” The new marine survival category, designated as “Extremely Low,” is also in the low end of the range. The work group recommended lower exploitation rates when spawner abundance or marine survival are low and therefore provided a more conservative framework relative to the original Amendment 13 matrix. The recommendations of the work group report were adopted by the Council as expert biological advice for how to implement Amendment 13, and continue to be used by the Council as guidance for implementing Amendment 13.

TABLE 3-2. Allowable fishery impact rate criteria for OCN coho stock components.

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

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

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

Southern: (Elk River to Winchuck River)	Rogue	5,400

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

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

3.3.7 Changes and Additions to Control Rules

The form of a control rule should only be changed by plan amendment, or as necessary to rebuild overfished stocks. However, the reference point values that define a particular control rule (e.g., S_{MSY}) may be periodically updated. Changes to these reference point values, or specification of reference points for stocks where estimates are currently lacking, may be made through a regulatory process without plan amendment if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification. Insofar as possible, a proposed change to the value of a reference point will only be reviewed and approved within the schedule established for salmon estimation methodology reviews (completed at the November meeting prior to the year in which the proposed change would be effective) and apart from the preseason planning process. Federal court-ordered changes will also be accommodated without a plan amendment.

3.4 Management for Hatchery and ESA-listed Stocks

”~~ First, these habitat changes increase large scale variations in stock productivity and associated stock abundances, which in turn complicate the overall determination of MSY and the specific assessment of whether a stock is producing at or below that level. Secondly, as the productivity of the freshwater habitat is diminished, the benefit of further reductions in fishing mortality to improve stock abundance decreases. Clearly, the failure of several stocks managed under this FMP to produce at an historic or consistent MSY level has little to do with current fishing impacts and often cannot be rectified with the cessation of all fishing.~~

~~To address the requirements of the Magnuson-Stevens Act to clearly identify when a stock may be approaching an overfished condition or is overfished, the Council has established two separate criteria based on a stock=s failure to meet its conservation objective. These criteria are denoted as a Aconservation alert@ and an Aoverfishing concern@. The criteria for these two categories are based on the unique life history of salmon and the large variations in annual stock abundance due to numerous environmental variables. They also take into account the uncertainty and imprecision surrounding many estimates of MSY, fishery impacts, and spawner escapements. In recognition of the unique salmon life history, the criteria differ somewhat from the general guidance in the National Standard Guidelines (' 600.310), but equal or exceed them in addressing the overfishing issue as it relates to salmon.~~

~~3.2.2 Conservation Alert~~

> *~~AA fishery shall be classified as approaching a condition of being overfished if, based on trends in fishing effort, fishery resource size, and other appropriate factors, the Secretary estimates that the fishery will become overfished within two years.@~~*
>
> *~~Magnuson-Stevens Act, ' 304(e)(1)~~*

~~To anticipate and react to potential stock declines which might lead to overfishing, the Council has established a conservation alert process with criteria and actions as described below.~~

~~3.2.2.1 Criteria~~

~~A conservation alert is triggered during the annual preseason process (Chapter 9) if a natural stock or stock complex, listed in Table 3-1, is projected to not achieve its conservation objective (MSY, MSY proxy, MSP, or floor in the case of some harvest rate objectives [e.g., 35,000 adult natural Klamath River fall Chinook spawners]). While a projected one-year shortfall may be of little biological concern, it may also represent the beginning of production problems and is worthy of note to help prevent future stock decline.~~

~~3.2.2.2 Council Action~~

~~For all natural stocks which meet the conservation alert criteria, the Council will notify pertinent fishery and habitat managers, advising that the stock may be temporarily depressed or approaching an overfishing concern (depending on its recent conservation status), and request that state and tribal fishery managers identify the probable causes, if known. If the stock in question has not met its conservation objective in the previous two years, the Council will request the pertinent state and tribal managers to do a formal assessment of the primary factors leading to the shortfalls and report their conclusions and recommendations to the Council no later than the March meeting prior to the next salmon season.~~

~~The Council will take the following actions for stocks which trigger a conservation alert that do not qualify as exceptions under Section 3.2.4 (see Table 3-1):~~

1. ~~Close salmon fisheries within Council jurisdiction that impact the stock.~~

2. ~~In the case of Washington coastal and Puget Sound salmon stocks and fisheries managed under U.S. District Court orders, the Council may allow fisheries which meet annual spawner targets developed through relevant U.S. v. Washington, Hoh v. Baldrige, and subsequent U.S. District Court ordered processes and plans, which may vary from the MSY or MSP conservation objectives.~~

3. ~~Within the Cape Falcon to Point Sur area, the Council may allow~~ *de minimis* ~~fisheries which: permit an ocean impact rate of no more than 10 percent on age-4 Klamath River fall Chinook, if the projected natural spawning escapement associated with a 10 percent age-4 ocean impact rate, including river recreational and tribal impacts, is between the conservation objective (35,000) and 22,000. If the projected natural escapement associated with a 10 percent age-4 ocean impact rate is less than 22,000, the Council shall further reduce the allowable age-4~~

~~ocean impact rate to reflect the status of the stock~~[4]~~. When recommending an allowable age-4 ocean impact rate, the Council shall consider the following year specific circumstances:~~

~~(i)The potential for critically low natural spawner abundance, including the risk of Klamath Basin substocks dropping below crucial genetic thresholds;~~
~~(ii) A series of low spawner abundance in recent years;~~
~~(iii) The status of co-mingled stocks;~~
~~(iv) The occurrence of *El Niño* or other adverse environmental conditions;~~
~~(v) Endangered Species Act (ESA) considerations; and~~
~~(vi) Other considerations as appropriate.~~

~~The Klamath River fall Chinook age-4 ocean impact rate must not jeopardize the long term capacity of the stock to produce maximum sustainable yield on a continuing basis. Implementation of~~ *de minimis* ~~fisheries will depend on year specific estimates of ocean abundance and age composition, and will be determined by the Salmon Technical Team prior to the March Council meeting. Ocean fishery impacts to the returning brood incurred during the previous fall/winter fisheries will be counted against the allowable age-4 ocean impact rate.~~

~~Other than the exceptions noted above, the Council may not recommend ocean salmon fisheries which are expected to trigger a conservation alert.~~

~~If postseason estimates confirm that a stock conservation objective is not met, a rebuilding program for the following year is implicit in the conservation objective since it is based on annually meeting MSY or MSP. In addition, the Council reviews stock status annually and, where needed, identifies actions required to improve estimation procedures and correct biases. Such improvements provide greater assurance that objectives will be achieved in future seasons. Consequently, a remedial response is built into the preseason planning process to address excessive fishing mortality levels relative to the conservation objective of a stock.~~

~~The Council does not believe that a one year departure from the MSY/MSP spawner objective for salmon affects the capacity of a stock to produce MSY over the long-term (i.e., does not constitute overfishing as defined by the Magnuson-Stevens Act). However, the Council=s use of a conservation alert and the rebuilding effect of the conservation objectives provides for sound resource management and responds to the concept in the National Standard Guidelines for action to address overfishing concerns in any one year. The Council=s conservation objectives which are used to trigger a conservation alert are generally based on MSY or MSP rather than a minimum stock size threshold. In this respect, the Council=s management approach is more conservative than recommended by the National Standard Guidelines.~~

~~3.2.3 Overfishing Concern~~

> *~~AFor a fishery that is overfished, any fishery management plan, amendment, or proposed regulations . . . for such fishery shallB(A) specify a time period for ending overfishing and rebuilding the fishery that shallB(i) be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of the fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem; and (ii) not exceed 10 years, except in cases where the biology~~*

[4] ~~NMFS interprets that, consistent with the~~ *de minimis* ~~provisions of the FMP, the maximum allowable 10 percent age-4 ocean impact rate may be implemented only when the anticipated escapement is near the 35,000 natural spawner floor. As escapement falls below approximately 30,000, the impact rate will need to decline automatically.~~

~~*of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise. . ..@*~~

~~*Magnuson-Stevens Act, ' 304(e)(4)*~~

~~The Magnuson-Stevens Act requires overfishing be ended and stocks rebuilt in as short a period as possible and, depending on other factors, no longer than ten years. For healthy salmon stocks which may experience a sudden reduction in production and/or spawner escapement, the limitation on fishing impacts provided by the Council=s MSY or MSY proxy conservation objectives provide a stock rebuilding plan that should be effective within a single salmon generation (two years for pinks, three years for coho, and three to five years for Chinook). However, additional actions may be necessary to prevent overfishing of stocks suffering from chronic depression due to fishery impacts outside Council authority, or from habitat degradation or long-term environmental fluctuations. Such stocks may meet the criteria invoking the Council=s overfishing concern.~~

~~*3.2.3.1 Criteria*~~

~~The Council=s criteria for an overfishing concern are met if, in three consecutive years, the postseason estimates indicate a natural stock has not achieved its conservation objective (MSY, MSP, spawner floor, or harvest rate objectives) in Table 3-1. It is possible that this situation could represent normal variation. However, the occurrence of three consecutive years of reduced stock size or spawner escapements, depending on the magnitude of the short-fall, could signal the beginning of a critical downward trend (e.g., Oregon coastal coho) which may result in fishing that jeopardizes the capacity of the stock to produce MSY over the long term if appropriate actions are not taken to ensure the conservation objectives is achieved.~~

~~*3.2.3.2 Assessment*~~

~~When an overfishing concern is triggered, the Council will direct its STT to work with state and tribal fishery managers to complete an assessment of the stock within one year (generally, between April and the March Council meeting of the following year). The assessment will appraise the actual level and source of fishing impacts on the stock, consider if excessive fishing has been inadvertently allowed by estimation errors or other factors, identify any other pertinent factors leading to the overfishing concern, and assess the overall significance of the present stock depression with regard to achieving MSY on a continuing basis.~~

~~Depending on its findings, the STT will recommend any needed adjustments to annual management measures to assure the conservation objective is met, or recommend adjustments to the conservation objective which may more closely reflect the MSY or ensure rebuilding to that level. Within the constraints presented by the biology of the stock, variations in environmental conditions, and the needs of the fishing communities, the STT recommendations should identify actions that will recover the stock in as short a time as possible, preferably within ten years or less, and provide criteria for identifying stock recovery and the end of the overfishing concern. The STT recommendations should cover harvest management, potential enhancement activities, hatchery practices, and any needed research. The STT may identify the need for special programs or analyses by experts outside the Council advisors to assure the long-term recovery of the salmon population in question. Due to a lack of data for some stocks, environmental variation, economic and social impacts, and habitat losses or problems beyond the control or management authority of the Council, it is likely that recovery of depressed stocks in some cases could take much longer than ten years.~~

~~In addition to the STT assessment, the Council will direct its Habitat Committee (HC) to work with federal, state, local, and tribal habitat experts to review the status of the essential fish habitat affecting this stock and, as appropriate, provide recommendations to the Council for restoration and enhancement measures within a suitable time frame.~~

~~3.2.3.3 Council Action~~

~~Following its review of the STT report, the Council will specify the actions that will comprise its immediate response for ensuring that the stock=s conservation objective is met or a rebuilding plan is properly implemented and any inadvertent excessive fishing within Council jurisdiction is ended. The Council=s rebuilding plan will establish the criteria that identify recovery of the stock and the end of the overfishing concern. In some cases, it may become necessary to modify the existing conservation objective/rebuilding plan to respond to habitat or other long-term changes. Even if fishing is not the primary factor in the depression of the stock or stock complex, the Council must act to limit the exploitation rate of fisheries within its jurisdiction so as not to limit recovery of the stock or fisheries, or as is necessary to comply with ESA consultation standards. In cases where no action within Council authority can be identified which has a reasonable expectation of providing benefits to the stock unit in question, the Council will identify the actions required by other entities to recover the depressed stock. Upon review of the report from the HC, the Council will take actions to promote any needed restitution of the identified habitat problems.~~

~~For those fishery management actions within Council authority and expertise, the Council may change analytical or procedural methodologies to improve the accuracy of estimates for abundance, harvest impacts, and MSY escapement levels, and/or reduce ocean harvest impacts when shown to be effective in stock recovery. For those causes beyond Council control or expertise, the Council may make recommendations to those entities which have the authority and expertise to change preseason prediction methodology, improve habitat, modify enhancement activities, and re-evaluate management and conservation objectives for potential modification through the appropriate Council process.~~

~~3.2.3.4 End of Overfishing Concern~~

~~The criteria for determining the end of an overfishing concern will be included as a part of any rebuilding plan adopted by the Council. Additionally, an overfishing concern will be ended if the STT stock assessment provides a clear finding that the Council=s ability to affect the overall trend in the stock abundance through harvest restrictions is virtually nil under the Aexceptions@ criteria below for natural stocks.~~

~~3.2.4 Exceptions~~

> ~~*A*~~*Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches*~~*.@*~~*."*
>
> *Magnuson-Stevens Act, National Standard 6*

~~This~~The NS1 Guidelines provide flexibility under limited circumstances in the way reference points and management measures are specified. The NS1 Guidelines allow for flexibility in the management of ESA listed species, hatchery stocks, and stocks with unusual life history characteristics like Pacific salmon. Consistent with these provisions of the NS1 Guidelines, this plan ~~contains three exceptions~~takes an alternative approach to the ~~application of overfishing~~specification of control rules and status determination criteria and subsequent Council actions for ~~stocks or stock complexes with conservation objectives in Table 3-1: (1) hatchery stocks, (2)~~ hatchery stocks ~~for which Council management actions have inconsequential impacts, and (3)~~, and stocks listed under the ESA that are in the fishery.

3.~~2~~.4.1 Hatchery Stocks

Salmon stocks important to ocean fisheries and comprised exclusively of hatchery production generally have conservation objectives expressed as an egg-take or the number of spawners returning to the hatchery ~~rack~~ to meet program objectives. This plan recognizes these objectives and strives to meet them. However, these artificially produced stocks generally do not need the protection of ~~overfishing~~annual catch limits, status determination criteria, and special Council rebuilding programs to maintain long-term production. Because hatchery stocks can generally sustain significantly higher ~~harvest~~ exploitation rates than natural stocks, ocean fisheries rarely present a threat to their long-term survival. In addition, it is often possible to make temporary program modifications at hatcheries to assure adequate production to sustain the stock during periods of low abundance (e.g., sharing brood stock with other hatcheries, arranging for trapping at auxiliary sites, etc.). If specialized hatchery programs are approved in the future to sustain ESA listed salmon stocks, the rebuilding programs would be developed and ~~followed~~implemented under the ESA.

3.~~2.4.2 Natural Stocks With Minimal Harvest Impacts in Council-Managed Fisheries~~

~~Several natural stock components identified within this FMP are subject to minimal harvest impacts in Council fisheries because of migration timing and/or distribution. As a result, the Council=s ability to affect the overall trend in the abundance of these components through harvest restrictions is virtually nil. Components in this category are identified by a cumulative adult equivalent exploitation rate of less than five percent in ocean fisheries under Council jurisdiction during base periods utilized by the fishery regulation assessment models (1979-1982 for Chinook and 1979-1981 for coho). Council action for these components, when a conservation alert or an overfishing concern are triggered, will consist of confirming negligible impacts of proposed Council fisheries, identifying factors which have led to the decline or low abundance (e.g., fishery impacts outside Council jurisdiction, or degradation or loss of essential fish habitat), and monitoring of abundance trends and total harvest impact levels. Council action will focus on advocating measures to improve stock productivity, such as reduced interceptions in non-Council-managed fisheries, and improvements in spawning and rearing habitat, fish passage, flows, and other factors affecting overall stock survival.~~

~~3.2.4.3~~4.2 Stocks Listed Under the Endangered Species Act

The ~~Council regards stocks listed as endangered or threatened under the ESA as a third exception to the application of overfishing criteria of the Magnuson-Stevens Act. The~~ ESA requires federal agencies whose actions may ~~jeopardize~~ adversely affect listed salmon to consult with NMFS. Because NMFS implements ocean harvest regulations, it is both the action and consulting agency for actions taken under the FMP. To ensure ~~there is no jeopardy~~that ESA standards are met, NMFS conducts internal consultations with respect to the effects of ocean harvest on listed salmon. The Council implements NMFS' guidance as necessary to avoid jeopardy, ~~as well as in~~and conform to the degree possible with recovery plans approved by NMFS. As a result of NMFS' consultation, an incidental take statement may be issued which authorizes take of listed stocks under the FMP that would otherwise be prohibited under the ESA.

The Council believes that the requirements of the ESA are sufficient to meet the intent of the Magnuson-Stevens Act overfishing provisions. Those provisions are structured to maintain or rebuild stocks to levels at or above MSY and require the Council to identify and develop rebuilding plans for overfished stocks. For many fish species regulated under the Magnuson-Stevens Act, the elimination of excess fishing pressure is often the sole action necessary to rebuild depressed stocks. This is, however, not the case for many salmon stocks and, in particular, for most listed populations.

Although harvest has certainly contributed to the depletion of West Coast salmon populations, the primary reason for their decline has been the degradation and loss of freshwater spawning, rearing, and migration habitats. The quality and quantity of freshwater habitat are key factors in determining the MSY of salmon populations. The Council has no control over the destruction or recovery of freshwater habitat nor is it able to predict the length of time that may be required to implement the habitat improvements necessary to recover stocks. While the Council could theoretically establish new MSY escapement goals consistent with the limited or degraded habitat available to listed species, adoption of revised goals would potentially result in an ESA-listed stock being classified as producing at MSY and; therefore, not overfished under the Magnuson-Stevens Act.~~ The Council believes that the intent of the ESA and the Magnuson-Stevens Act is the recovery of stocks to MSY levels associated with restored habitat conditions~~ As species are delisted, the Council may establish conservation objectives and associated reference points to manage stocks consistent with the MSA, or alternatively, remove the stock from the FMP through a plan amendment.

~~The Council considers the consultation standards and recovery plans developed by NMFS for listed populations as interim rebuilding plans. Although NMFS= consultation standards and recovery plans may not by themselves recover listed populations to historical MSY levels within ten years, they are sufficient to stabilize populations until freshwater habitats and their dependent populations can be restored and estimates of MSY developed consistent with recovered habitat conditions. As species are delisted, the Council will establish conservation objectives with subsequent overfishing criteria and manage to maintain the stocks at or above MSY levels.~~

~~*3.3 SUPPLEMENTARY CONSERVATION INFORMATION*~~

~~**3.3.1 Endangered Species Act Listings**~~

Since 1990, West Coast salmon fisheries have been modified to accommodate special requirements for the protection of salmon species listed under the federal ESA. The ESA listing of a salmon population may have profound consequences for the management of Council mixed-stock ocean fisheries since listed populations are often incidentally harvested with more abundant healthy populations. As additional stocks of salmon have been listed, the ~~Council=s~~Council's preseason process has increasingly focused on protecting listed stocks. In applying the ESA to Pacific salmon, NMFS determined that a population segment of a salmon species must represent an evolutionarily significant unit (ESU) of that species in order to be eligible for listing. ESUs are characterized by their reproductive isolation and contribution to the genetic diversity of the species as a whole. NMFS establishes consultation standards for listed ESUs, which specify levels of incidental take that are not likely to jeopardize the continued existence of the ESU.

The Council must meet or exceed the requirements of the ESA, which is other applicable law. In addition to the stocks and conservation objectives in Table 3-1, the Council will manage all species listed under the ESA consistent with NMFS consultation standards or recovery plans to meet immediate conservation needs and to achieve the long~~-~~-term recovery of the species. These standards are provided annually to the Council by NMFS at the start of the preseason planning process. In so far as is practical, while not compromising its ability to meet the requirements of the ESA, NMFS will endeavor to provide opportunity for Council and peer review of any proposed consultation standards, or the objectives of recovery plans, well prior to their implementation. Such review would ideally commence no later than the last Council meeting in the year immediately preceding the first salmon season in which the standards would be implemented.

Table 3-~~2~~3 summarizes the relationships of the individual stocks and stock units managed under the FMP to the ESUs identified by NMFS in the course of ESA status reviews. With the exception of some hatchery stocks, the stocks managed under the FMP are generally representative of the range of life history features characteristic of most ESUs. The managed stocks therefore serve as indicators for ESUs and provide the information needed to monitor fishery impacts on ESUs as a whole. In some cases, the information necessary for stock specific management is lacking, leaving some ESUs without adequate representation. For these ESUs, it will be necessary in the immediate future to use conservative management principles and the best available information in assessing impacts in order to provide necessary protection. In the meantime, the responsible management entities should implement programs to ensure that data are collected for at least one stock representative of each ESU. Programs should be developed within five years of any ESA listing to provide the information that will permit the necessary stock specific management ~~within five years of completion of this amendment~~.

TABLE 3-~~1. Conservation objectives~~3. Listing of evolutionarily significant units, their ESA status, and ~~management information for natural and hatchery salmon~~associated stocks ~~and stock complexes of significance to ocean salmon fisheries. Abundance information is generally based on~~managed under the ~~period 1994-1998.~~ ~~a/~~FMP. (Page 1 of ~~15)~~2).

~~**Stock**~~	~~**Conservation Objective**~~[~~b/~~] ~~(to be met annually, unless noted otherwise)~~	~~**Subject to Council Actions to Prevent Overfishing**~~	~~**Other Management Information**~~[~~c/~~]

~~**- - - CHINOOK - - -**~~

ESU[a/]	~~**CALIFORNIA CENTRAL VALLEY** - All fall, late-fall, winter, and spring stocks of the Sacramento and San Joaquin Rivers and their tributaries. Management of this stock complex is based primarily on Sacramento River fall Chinook, which includes a large hatchery component and natural Sacramento River winter Chinook, which are listed as endangered. The San Joaquin system has been severely degraded by water development projects and pollution. Natural populations of spring Chinook there have been extirpated, and remaining spawning areas are utilized primarily by fall Chinook which have comprised <10% of the total Central Valley fall run.~~**ESA Status Month and Year of Initial Listing**
	- - - C
~~**Sacramento River**~~Central Valley Fall and Late Fall-run	Candidate Species Sept. 1999
Central Valley Spring-run	~~**Sacramento River Spring**~~ Listed Threatened Sept. 1999 ~~NMFS consultation standard/recovery plan (not established at time of printing. No defined objective for ocean management prior to listing.~~

Sacramento River Winter ~~Endangered (1994)~~-run	~~NMFS consultation standard. Since 1996, an annual preseason objective of a 31% increase in the adult spawner replacement rate (equivalent to a 1.77 replacement rate) relative to the observed 1989-1993 mean rate of 1.35. Objective undefined prior to listing.~~	~~No. Listed stock, MSY criteria undefined. ESA consultation standard provides interim rebuilding program.~~Listed Endangered Aug. 1989

~~nce to San Francisco Bay. Management of this stock complex is based primarily on meeting spawning escapements for natural fall Chinook. Limited data is available except for the Klamath River. An assessment and~~
~~basis for the future. There are significant water diversion problems in several drainages. In the Klamath River Basin, there is significant hatchery production of fall Chinook and less so of spring Chinook, resulting primar~~

California Coast	Listed Threatened Sept. 1999

~~aturally spawning adults in any one year. Brood escapement rate must average 33%-34% over the long-term, but an individual brood may vary~~ ~~Yes. A conservation alert or overfishing concern will be based on a failu~~
~~Objective designed to allow a wide range of spawner escapements from which to develop an MSY objective or proxy while protecting the stock~~
~~on Hubbell and Boydstun (1985); KRTT (1986); PFMC (1988); minor technical modifications in 1989, 1996, and 2008 (Table I-1). Natural~~
~~ts (Hubbell and Boydstun 1985), and 40,700 (Salmon Technical Team, 2005).~~

~~Indirectly. MSY criteria undefined. Productive potential protected by t~~

~~to tribal and sport fisheries which lowers ocean fishery impacts.~~

~~eason abundance estimates available. Management based primarily on an aggregate objective of 150,000 to 200,000 natural adult spawners (attainment of objective based on a postseason estimate of 60%-90 natural adult~~
~~twice the estimated MSY spawning escapement of 79,000 fall Chinook adults based on stock recruit analysis (McGie 1982). Significant hatchery production also exists within the coastal streams.~~

~~wners for Oregon coast (Thompson 1977 and McGie 1982). ODFW developing specific conservation objectives for spring and fall stocks that~~
~~cil.~~

~~Yes, based on postseason estimates of <60 natural adult spawners per m~~
~~which includes a large inside allocation component that reduces ocean fi~~

~~wners for Oregon coast (Thompson 1977 and McGie 1982). ODFW developing specific conservation objectives for spring and fall stocks that~~
~~cil.~~

~~Yes, based on postseason estimates of <60 natural adult spawners per mi~~

Southern Oregon/Northern California Coast	Not Warranted Sept. 1999

~~ing). McIsaac (1990) stock-recruit analysis supports MSY objective of 5,700 natural adult spawners.~~	~~No. Listed stock. ESA consultation standard provides interim rebuildin~~
~~ies.~~	~~No (hatchery exception).~~
~~.~~	~~No (hatchery exception).~~
~~ting). Willamette River Management Plan provides an MSY proxy of 30,000 to 45,000 hatchery and natural adults over Willamette River falls,~~	~~No. Listed stock. ESA consultation standard provides interim rebuild prevents effective Council fishery management and rebuilding.~~
	~~No (hatchery exception).~~
	~~No (hatchery exception).~~

~~CRFMP objective - MSY proxy of 115,000 adults above Bonneville Dam, including upper and mid-Columbia and Snake River stocks (state and~~ ~~these stocks).~~

~~Limited. Base period Council-area ocean fishery exploitation rate of <1~~ ~~restoration addressing water withdrawals and dam passage and blockage~~

~~f limiting its fisheries so that the total exploitation rate on age-3 and age-4 Lyons Ferry Hatchery fall Chinook (representing Snake River fall~~ ~~1988-1993 average adult equivalent exploitation rate. Prior to listing, managed within objectives for upper Columbia River bright fall Chinook.~~

~~No. Listed stock, MSY criteria undefined. ESA consultation standard~~ ~~dams block former primary spawning area.~~

~~No. Listed stock. Base period Council-area ocean fishery impacts rare (~~

~~984 based on CRFMP. The management goal has been increased to 45,000 by Columbia River managers in recent years.~~

~~Limited. Base period Council-area ocean fishery exploitation rate <4%~~

~~FMP objective - MSY proxy of 80,000 to 90,000 adults above Bonneville Dam, including both Columbia and Snake River stocks (state and tribal~~

~~Limited. Base period Council-area ocean fishery exploitation rate <2%~~ ~~mortalities must be reduced to allow rebuilding.~~

~~are and recognize CRFMP objective - MSY proxy of 115,000 adults above Bonneville Dam, including upper and mid-Columbia and Snake River these stocks).~~	~~No. Listed stock. Base period Council-area ocean fishery impacts r Reduce dam passage mortalities to allow rebuilding.~~

~~Columbia River through the western Strait of Juan de Fuca (west of the Elwha River). This stock complex consists of several natural stocks, generally of small to medium sized populations, and some hatchery proc ntly impacted by Council-area ocean fisheries. Preseason abundance estimates are generally not available for Council management. These stocks qualify as **exceptions** to the Council=s overfishing criteria, due to very l y. Objectives for Grays Harbor and the north coast river systems have been established pursuant to the U.S. District Court order in Hoh v. Baldrige. However, annual natural spawning escapement targets may vary from ishery escapement objectives are established for each river, or region of origin, which include provisions for treaty allocation and inside, non-Indian fishery needs.~~

	~~Limited (exploitation rate exception).~~
	~~No (hatchery exception).~~
~~l rearing habitat (WDF 1979).~~	~~Limited (exploitation rate exception).~~
	~~A~~
	~~No (hatchery exception).~~
~~ral adult spawners, the MSY level estimated by Cooney (1984).~~	~~Limited (exploitation rate exception).~~
~~l adult spawners.~~	~~A~~
~~ral adult spawners, the MSY level estimated by Cooney (1984).~~	~~A~~
~~l adult spawners.~~	~~A~~
~~ral adult spawners, the MSY level estimated by Cooney (1984).~~	~~A~~
	~~A~~
~~r (1977). May include adults used for supplementation program.~~	~~A~~

~~the eastern Strait of Juan de Fuca (east of Salt Creek). This stock complex consists of numerous natural Chinook stocks of small to medium sized populations and significant hatchery production. Puget Sound stocks c uivalent) of 2% or less are below a management threshold which allows effective Council management of these stocks and they qualify as **exceptions** to the Council=s overfishing criteria. The stocks within this comp ion were developed by a State/Tribal Management Plan Development Team following the Boldt Decision and were based on Athe adult spawning population that will, on the average, maximize biomass of juvenile c~~

~~ent spawner abundances that provided maximum production (Ames and Phinney 1977). The objectives for stocks managed for artificial production are based on hatchery escapement needs. Annual management ta~~ ~~orandum Adopting Salmon Management Plan@ (U.S. v. Washington, 626 F. Supp. 1405 [1985]).~~	
~~inting). MSP objective of 3,825 natural and hatchery adult spawners 2,900 for the Elwha River (Ames and Phinney 1977) and 925 for the~~	~~Limited (exploitation rate exception).~~
~~ing). MSP objective of 1,650 natural adult spawners (Ames and Phinney 1977).~~	~~A~~
~~ing). MSP objective of 2,000 natural adult spawners.~~	~~A~~
~~ing). MSP objective of 14,850 natural adult spawners (Ames and Phinney 1977).~~	~~A~~
~~ing). MSP objective of 3,000 natural adult spawners based on mean escapement 1959-1968.~~	~~A~~
~~ing). MSP objective of 2,000 natural adult spawners (Ames and Phinney 1977).~~	~~A~~
~~ing). MSP objective of 5,250 natural adult spawners (Ames and Phinney 1977).~~	~~A~~
~~ing). MSP objective of 1,200 natural adult spawners (Hage et al. 1994).~~	~~A~~
~~ing). MSP objective of 1,000 natural adult spawners.~~	~~A~~
~~ing). MSP objective of 5,750 natural adult spawners (Ames and Phinney 1977).~~	~~A~~
~~ing). MSP objective of 900 natural adult spawners.~~	~~A~~
~~Fraser River. Management based primarily on natural and hatchery fall Chinook. Base period, Council-area ocean fishery exploitation rates (adult equivalent) on the coastal stocks of 1% or less are below a managemen~~	
~~on Treaty.~~	~~No. Under Canadian authority and would also be an exploitation rate ex~~

~~on Treaty.~~

~~No. Under Canadian authority.~~

~~atchery coho stocks from streams south of Leadbetter Pt., WA. Significant production from Columbia River and Oregon coastal hatcheries provide harvest in ocean fisheries throughout the Council management area. C~~
~~cks. Both natural and hatchery components have been severely depressed for several years due to a combination of previously high fishery impacts, major losses or degradation of freshwater habitat, and long-term marine~~

~~of coho in commercial and recreational fisheries off California in conjunction with total marine fishery impacts of no more than 13% on~~
~~r to listing.~~

~~No. Listed stock, MSY criteria undefined. ESA consultation stand~~
~~deterioration of significant portions of freshwater habitat, distribution at~~

~~shery impacts limited to no more than 13% on Rogue/Klamath hatchery coho (surrogate stock) and no retention of coho in California ocean~~

~~No. Listed stock, MSY criteria undefined. ESA consultation standard p~~
~~10 years even with no fishery impacts, due to loss or deterioration~~
~~conditions.~~

~~jective under Amendment 13 and the Oregon Plan: For each of the four component stocks, a rebuilding and data collection program with an 35%, depending on parent escapement and ocean survival trends (adopted 1997). For a detailed description of the objective, see Section 3.3.2.~~

~~No. Listed stock, rebuilding program initiated in 1998. The ann environmental conditions are favorable. Recovery for some compone deterioration of significant portions of freshwater habitat and ongoing ur~~

~~No (hatchery exception).~~

~~No (hatchery exception).~~

~~critical review that may establish an explicit objective.~~

~~Not presently. See management information.~~

~~streams north of the Columbia River through the western Strait of Juan de Fuca (West of the Elwha River). Management goals for Grays Harbor and Olympic Peninsula coho stocks include achieving natural spawning~~
~~capements established pursuant to the U.S. District Court order in Hoh v. Baldrige. Annual natural spawning escapement targets and total escapement objectives are established by the Washington Department of Fish a~~
~~nt objectives are established for each river, or region of origin, which include provisions for providing treaty allocation requirements and inside, non-Indian fishery needs. The conservation objectives for the Queets,~~
~~e of recruits-per-spawner and low estimate of carrying capacity for the lower bound, and the low estimate of recruits-per-spawner with the high estimate of smolt carrying capacity for the upper end of the range. The rang~~

~~No (hatchery exception).~~

~~et agreed to by WDFW and the Quinault Indian Nation .~~

~~Yes. Conservation alert or overfishing concern based on fewer than 35,4~~

~~ction potential for naturally spawning fish.~~	~~No (hatchery exception).~~
~~or annual target agreed to by WDFW and the Quinault Indian Nation.~~	~~Yes. Conservation alert or overfishing concern based on fewer than 5,80~~
~~or annual target agreed to by WDFW and Hoh Tribe.~~	~~Yes. Conservation alert or overfishing concern based on fewer than 2,00~~
~~or annual target agreed to by WDFW and the Quillayute Tribe.~~	~~Yes. Conservation alert or overfishing concern based on fewer than 6,30~~

~~No (hatchery exception).~~

~~habitat apportionment of WDFW/Tribal Technical Committee in 1998) or annual target agreed to through fixed procedures established in U.S.~~ ~~Yes. Conservation alert or overfishing concern based on fewer than 11,9~~

~~d and the eastern Strait of Juan de Fuca (east of Salt Creek). The Puget Sound Salmon Management Plan defines management objectives and long term goals for these stocks as developed by representatives from fede~~
~~s managed for artificial production. However, a transition to exploitation rate management is currently under consideration by the involved managers. Annual escapement targets for these coho stocks are developed th~~
~~iginal conservation objectives were developed by a State/Tribal Management Plan Development Team following the Boldt Decision with the goal for natural spawning stocks defined as Athe adult spawning population~~
~~sed on assessment of the quantity and quality of rearing habitat and the number of adult spawners required to fully seed the habitat (Zillges 1977). Some objectives have subsequently been modified in 1983 by the U~~

~~itat apportionment of WDFW/Tribal Technical Committee in 1998) or annual target agreed to in fixed procedures set by U.S. District Court. The~~ ~~Yes. Conservation alert or overfishing concern based on fewer than 950~~
~~aged on a harvest rate basis.~~

~~e 1994 by WDFW/Tribal Technical Committee) or annual target agreed to in fixed procedures set by U.S. District Court.~~ ~~Yes. Conservation alert or overfishing concern based on fewer than 21,5~~

~~983) or annual target agreed to in fixed procedures set by U.S. District Court. (The spawner assessment methodology is currently being revised~~ ~~Yes. Conservation alert or overfishing concern based on fewer than 30,0~~

~~arget agreed to in fixed procedures set by U.S. District Court.~~ ~~Yes. Conservation alert or overfishing concern based on fewer than 17,0~~

~~by WDFW/Tribal Technical Committee) or annual target agreed to in fixed procedures set by U.S. District Court.~~ ~~Yes. Conservation alert or overfishing concern based on fewer than 70,0~~

~~r development.~~	~~No (hatchery exception).~~
~~ding Vancouver Island) and the Fraser River.~~	
~~visions of the Pacific Salmon Treaty.~~	~~No. Not under Council management authority.~~
~~visions of the Pacific Salmon Treaty.~~	~~No. Not under Council management authority.~~

~~orth of 48E N latitude to meet Fraser River natural spawning escapement and U.S./Canada allocation requirements. The Council manages pink salmon harvests in that portion of the EEZ, which is not in the Fraser Rive~~
~~fixed constraints of coho and Chinook harvest ceilings and providing for treaty allocation requirements.~~

~~on Treaty (Fraser River Panel).~~	~~No. Minor impacts in Council fisheries and not under Council managem~~

~~visions of the Pacific Salmon Treaty (Fraser River Panel).~~	~~No. Minor impacts in Council fisheries and not under Council managem~~

~~TABLE 3-2. Listing of evolutionarily significant units, their ESA status, and associated stocks managed under the FMP. (Page 28 of 2).~~

~~ESU[a/]~~	~~ESA Status Month and Year of Initial Listing~~	~~Stock Representation in FMP~~
~~CHINOOK~~		
~~Central Valley Fall~~	~~Candidate Species Sept. 1999~~	~~! Sacramento River Fall~~
~~Central Valley Spring~~	~~Listed Threatened Sept. 1999~~	~~! Central Valley Spring~~
~~Sacramento River Winter~~	~~Listed Endangered Aug. 1989~~	~~! Sacramento River Winter~~
~~California Coast~~	~~Listed Threatened Sept. 1999~~	~~! Eel, Mattole, and Mad Rivers~~
~~Southern Oregon/Northern California Coast~~	~~Not Warranted Sept. 1999~~	~~! Southern Oregon~~ ~~! Smith River~~ ~~! Klamath River Fall~~
Upper Klamath and Trinity Rivers	Not Warranted	! Klamath River Fall ! Klamath River Spring
Oregon Coast	Not Warranted	! Central and Northern Oregon
Washington Coast	Not Warranted	! Willapa Bay Fall ! Grays Harbor Fall ! Grays Harbor Spring ! Queets Fall ! Queets Spring/Summer ! Hoh Fall ! Hoh Spring/Summer ! Quillayute Fall ! Quilayute Spring/Summer ! Hoko Summer/Fall (Western Strait of Juan de Fuca)
Puget Sound	Listed Threatened May 1999	! Elwha Summer/Fall (Eastern Strait of Juan de Fuca) ! Skokomish Summer/Fall (Hood Canal) ! Nooksack Spring (early) ! Skagit Summer/Fall ! Skagit Spring ! Stillaguamish Summer/Fall ! Snohomish Summer/Fall ! Cedar River Summer/Fall (Lake Washington) ! White River Spring ! Green River Summer/Fall ! Nisqually River Summer/Fall (South Puget Sound)
Lower Columbia River	Listed Threatened May 1999	! Sandy, Kalama, and Cowlitz (fall and spring) ! North Lewis River Fall
Upper Willamette River	Listed Threatened May 1999	! Upper Willamette ~~and Clackamas Rivers~~River
~~Mid-Columbia River Spring~~	~~Not Warranted~~	! ~~Klickitat, Warm Springs, John Day, and Yakima Rivers (spring)~~
Upper-Columbia River Summer/Fall	Not Warranted	! Upper River Bright ! Upper ~~Columbia~~ River Summer
Upper Columbia River Spring	Listed Endangered May 1999	! Upper ~~Columbia~~ River Spring
Snake River Fall	Listed Threatened May 1992	! Snake River Fall

Snake River Spring/Summer	Listed Threatened May 1992	! Snake River Spring/Summer
	- - - COHO - - -	
Central California Coast	Listed Threatened Dec. 1996	! By proxy - Rogue/Klamath hatchery coho
Southern Oregon/Northern California Coasts	Listed Threatened May 1997	! Southern Oregon Coastal Natural ! Northern California
Oregon Coast	Listed Threatened Oct. 1998	! South Central Oregon Coast ! North Central Oregon Coast ! Northern Oregon Coastal
Lower Columbia River	Listed Threatened June 2005	! Columbia River Natural
~~South Western~~Southwest Washington Coast	Candidate Species July 1995	! Grays Harbor
Olympic Peninsula	Not Warranted	! Queets ! Hoh ! Quillayute Fall ! Strait of Juan de Fuca (Western)
Puget Sound/Strait of Georgia	Candidate Species	! Strait of Juan de Fuca (Eastern) ! Hood Canal ! Skagit ! Stillaguamish ! Snohomish
	- - - PINK - - -	
Puget Sound, Odd Numbered Years	Not Warranted	! Puget Sound

~~3.3.2 Oregon Coastal Natural Coho~~

~~Amendment 13 (PFMC 1999) established a recovery and rebuilding plan for Oregon coastal natural (OCN) coho which (1) defines individual management criteria for four separate stock components, (2) sets overall harvest exploitation rate targets for OCN coho that significantly limit the impact of fisheries on the recovery of depressed stock components, (3) promotes stock rebuilding while allowing limited harvest of other abundant salmon stocks during critical rebuilding periods, and (4) is consistent with the Oregon State recovery plan.~~a/ A description of the ESU boundaries may be found at 63 FR 11486 (March 9, 1998) for Chinook and 60 FR 38016 (July 25, 1995) for coho.

3.5~~ Under the rebuilding program, the overall allowable fishery impact rate in any given year for each stock component is determined by the spawning abundance of the parents and grandparents of the returning adults and upon the marine survival expectations for the current maturing brood, as predicted by smolt-to-jack survival rates for hatchery coho.~~

~~The assessment of historic parent abundance utilized in Amendment 13 is based on the number of spawners in each of the four stock components that is projected to achieve full seeding of high quality freshwater habitat at low levels of marine survival. The full seeding estimates (in terms of stratified random sampling numbers) are derived from a model based on freshwater habitat assessment which incorporates measures of variability in the quality of the freshwater habitat and estimates of survival between life stages where numerical indicators have been measured (Nickelson and Lawson 1996). The assessment of marine survival status is based on a partitioning of the observed marine survival for Oregon hatchery reared coho from 1970-1996 (PFMC 1999).~~

~~Under the rebuilding plan, the allowable overall fishery impact (exploitation rate) for OCN coho represents all fishing related mortality, including marine and freshwater fisheries for both retention and catch-and-release fishing. The maximum allowable exploitation rates range from less than 10% when parent abundance and/or marine survival is especially low, to a high of 35% if two generations of spawner~~

~~rebuilding have occurred and marine survival is sufficient to expect continued improvements in spawner escapement for a third generation. Regardless of high parental spawning levels or projected favorable ocean conditions, a cap of 35% in total stock impacts is maintained to provide insight as to the effects of high spawner levels on production. A limitation of 15% remains in effect even at the two highest tiers of parent escapement if ocean conditions are not favorable, so as to preserve rebuilding progress achieved to that point. The matrix in Table 3-3 illustrates specifically how spawner abundance and marine survival determine the maximum allowable stock exploitation rate objectives for each OCN coho stock component.~~

~~Each of the four OCN coho stock components will be managed in marine fisheries as a separate stock to the extent that the best scientific information allows. Because of apparent similarities in the marine distribution of the four components, little flexibility is expected in marine fishery intensities among the components. If some components begin rebuilding faster than others, but data are not available which allows the marine harvest of OCN coho components at different rates, opportunities for increased ocean harvest may be constrained by the weakest component. Any management flexibility for increased fisheries on any strong OCN coho component will likely be in freshwater or estuarine areas during the initial phase of the rebuilding process. In these areas, ODFW will base fishing opportunity on the status of populations in individual basins within a stock component, and directed fisheries on natural coho will be allowed only when spawners are expected to be at or above the full seeding level for high quality habitat. Actual seasons would be based on the presence of fin-clipped hatchery fish (e.g., selective fisheries), public comment, and other basin-specific factors. An intensive monitoring program will be implemented by ODFW to measure the overall management effectiveness toward the goal of increasing OCN spawner levels and consequent juvenile and adult progeny. The Environmental Assessment (EA) for Amendment 13 (PFMC 1999) contains further details of the monitoring plan and of the overall OCN coho management criteria and its basis.~~

~~In consideration for the uncertainties that exist in this recovery regime and the potential for new information to affect basic assumptions critical to its success, the measures adopted in Amendment 13 are subject to a comprehensive, adaptive review in 2000 (PFMC 2000b). To incorporate the best science, the methods of estimating the technical parameters used in this proposal may change without plan amendment, if approved by the Council following a technical review and recommendation for change by the Scientific and Statistical Committee.~~

~~3.4~~ BYCATCH

AConservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.@

Magnuson-Stevens Act, National Standard 9

A...Establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priorityB

(A) minimize bycatch; and

(B) minimize the mortality of bycatch which cannot be avoided;@

Magnuson-Stevens Act , ' 303(a)(11)

3.~~4~~5.1 Definition and Management Intent

~~A~~“Bycatch~~@~~” for the purposes of this fishery management plan is defined as fish caught in an ocean salmon fishery which are not sold or kept for personal use and includes economic discards, regulatory discards, and fishery mortality due to an encounter with fishing gear that does not result in capture of fish. Bycatch does not include any fish that legally are retained in a fishery and kept for personal, tribal, or cultural use, or that enter commerce through sale, barter, or trade. In addition, under the provisions of the Magnuson-Stevens Act, bycatch does not include targeted salmon released alive under a recreational catch-and-release fishery management program.

~~TABLE 3-3. Allowable fishery impact rate criteria for OCN coho stock components.~~

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

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

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

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

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

Under the salmon FMP, the primary bycatch that occurs is bycatch of salmon species. Therefore, the ~~Council=s~~Council's conservation and management measures shall seek to minimize salmon bycatch and bycatch mortality (drop off and hooking mortality) to the greatest extent practical in all ocean fisheries. When bycatch cannot be avoided, priority will be given to conservation and management measures that seek to minimize bycatch mortality and ensure the extended survival of such fish. These measures will be developed in consideration of the biological and ecological impacts to the affected species, the social and economic impacts to the fishing industry and associated communities, and the impacts upon the fishing, management, and enforcement practices currently employed in ocean salmon fisheries (see also Section 6.5.3).

3.~~4~~5.2 Occurrence

The present bycatch and bycatch mortality ~~estimation~~ estimates and methodologies ~~and procedures~~ for salmon in salmon fisheries are documented ~~in~~by the STT ~~(1999d)~~annually in the SAFE and ~~a compilation of SSC reviews of salmon estimation methodologies (PFMC 1997c).~~Preseason Report III documents. Bycatch of salmon in Pacific Coast trawl fisheries is documented in Amendment 12 (PFMC 1997a). More recent information is reported in a Section 7 biological opinion regarding salmon bycatch in the groundfish fishery (NMFS 2006), and a subsequent report that summarizes the bycatch of salmon in recent years (Bellman et al. 2011). Salmon fisheries or fishery practices which lack or do not have recent observation data or estimates of bycatch composition and associated mortality rates will be identified by the Council for future research priority in their biannual Research and Data Needs Report to NMFS. Future changes in the procedures and methodologies will occur only if a comprehensive technical review of existing biological data justifies a modification and is approved by the STT, SSC, and Council. All of these changes will occur within the schedule established for salmon estimation methodology review and apart from the preseason planning process.

Bycatch of fish other than salmon in salmon fisheries is generally very limited. Only hook-and-line gear is allowed in ocean salmon fisheries and regulations allow for retention of most groundfish species and limited numbers of Pacific halibut that are caught incidentally while salmon fishing.

3.~~4~~5.3 Standard Reporting Methodology

Within the salmon preseason planning process, management options will be assessed for the effects on the amount and type of salmon bycatch and bycatch mortality. Estimates of salmon bycatch and incidental mortalities associated with salmon fisheries will be included in the modeling assessment of total fishery impact and assigned to the stock or stock complex projected to be impacted by the proposed management measure. The resultant fishery impact assessment reports for the ocean salmon fisheries will specify the amount of salmon bycatch and bycatch mortality associated with each accompanying management option. The final analysis of Council-adopted management measures will contain an assessment of the total salmon bycatch and bycatch mortality for ocean salmon fisheries, and include the percentage that these estimates represent compared to the total harvest projected for each species, as well as the relative change from the previous ~~year=s~~year's total bycatch and bycatch mortality levels.

4 HABITAT AND PRODUCTION

AAny fishery management plan . . . shall . . . protect, restore, and promote the long-term health and stability of the fishery.

Magnuson-Stevens Act, '303(a)(1)

The Council will be guided by the principle that there should be no net loss of the productive capacity of marine, estuarine, and freshwater habitats which sustain commercial, recreational, and tribal salmon fisheries beneficial to the nation. Within this policy, the Council will assume an aggressive role in the protection and enhancement of anadromous fish habitat, especially essential fish habitat.

4.1 ESSENTIAL FISH HABITAT

A...Describe and identify essential fish habitat for the fishery . . . minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;@

Magnuson-Stevens Act, '303(a)(7)

Protecting, restoring, and enhancing the natural productivity of salmon habitat, especially the estuarine and freshwater areas, is an extremely difficult challenge which must be achieved if salmon fisheries are to remain healthy for future generations. Section 3(10) of the Magnuson-Stevens Act defines essential fish habitat (EFH) as ~~A~~those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity~~.@~~. The following interpretations have been made by NMFS to clarify this definition: ~~A~~waters~~@~~ include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include historic areas if appropriate; ~~A~~substrate~~@~~ includes sediment, hard bottom, structures underlying the waters, and associated biological communities; ~~A~~necessary~~@~~ means the habitat required to support a sustainable fishery and the managed species~~=~~ contribution to a healthy ecosystem; and ~~A~~spawning, breeding, feeding, or growth to maturity~~@~~ covers a species full life cycle.

4.1.1 Identification and Description

Appendix A to the *Pacific Coast Salmon Plan* contains the ~~Council=s~~Council's complete identification and description of Pacific coast salmon fishery EFH, along with a detailed assessment of adverse impacts and actions to encourage conservation and enhancement of EFH. The Pacific coast salmon fishery EFH includes those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. In the estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (200 nautical miles) offshore of Washington, Oregon, and California north of Point Conception. Foreign waters off Canada, while still salmon habitat, are not included in salmon EFH, because they are outside U.S. jurisdiction. The Pacific coast salmon fishery EFH also includes the marine areas off Alaska designated as salmon EFH by the North Pacific Fishery Management Council. In freshwater, the salmon fishery EFH includes all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon (except above certain impassable natural barriers) in Washington, Oregon, Idaho, and California as identified in Table 1-1 of Appendix A. Salmon EFH includes aquatic areas above all artificial barriers except the impassible barriers (dams) listed in Table A-2 of Appendix A. However, activities occurring above impassable barriers that are likely to adversely affect EFH below impassable barriers are subject to the consultation provisions of the Magnuson-Stevens Act. The identification and description of EFH may be modified in the future through salmon FMP amendments as new or better information becomes available.

4.1.2 Adverse Effects of Fishing on Essential Fish Habitat

To the extent practicable, the Council must minimize adverse impacts of fishing activities on salmon EFH. Fishing activities may adversely affect EFH if the activities cause physical, chemical, or biological alterations of the substrate, and loss of or injury to benthic organisms, prey species and their habitat, and other components of the ecosystem. The marine activities under Council management authority or influence that may impact EFH are effects of fishing gear, prey removal by other fisheries, and the effect of salmon fishing on the reduction of stream nutrients due to fewer salmon carcasses on the spawning grounds. Within its fishery management authority, the Council may use fishing gear restrictions, time and area closures, or harvest limits to reduce negative impacts on EFH. Section 3.1 of Appendix A provides a description of the potential impacts on EFH from fishing activities and measures to assess or reduce those impacts. The description and measures includes both fisheries within Council management authority and those under other management jurisdictions.

In determining actions to take to minimize any adverse effects from fishing, the Council will consider the nature and extent of the impact and the practicality and effectiveness of management measures to reduce or eliminate the impact. The consideration will include long- and short-term costs and benefits to the fishery and EFH along with other appropriate factors consistent with National Standard 7 ~~(A~~(”Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication~~.@).~~.”).

4.1.3 Adverse Effects of Non-Fishing Activities on Essential Fish Habitat

> *~~A~~“Each Council shall comment on and make recommendations to the Secretary and any Federal or State agency concerning any such activity (authorized, funded, or undertaken, or proposed to be undertaken by any Federal or State agency) that, in the view of the Council, is likely to substantially affect the habitat, including essential fish habitat, of an anadromous fishery resource under its authority~~.@ . . . A~~.”. . . “Within 30 days . . . a Federal agency shall provide a detailed response in writing . . ~~.@~~..”*
>
> *Magnuson-Stevens Act, ' 305(b)*

The Council will strive to assist all agencies involved in the protection of salmon habitat. This assistance will generally occur in the form of Council comments endorsing protection, restoration, or enhancement programs; requesting information on and justification for actions which may adversely impact salmon production; and in promoting salmon ~~fisheries=~~fisheries’ needs among competing uses for the limited aquatic environment. In commenting on actions which may affect salmon habitat, the Council will seek to ensure implementation of consistent and effective habitat policies with other agencies having environmental control and resource management responsibilities over production and harvest in inside marine and fresh waters.

Specific recommendations for conservation and enhancement measures for EFH are listed in Appendix A. In implementing its habitat mandates, the Council will seek to achieve the following overall objectives:

1. Work to assure that Pacific salmon, along with other fish and wildlife resources, receive equal treatment with other purposes of water and land resource development.

2. Support efforts to restore Pacific salmon stocks and their habitat through vigorous implementation of federal and state programs.

3. Work with fishery agencies, tribes, land management agencies, and water management agencies to assess habitat conditions and develop comprehensive restoration plans.

4. Support diligent application and enforcement of regulations governing ocean oil exploration and development, timber harvest, mining, water withdrawals, agriculture, or other stream corridor uses by local, state, and federal authorities. It is Council policy that approved and permitted activities employ the best management practices available to protect salmon and their habitat from adverse effects of contamination from domestic and industrial wastes, pesticides, dredged material disposal, and radioactive wastes.

5. Promote agreements between fisheries agencies and land and water management agencies for the benefit of fishery resources and to preserve biological diversity.

6. Strive to assure that the standard operation of existing hydropower and water diversion projects will not substantially reduce salmon productivity.

7. Support efforts to identify and avoid cumulative or synergistic impacts in drainages where Pacific salmon spawn and rear. The Council will assist in the coordination and accomplishment of comprehensive plans to provide ~~basinwide~~basin-wide review of proposed hydropower development and other water use projects. The Council encourages the identification of no-impact alternatives for all water resource development.

8. Support and encourage efforts to determine the net economic value of conservation by identifying the economic value of fish production under present habitat conditions and expected economic value under improved habitat conditions.

4.2 COMPENSATION FOR NATURAL PRODUCTION LOSSES

Whenever unavoidable fish population losses occur as a result of various development programs or other action, the Council will recommend compensatory measures that, to the extent practicable, meet the following guidelines:

1. Replacement of losses will be by an equivalent number of fish of the appropriate stock of the same fish species or by habitat capable of producing the equivalent number of fish of the same species that suffered the loss.

2. Mitigation or compensation programs will be located in the immediate area of loss.

3. In addition to direct losses of fish production, compensation programs will include consideration of the opportunity to fish and potential unrealized production at the time of the project.

4. Measures for replacement of runs lost due to construction of water control projects should be completed in advance of, or concurrent with, completion of the project.

4.3 ARTIFICIAL PRODUCTION

Artificial production programs can be an important component of healthy salmon fisheries. They may fall under one of four general categories: fishery enhancement, natural stock recovery, coded-wire tag indicator stock, or mitigation. To assure the effectiveness and maximize the benefits of artificial production programs, the Council recommends meeting the following objectives:

5. Maximize the continued production of hatchery stocks consistent with harvest management and stock conservation objectives.

6. Ensure that mitigation and enhancement programs, with a primary objective of producing hatchery origin salmon for harvest, minimize adverse ecological and genetic impacts to naturally producing

populations (e.g., straying and mixing on the spawning grounds, unbalanced exploitation rates, loss of genetic diversity). Further, the methods employed to produce salmon for harvest should ensure high survival and high contribution rates to the fisheries targeting the enhanced stock while meeting natural stock objectives.

7. Ensure that artificial production programs designed to perpetuate and/or rebuild depressed natural populations are designed to be short-term in duration, boost the abundance of targeted natural populations over a few generations, and terminate when the population is able to sustain itself naturally.

8. Support efforts to continually review and improve the effectiveness of artificial propagation.

5 HARVEST

~~A~~"Conservation and management measures shall, consistent with the conservation requirements of this Act, … 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~~.@~~."

Magnuson-Stevens Act, National Standard 8

The Council process for determining the allowable ocean fishery harvest centers primarily around protecting weak or listed natural salmon stocks, while providing harvest opportunity on stronger natural and hatchery stocks in ways that conform to the ~~plan=s~~plan's harvest allocation objectives. Achieving these multiple objectives is complicated by natural variability in annual stock abundance, variability in the ocean migratory routes and timing, the high degree of mixing of different salmon species and stocks in ocean fisheries, and imprecision in the estimation of these important parameters. Within this complexity and uncertainty, the Council attempts to achieve its fishery harvest objectives by using the various management tools described in Chapter 6.

Procedures for determining allowable ocean harvest vary by species, fishery complexity, available data, and the state of development of predictive tools. Descriptions of the various procedures in effect in 1984 have been documented ~~in~~ (PFMC ~~(~~1984). These procedures have and will change over time to incorporate the best science. Specific changes resulting from improvements in forecasting techniques or changes in outside/inside allocation procedures due to treaty or user-sharing revisions are anticipated by the ~~plan=s~~plan's framework mechanism. Such changes may be adopted without formal amendment. Changes in procedures and the rationale for such changes are described in Council documents developed during the preseason regulatory process (see Chapter 9), in pertinent plan amendment documents, and in various methodology reviews by the SSC.

5.1 OVERALL FISHERY OBJECTIVES

The following objectives guide the Council in establishing fisheries against a framework of ecological, social, and economic considerations.

10. Establish ocean exploitation rates for commercial and recreational salmon fisheries that are consistent with requirements for stock conservation objectives and ACLs within Section 3~~.1~~, specified ESA consultation or recovery standards, or Council adopted rebuilding plans.

11. 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.

12. Seek to maintain ocean salmon fishing seasons which support the continuance of established recreational and commercial fisheries while meeting salmon harvest allocation objectives among ocean and inside recreational and commercial fisheries that are fair and equitable, and in which fishing interests shall equitably share the obligations of fulfilling any treaty or other legal requirements for harvest opportunities~~.~~ ~~1~~ 3/.

13. Minimize fishery mortalities for those fish not landed from all ocean salmon fisheries as consistent with optimum yield and the bycatch management specifications of Section 3.4.

14. Manage and regulate fisheries so that the optimum yield encompasses the quantity and value of food produced, the recreational value, and the social and economic values of the fisheries.

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

16. 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.

17. 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.

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

5.2 MANAGEMENT CONSIDERATIONS BY SPECIES AND AREA

Following, are brief descriptions of the stock management considerations which guide the Council in setting fishing seasons within the major subareas of the Pacific Coast.

5.2.1 Chinook Salmon

5.2.1.1 South of Horse Mountain

Within this area, considerable overlap of Chinook originating in Central Valley and northern California coastal rivers occurs between Point Arena and Horse Mountain. Ocean commercial and recreational fisheries are managed to address impacts on Chinook stocks originating from the Central Valley, California Coast, Klamath River, Oregon Coast, and the Columbia River. With respect to California stocks, ocean commercial and recreational fisheries operating in this area are managed to maximize natural production consistent with meeting the U.S. obligation to Indian tribes with federally recognized fishing rights, and recreational needs in inland areas. Special consideration must be given to meeting the consultation or recovery standards for endangered Sacramento River winter Chinook in the area south of Point Arena and for threatened Snake River fall Chinook north of Pigeon Point. Sacramento River spring Chinook and California coastal Chinook are also listed as threatened under the state ESA.

5.2.1.2 Horse Mountain to Humbug Mountain (Klamath Management Zone)

Major Chinook stocks contributing to this area originate in streams located along the southern Oregon/California coasts as well as the Central Valley. The primary Chinook run in this area is from the Klamath River system, including its major tributary, the Trinity River. Ocean commercial and recreational fisheries operating in this area are managed to maximize natural production of Klamath River fall and spring Chinook consistent with meeting the U.S. obligations to Indian tribes with federally recognized fishing rights, and recreational needs in inland areas. Ocean fisheries operating in this area must balance management considerations for stock-specific conservation objectives for Klamath River, Central Valley, California coast, Oregon coast, and Columbia River Chinook stocks.

5.2.1.3 Humbug Mountain to Cape Falcon

The major Chinook stocks contributing to this area primarily originate in Oregon coastal rivers located north of Humbug Mountain, as well as from the Rogue, Klamath, and Central Valley systems. Allowable ocean harvests in this area are an annual blend of management considerations for impacts on Chinook stocks originating from the Central Valley, California Coast, Klamath River, Oregon Coast, Columbia River, and the Washington Coast.

5.2.1.4 North of Cape Falcon

The majority of the ocean Chinook harvest in this area primarily originates from the Columbia River, with additional contributions from Oregon and Washington coastal areas, Puget Sound and some California stocks. Bonneville Pool (Spring Creek hatchery tule) fall and lower Columbia River (tule) fall and spring (Cowlitz) Chinook, all primarily of hatchery-origin, comprise a majority of the ocean Chinook harvest between Cape Falcon, Oregon and the U.S.-Canada border. Hatchery production escapement goals of these stocks are established according to long-range production programs and/or mitigation requirements associated with displaced natural stocks. Allowable ocean harvest in this area is directed at Columbia River stocks with contributions from the Oregon Coast, Washington Coast, and Puget Sound.

5.2.2 Coho Salmon

5.2.2.1 South of Cape Falcon

Columbia River, Oregon, and California coho are managed together within the framework of the Oregon Production Index (OPI) since these fish are essentially intermixed in the ocean fishery. These coho contribute to ocean fisheries off the southern Washington coast as well as to fisheries off the coasts of Oregon and northern California. Ocean fishery objectives for the OPI area address the following (1) conservation and recovery of Oregon and California coastal coho, including consultation or recovery standards for OCN and California coastal coho; (2) the desire for viable fisheries inside the Columbia River; and (3) impacts on conservation objectives for other key stocks.

The OPI is used as a measure of the annual abundance of adult three-year-old coho salmon resulting from production in the Columbia River and Oregon and California coastal basins. The index itself is simply the combined number of adult coho that can be accounted for within the general area from Leadbetter Point, Washington to as far south as coho are found. Currently, it is the sum of (1) ocean sport and troll fishery impacts in the ocean south of Leadbetter Point, Washington, regardless of origin; (2) Oregon and California coastal hatchery returns; (3) the Columbia River inriver runs; (4) Oregon coastal natural spawner escapement and (5) Oregon coastal inside fishery impacts. Most of the California production is from hatcheries which provide a very small portion of the total hatchery production in the OPI area.

5.2.2.2 North of Cape Falcon

Management of ocean fisheries for coho north of Cape Falcon is complicated by the overlap of OCN stocks and other stocks of concern in the vicinity of the Columbia River mouth. Allowable harvests in the area between Leadbetter Point, Washington and Cape Falcon, Oregon will be determined by an annual blend of OCN and Washington coho management considerations including:

1. Abundance of contributing stocks.
2. Stock specific conservation objectives (as found in Table 3-1).
3. Consultation standards of the Endangered Species Act.
4. Relative abundance of Chinook and coho.
5. Allocation considerations of concern to the Council.

Coho occurring north of Cape Falcon, Oregon are comprised of a composite of coho stocks originating in Oregon, Washington, and southern British Columbia. Ocean fisheries operating in this area must balance management considerations for stock-specific conservation objectives for Southern Oregon/Northern California, Oregon Coast, Southwest Washington, Olympic Peninsula, and Puget Sound.

5.2.3 Pink Salmon

Ocean pink salmon harvests occur off the Washington coast and are predominantly of Fraser River origin. Pink salmon of Puget Sound origin represent a minor portion of the ocean harvest although ocean impacts can be significant in relation to the terminal return during years of very low abundance.

The Fraser River Panel of the PSC manages fisheries for pink salmon in the Fraser River Panel Area (U.S.) north of 48E N latitude to meet Fraser River natural spawning escapement and U.S./Canada allocation requirements. The Council manages pink salmon harvests in that portion of the EEZ which is not in the Fraser River Panel Area (U.S.) waters consistent with Fraser River Panel management intent and in accordance with the conservation objectives for Puget Sound pink salmon.

Pink salmon management objectives must address meeting natural spawning escapement objectives, allowing ocean pink harvest within fixed constraints of coho and Chinook harvest ceilings and providing for treaty allocation requirements.

5.3 ALLOCATION

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

Magnuson-Stevens Act, National Standard 4

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

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

5.3.1.1 Goal, Objectives, and Priorities

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

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

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

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

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

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

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

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

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

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

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

5.3.1.2 Allocation Schedule Between Gear Types

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

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

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

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

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

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

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

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

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

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

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

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

5.3.1.3 Recreational Subarea Allocations

Coho

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

In years with no Area 4B fishery, the distribution of coho north of Leadbetter Point (50% of the total recreational TAC) will be divided to provide 74% to the area between Leadbetter Point and the Queets River (Westport), 5.2% to the area between Queets River and Cape Flattery (La Push), and 20.8% to the area north of the Queets River (Neah Bay). In years when there is an Area 4B (Neah Bay) fishery under state management, the allocation percentages north of Leadbetter Point will be modified to maintain more equitable fishing opportunity among the ports by decreasing the ocean harvest share for Neah Bay. This will be accomplished by adding 25% of the numerical value of the Area 4B fishery to the recreational TAC north of Leadbetter Point prior to calculating the shares for Westport and La Push. The increase to Westport and La Push will be subtracted from the Neah Bay ocean share to maintain the same total harvest allocation north of Leadbetter Point. Table 5-2 displays the resulting percentage allocation of the total recreational coho catch north of Cape Falcon among the four recreational port areas (each port area allocation will be rounded to the nearest hundred fish, with the largest quotas rounded downward if necessary to sum to the TAC).

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

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

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

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

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

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

Chinook

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

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

5.3.2 Commercial and Recreational Fisheries South of Cape Falcon

The allocation of allowable ocean harvest of coho salmon south of Cape Falcon has been developed to provide a more stable recreational season and increased economic benefits of the ocean salmon fisheries at varying stock abundance levels. When coupled with various recreational harvest reduction measures or the timely transfer of unused recreational allocation to the commercial fishery, the allocation schedule is designed to help secure recreational seasons extending at least from Memorial Day through Labor Day when possible, assist in maintaining commercial markets even at relatively low stock sizes, and fully utilize available harvest. Total ocean catch of coho south of Cape Falcon will be treated as a quota to be allocated between troll and recreational fisheries as provided in Table 5-3.

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

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

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

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

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

a/ The allocation schedule is based on the following formula: first 150,000 coho to the recreational base (this amount may be reduced as provided in footnote b); over 150,000 to 350,000 fish, share at 2:1, 0.667 to troll and 0.333 to recreational; over 350,000 to 800,000 the recreational share is 217,000 plus 14% of the available fish over 350,000; above 800,000 the recreational share is 280,000 plus 10% of the available fish over 800,000.

Note: The allocation schedule provides guidance only when coho abundance permits a directed coho harvest, not when the allowable impacts are insufficient to allow general coho retention south of Cape Falcon. At such low levels, allocation of the allowable impacts will be determined in the Council=s preseason process. Deviations from the allocation may also be allowed to meet consultation standards for ESA listed stocks (e.g., the 1998 biological opinion for California coastal coho requires no retention of coho in fisheries off California).

b/ If the commercial allocation is insufficient to meet the projected hook-and-release mortality associated with the commercial all-salmon-except-coho season, the recreational allocation will be reduced by the number needed to eliminate the deficit.

c/ When the recreational allocation is 167,000 coho or less, special allocation provisions apply to the recreational harvest distribution by geographic area (unless superseded by requirements to meet a consultation standard for ESA listed stocks); see text of FMP as modified by Amendment 11 allocation provisions.

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

1. abundance of contributing stocks
2. allocation considerations of concern to the Council
3. relative abundance in the fishery between Chinook and coho
4. escapement goals

5. maximizing harvest potential

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

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

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

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

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

   b. South of Humbug Mountain - 30%

   In addition,

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

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

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

5.3.3 Tribal Indian Fisheries

5.3.3.1 California

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

5.3.3.2 Columbia River

Pursuant to a September 1, 1983 Order of the U.S. District Court, the allocation of harvest in the Columbia River is established under the "Columbia River Fish Management Plan" which was implemented in 1988 by the parties of U.S. ~~et. al.~~ v. Oregon~~, Washington et al~~. This plan replaced the original 1977 plan (pages 16-20 of the 1978 FMP). Since the Columbia River Fishery Management Plan expired on December 31, 1998, fall Chinook in Columbia River fisheries were managed through 2007 under the guidance of annual management agreements among the U.S. versus Oregon parties. In 2008, a new 10 year management agreement was negotiated through the U.S. versus Oregon process, which included revisions to some inriver objectives. This most recent plan is the "2008-2017 U.S. v Oregon Management Agreement". The plan provides a framework within which the relevant parties may exercise their sovereign powers in a coordinated and systematic manner in order to protect, rebuild, and enhance upper Columbia River fish runs while providing harvest for both treaty Indian and non-Indian fisheries. The parties to the agreement are the United States, the states of Oregon, Washington, and Idaho, and four Columbia River treaty Indian tribes~~—~~-Warm Springs, Yakama, Nez Perce, and Umatilla.

5.3.3.3~~–~~ U.S. v. Washington Area

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

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

5.4 U.S. HARVEST AND PROCESSING CAPACITY AND ALLOWABLE LEVEL OF FOREIGN FISHING

> *~~A.~~“A. . . Assess and specify . . . (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield . . . (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing, and (C) the capacity and extent to which United States processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States~~.@~~.”*
>
> *Magnuson-Stevens Act, '303(a)(4)*

At the highest conceivable level of recent past, present, or expected future abundance, the total allowable harvest of salmon stocks can be fully taken by U.S. fisheries. There is no recent record of processors in the Council area refusing fish from fishermen because of inadequate processing capacity. Because shore-based processors can fully utilize all the salmon that can be harvested in marine waters, joint venture processing is fixed as zero.

In view of the adequacy of the domestic fisheries to harvest the highest conceivable level of abundance, the total allowable level of foreign fishing ~~(TALFF)~~ also is fixed as zero. The United States allowed Canadian fishing in U.S. waters under a reciprocal agreement until 1978. Negotiations between the two governments, including those within the context of the PSC, continue to seek a resolution of all transboundary salmon issues. These negotiations are aimed at stabilizing and reducing, where possible, the interception of salmon originating from one country by fishermen of the other. No U.S./Canada reciprocal salmon fishing is contemplated in the foreseeable future.

6 MEASURES TO MANAGE THE HARVEST

A number of management controls are available to manage the ocean fisheries each season, once the allowable ocean harvests and the basis for allocation among user groups have been determined. Among these are management boundaries, seasons, quotas, minimum harvest lengths, fishing gear restrictions, and recreational daily bag limits. Natural fluctuations in salmon abundance require that annual fishing periods, quotas, and bag limits be designed for the conditions of each year. What is suitable one year probably will not be suitable the next. New information on the fisheries and salmon stocks also may require other adjustments to the management measures. The Council assumes these ocean harvest controls also apply to territorial seas or any other areas in state waters specifically designated in the annual regulations.

Some of the more common measures that have been applied to manage ocean salmon fisheries since 1977 under the ~~Magnuson Fishery Conservation and Management Act~~MSA are described below, along with a clarification of the process and flexibility in implementing the measures. The Framework Amendment (PFMC 1984) provides a more detailed history of salmon harvest controls and rationale for their designation as fixed or flexible elements of the salmon FMP.

6.1 MANAGEMENT BOUNDARIES AND MANAGEMENT ZONES

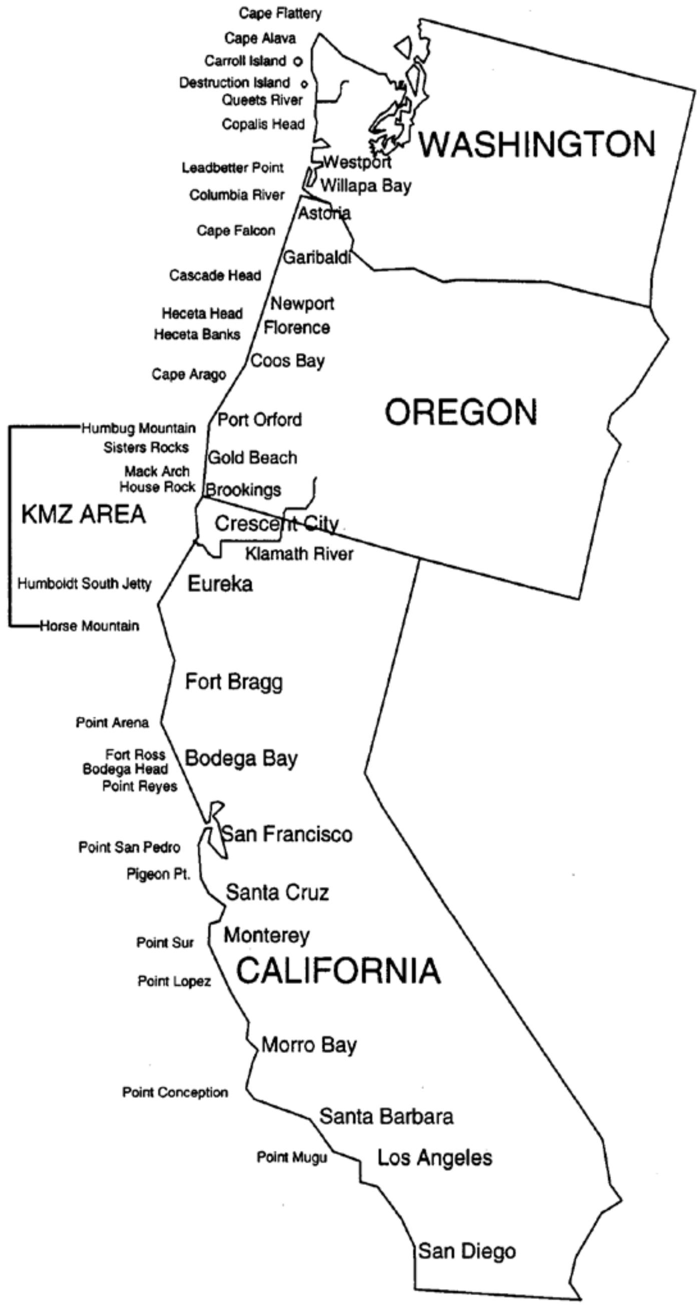
Management boundaries and zones will be established during the preseason regulatory process or adjusted inseason (Section 10.2) as necessary to achieve a conservation or management objective. A conservation or management objective is one that protects a fish stock, simplifies management of a fishery, or results in the ~~wise~~sustainable use of the resources. For example, management boundaries and management zones can be used to separate fish stocks, facilitate enforcement of regulations, separate conflicting fishing activities, or facilitate harvest opportunities. Management boundaries and zones will be described in the annual regulations by geographical references, coordinates (latitude and longitude), depth contours, distance from shore, or similar criteria. Figure 6-1 displays management boundaries in common use in ~~the early to mid-1990s~~2000-2010.

While there are many specific reasons for utilizing management boundaries or zones which may change from year to year, some boundaries or zones have purposes that remain relatively constant. The boundary used to separate management of Columbia River Chinook from those stocks to the south and to divide the Council's harvest allocation schedules has always been at or near Cape Falcon, Oregon. The Klamath management zone (beginning in 1990, the area between Humbug Mountain, Oregon and Horse Mountain, California) has been used to delineate the area where primary concern is the management of Klamath River fall Chinook. A closed zone at the mouth of the Columbia River has been used for several years to eliminate fishing in an area believed to generally contain a high percentage of sublegal "feeder" Chinook. A similar zone has been established at the mouth of the Klamath River to allow fish undisturbed access to the river. Changes to these boundaries or zones may require special justification and documentation. However, the basis of establishing most other management boundaries and zones depends on the annual management needs as determined in the preseason process.

6.2 MINIMUM HARVEST LENGTHS FOR OCEAN COMMERCIAL AND RECREATIONAL FISHERIES

Minimum size limits for ocean commercial and recreational fisheries may be changed each year during the preseason regulatory process or modified inseason under the procedures of Section 10.2. Recommended changes must serve a useful purpose which is clearly described and justified, and projections made of the probable impacts resulting from the change.

Minimum size limits have been relatively stable since the Council began management in 1977 and any changes are expected to occur infrequently. From 1977 through 1995 there were no changes in the size limits for non-Indian commercial fisheries except for the decision to use the California coho minimum length for the entire Klamath management area which extends into Oregon. Recreational minimum size limits did not change between 1988 and 1995. However, ~~in 1996 Chinook minimum~~since the mid 2000's, size limits ~~were increased in California fisheries~~have changed more frequently to reduce ~~impacts~~impact on ~~Sacramento River winter Chinook.~~



~~FIGURE 6-1. Management boundaries in common use during the early to mid-1990s.~~

stocks of concern. The minimum size limits listed below (total length in inches) have been consistently used by the Council with only infrequent modifications in limited areas to address special needs or situations.

TABLE 6-1.Minimum size limits.

	Chinook		Coho		Pink	
	Troll	Sport	Troll	Sport	-Troll	–Sport
North of Cape Falcon	28.0	24.0	16.0	16.0	None	None
Cape Falcon to ~~Humbug Mt.~~OR/CA Border	~~26~~28.0	~~20~~24.0	16.0	16.0	None	None
South of ~~Humbug Mt~~OR/CA Border.	26.0	20.0	~~22.0~~	~~20.0~~	None	~~None a/~~24

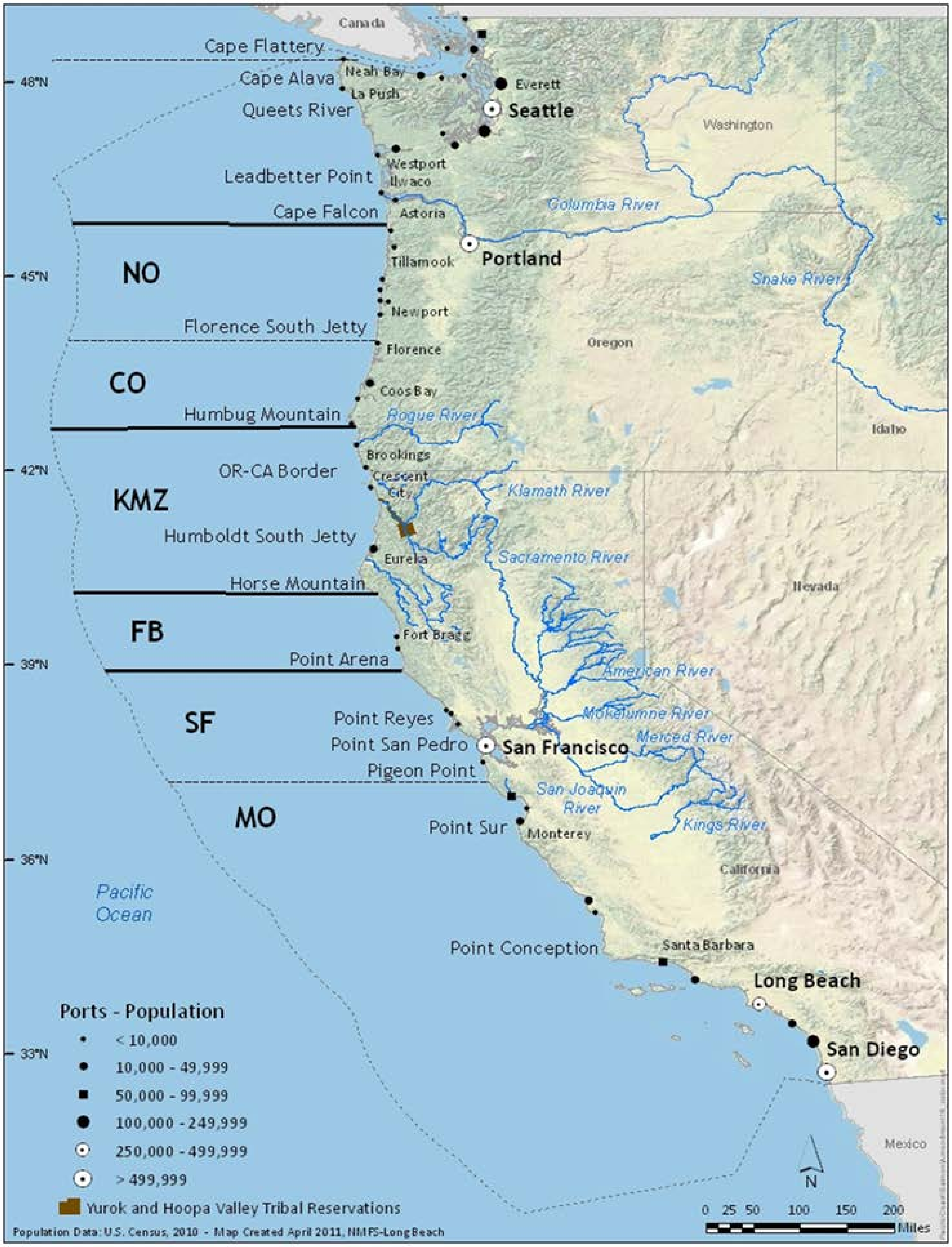


FIGURE 6-1. Management boundaries in common use in 2000-2010.

6.3 RECREATIONAL DAILY BAG LIMIT

Recreational daily bag limits for each management area may be set during the preseason regulatory process or modified inseason (Section 10.2). They will be set to maximize the length of the fishing season consistent with the allowable level of harvest. In recent years, bag limits of one or two salmon have been commonplace.

In general, for every fishing area, the level of allowable ocean harvest will be determined for the recreational fishery; next, the fishing season will be set to be as long as practicable, including the Memorial Day and/or Labor Day weekends if feasible, consistent with the allowable level of harvest; and, bag limits will be simultaneously set to accommodate that fishing season. In years of low salmon abundance, the season will be short and the bag limits will be low; in years of high salmon abundance, the season will be long and the bag limits will be higher.

6.4 FISHING GEAR RESTRICTIONS

Gear restrictions may be changed annually during the preseason regulatory process and inseason as provided in Section 10.2 Recommended changes must serve one or more useful purposes while being consistent with the goals of the plan. For example, changes could be made to facilitate enforcement, reduce hooking mortality, or reduce gear expenses for fishermen. Annual gear restriction changes in previous years have included the requirement for barbless hooks in both the troll and recreational fisheries, and a limit to the number of spreads per line in the troll fishery. Both of these gear changes were instituted to reduce total hook-and-release mortality. Other restrictions have included bait size, number of rods per recreational fisher, and requirements for the number of lines or the attachment of lines to the vessel in the commercial fishery.

6.5 SEASONS AND QUOTAS

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

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

6.5.1 ~~–~~ Preferred Course of Action

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

6.5.2 ~~–~~ Procedures for Calculating Seasons

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

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

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

6.5.3 Species-Specific and Other Selective Fisheries

6.5.3.1 Guidelines

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

7. Harvestable fish of the target species are available.

8. Harvest impacts on incidental species will not exceed allowable levels determined in the management plan.

9. Proven, documented, selective gear exists (if not, only an experimental fishery should be considered).

10. Significant wastage of incidental species will not occur or a written economic analysis demonstrates the landed value of the target species exceeds the potential landed value of the wasted species.

11. The species specific or ratio fishery will occur in an acceptable time and area where wastage can be minimized and target stocks are maximally available.

12. Implementation of selective fisheries for marked or hatchery fish must be in accordance with U.S. v. Washington stipulation and order concerning co-management and mass marking (Case No. 9213, Subproceeding No. 96-3) and any subsequent stipulations or orders of the U.S. District Court, and consistent with international objectives under the Pacific Salmon Treaty (e.g., to ensure the integrity of the coded-wire tag program).

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

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

6. Selective fisheries will first be considered during the months of August and/or September. However, the Council may consider selective fisheries at other times, depending on year to year circumstances identified in the preceding paragraph.

7. The total impacts within each port area or gear group on the critical natural stocks of management concern are not greater than those under the original allocation without the selective fisheries.

8. Other allocation objectives (i.e., treaty Indian, or ocean and inside allocations) are satisfied during negotiations in the North of Cape Falcon Forum.

9. The selective fishery is assessed against the guidelines in Section 6.5.3.1.

10. Selective fishery proposals need to be made in a timely manner in order to allow sufficient time for analysis and public comment on the proposal before the Council finalizes its fishery recommendations.

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

3. Allocate the TAC among the gear groups and port areas according to the basic FMP allocation process described in Section 5.3.1 without the selective fishery.

4. Each gear group or port area may utilize the critical natural stock impacts allocated to its portion of the TAC to access additional harvestable, marked fish, over and above the harvest share established in step one, within the limits of the management constraints listed in the preceding paragraph.

6.5.4 Procedures for Calculating Quotas

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

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

1. For coho, private hatchery contribution to the ocean fisheries in the OPI area.

2. Unanticipated loss of shakers (bycatch mortality of undersized fish or unauthorized fish of another species that have to be returned to the water) during the season. (Adjustment for coho hooking mortality during any all-salmon-except-coho season will be made when the quotas are established.)

3. Any catch that take place in fisheries within territorial waters that are inconsistent with federal regulations in the EEZ.

4. If the ability to update inseason stock abundance is developed in the future, adjustments to total allowable harvest could be made, where appropriate.

5. The ability to redistribute quotas between subareas depending on the performance toward achieving the overall quota in the area.

Changes in the quotas as a result of the inseason adjustment process will be avoided unless the changes are of such magnitude that they can be validated by the STT and Council, given the precision of the original estimates.

The basis for determining the private hatchery contribution in (1) above will be either coded-wire tag analysis or analysis of scale patterns, whichever is determined by the STT to be more accurate, or another more accurate method that may be developed in the future, as determined by the STT and Council.

In reference to (4) and (5) above, if reliable techniques become available for making inseason estimates of stock abundance, and provision is made in any season for its use, a determination of techniques to be applied will be made by the Council and discussed during the preseason regulatory process.

6.5.5 Procedures for Regulating Ocean Harvests of Pink and Sockeye

Sockeye salmon are only very rarely caught in Council-managed ocean salmon fisheries and no specific procedures have been established to regulate their harvest. Procedures for pink salmon are as follows:

1. All-species seasons will be planned such that harvest of pink salmon can be maximized without exceeding allowable harvests of Chinook and/or coho and within conservation and allocation constraints of the pink stocks.

2. Species specific or ratio fisheries for pink salmon will be considered under the guidelines for species specific fisheries presented in Section 6.5.3, and allocation constraints of the pink stocks.

6.6 OTHER MANAGEMENT MEASURES

6.6.1 Treaty Indian Ocean Fishing

Since 1977 the Council has adopted special measures for the treaty Indian ocean troll fisheries off the Washington Coast. The Makah, Quileute, Hoh, and Quinault tribes are entitled by federal judicial determination to exercise their treaty rights in certain ocean areas. In addition, Lower S'Klallam, Jamestown S'Klallam, and Port Gamble S'Klallam tribes are entitled by federal judicial determination to exercise their treaty rights in ocean salmon Area 4B, the entrance to the Strait of Juan de Fuca.

The treaty Indian ocean salmon fishing regulations will be established annually during the preseason regulatory process. The affected tribes will propose annual treaty Indian ocean fishing regulations at the March meeting of the Council. After a review of the proposals, the Council will adopt treaty Indian regulations along with non-treaty ocean fishing regulations for submission to the Secretary of Commerce at the April Council meeting.

The specific timing and duration of the treaty Indian ocean salmon season varies with expected stock abundance and is limited by quotas for both Chinook and coho. Within these constraints, the general season structure has been a Chinook-directed fishery in May and June, followed by an all-salmon season from July through the earliest of quota attainment or October 31.

6.6.1.1 Seasons

Given that the traditional tribal ocean season has changed in recent years and because it is largely up to the tribes to recommend annual ocean management measures applicable to their ocean fishery, a flexible mechanism for setting fishing seasons is proposed so that desired changes can be made in the future without the need for plan amendment.

The treaty Indian troll season will be established based upon input from the affected tribes, but would not be longer than that required to harvest the maximum allowable treaty Indian ocean catch. The maximum allowable treaty Indian ocean catch will be computed as the total treaty harvest that would occur if the tribes chose to take their total entitlement of the weakest stock in the ocean, assuming this level of harvest did not create conservation or allocation problems on other stocks.

6.6.1.2 Quotas

Fixed or adjustable quotas by area, season, or species may be employed in the regulation of treaty Indian ocean fisheries, provided that such quotas are consistent with established treaty rights. The maximum size of quotas shall not exceed the harvest that would result if the entire treaty entitlement to the weakest run were to be taken by treaty ocean fisheries. Any quota established does not represent a guaranteed ocean harvest, but a maximum ceiling on catch. Catches in ocean salmon Area 4B are counted within the tribal ocean harvest quotas during the May 1-September 30 ocean management period.

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

1. Unanticipated shaker loss during the season.

2. Catches by treaty ocean fisheries that are inconsistent with federal regulations in the EEZ.

3. If an ability to update inseason stock abundance is developed in the future, adjustments to quotas could be made where appropriate.

4. Ability to redistribute quotas between subareas depending upon performance toward catching the overall quota for treaty ocean fisheries in the area.

Procedures for the above inseason adjustments will be made in accordance with Section 10.2.

Changes in the quotas as a result of the inseason adjustment process will be avoided unless the changes are of such magnitude that they are scientifically valid as determined by the STT and Council, given the precision of the original estimates.

Harvest guidelines may be used within overall quotas to trigger inseason management actions which were established during the preseason regulatory process.

6.6.1.3 Areas

Current tribal ocean fishing areas in the EEZ (subject to change by court order) are as follows:

Makah - north of 48E02'15" N to the U.S./Canada border and east of 125E44'00".

Hoh - south of 47E54'18" N and north of 47E21'00" N and east of 125E44'00".

Quileute - south of 48E07'36" N and north of 47E31'42" N and east of 125E44'00".

Quinault - south of 47E40'06" N and north of 46E54'03" N and east of 125E44'00".

In addition, a portion of the usual and accustomed fishing areas for the Lower Elwha, Jamestown, and Port Gamble S'Klallam tribes is in ocean salmon Area 4B at the entrance to the Strait of Juan de Fuca (Bonilla-Tatoosh line east to the Sekiu River).

Area restrictions may be employed in the regulation of treaty ocean fisheries, consistent with established treaty rights. For example, in 1982 treaty fishing was prohibited within a six-mile radius around the Queets and Hoh River mouths when the area was closed to non-treaty salmon fishing.

6.6.1.4 Size Limits and Gear Restrictions

Regulations for size limits and gear restrictions for treaty ocean fisheries will be based on recommendations of the affected treaty tribes.

6.6.2 Net Prohibition

No person shall use nets to fish for salmon in the EEZ except that a hand-held net may be used to bring hooked salmon on board a vessel. Salmon caught incidentally in trawl nets while legally fishing under the groundfish FMP are a prohibited species as defined by the groundfish regulations (50 CFR Part 660, Subpart G). However, in cases where the Council determines it is beneficial to the management of the groundfish and salmon resources, salmon bycatch may be retained under the provisions of a Council-approved program which defines the handling and disposition of the salmon. The provisions must specify that salmon remain a prohibited species and, as a minimum, include requirements that allow accurate monitoring of the retained salmon, do not provide incentive for fishers to increase salmon bycatch, and assure fish do not reach commercial markets. In addition, during its annual regulatory process for groundfish, the Council must consider regulations which would minimize salmon bycatch in the monitored fisheries.

6.6.3 Prohibition on Removal of Salmon Heads

No person shall remove the head of any salmon caught in the EEZ, nor possess a salmon with the head removed if that salmon has been marked by removal of the adipose fin to indicate that a coded-wire tag has been implanted in the head of the fish.

6.6.4 Steelhead Prohibition

Persons, other than Indians with judicially-declared rights to do so and legally licensed recreational fishermen, may not take and retain, or possess any steelhead within the EEZ.

6.6.5 Prohibition on Use of Commercial Troll Fishing Gear for Recreational Fishing

No person shall engage in recreational fishing for salmon while aboard a vessel engaged in commercial fishing.

6.6.6 Experimental Fisheries

The Council may recommend that the Secretary allow experimental fisheries in the EEZ for research purposes that are proposed by the Council, federal government, state government, or treaty Indian tribes having usual and accustomed fishing grounds in the EEZ.

The Secretary may not allow any recommended experimental fishery unless he or she determines that the purpose, design, and administration of the experimental fishery are consistent with the goals and objectives of the Council's fishery management plan, the national standards of the Magnuson Fishery Conservation and Management Act, and other applicable law. Each vessel that participates in an approved experimental fishery will be required to carry aboard the vessel the letter of approval, with specifications and qualifications (if any), issued and signed by the Regional Director of NMFS.

6.6.7 Scientific Research

This plan neither inhibits nor prevents any scientific research in the EEZ by a scientific research vessel. The Secretary will acknowledge any notification received regarding scientific research on salmon being conducted by a research vessel. The Regional Director of NMFS will issue to the operator/master of that vessel a letter of acknowledgment, containing information on the purpose and scope (locations and schedules) of the activities. Further, the Regional Director will transmit copies of such letters to the Council and to state and federal fishery and enforcement agencies to ensure that all concerned parties are aware of the research activities.

7 DATA NEEDS, DATA COLLECTION METHODS, AND REPORTING REQUIREMENTS

Successful management of the salmon fisheries requires considerable information on the fish stocks, the amount of effort for each fishery, the harvests by each fishery, the timing of those harvests, and other biological, social, and economic factors. Much of the information must come from the ocean fisheries; other data must come from inside fisheries, hatcheries, and spawning grounds. Some of this information needs to be collected and analyzed daily, whereas other types need to be collected and analyzed less frequently, maybe only once a year. In general, the information can be divided into that needed for inseason management and that needed for annual and long-term management. The methods for reporting, collecting, analyzing, and distributing information can be divided similarly.

7.1 INSEASON MANAGEMENT

7.1.1 Data Needs

Managers require certain information about the fisheries during the season if they are to control the harvests to meet established quotas and goals. If conditions differ substantially from those expected, it may be necessary to modify the fishing seasons, quotas, or other management measures. The following information is useful for inseason management:

a. harvest of each species by each fishery in each fishing area by day and by cumulative total;

b. number of troll day boats and trip boats fishing;

c. estimated average daily catch for both day and trip boats;

d. distribution and movement of fishing effort;

e. average daily catch and effort for recreational fishery;

f. estimates of expected troll fishing effort for the remainder of the season;

g. information on the contribution of various fish stocks, determined from recovered coded-wire tags, scales, or other means.

7.1.2 Methods for Obtaining Inseason Data

Inseason management requires updating information on the fisheries daily. Thus, data will be collected by sampling the landings, aerial surveys, radio reports, and telephone interviews.

In general, data necessary for inseason management will be gathered by one or more of the following methods. Flights over the fishing grounds will be used to obtain information on the distribution, amount, and type of commercial fishing effort. Data on the current harvests by commercial and Indian ocean fishermen will be obtained by telephoning selected (key) fish buyers, by sampling the commercial landings on a daily basis, and from radio reports. Data on the current effort of, and harvests by, the recreational fisheries will be obtained by telephoning selected charter boat and boat rental operators and by sampling landings at selected ports. Analyses of fish scales, recovered fish tags, and other methods will provide information on the composition of the stocks being harvested.

7.2 ANNUAL AND LONG-TERM MANAGEMENT

7.2.1 Data Needs

In addition to the data used for inseason management, a considerable amount of information is used for setting the broad measures for managing the fishery, evaluating the success of the previous year's management, and evaluating the effectiveness of the plan in achieving the long-term goals. Such data include landings, fishing effort, dam counts, smolt migration, returns to hatcheries and natural spawning areas, stock contribution estimates, and economic information.

7.2.2 Methods for Obtaining Annual and Long-Term Data

In addition to those methods used for collecting data for in-season management, the longer term data will be collected by the use of (a) fish tickets (receipts a fish buyer completes upon purchasing fish from a commercial fisherman), (b) log books kept by commercial fishermen and submitted to the state fishery management agencies at the end of the season, and (c) catch record cards completed by a recreational fisherman each time he catches a fish to show location, date, and species and submitted to the state agency, either when the whole card is completed or at the end of the season.

The local fishery management authorities (states, Indian tribes) will collect the necessary catch and effort data and will provide the Secretary with statistical summaries adequate for management. The local management authorities, in cooperation with the National Marine Fisheries Service, will continue the ongoing program of collecting and analyzing data from salmon processors.

Data on spawning escapements and jack returns to public and private hatcheries, other artificial production facilities, and natural spawning grounds will be collected by the accepted methods now being used by those authorities. The methods used to collect these data should be identified and available to the public.

7.3 REPORTING REQUIREMENTS

This plan authorizes the local management authorities to determine the specific reporting requirements for those groups of fishermen under their control and to collect that information under existing state data-collection provisions. With one exception, no additional catch or effort reports will be required of fishermen or processors as long as the data collection and reporting systems operated by the local authorities continue to provide the Secretary with statistical information adequate for management. The one exception would be to meet the need for timely and accurate assessment of inseason management data. In that instance the Council may annually recommend implementation of regulations requiring brief radio reports from commercial salmon fishermen who leave a regulatory area in order to land their catch in another regulatory area open to fishing. The federal or state entities receiving these radio reports would be specified in the annual regulations.

8 SCHEDULE AND PROCEDURES FOR ANALYZING THE EFFECTIVENESS OF THE SALMON FMP

To effectively manage the salmon fisheries, the Council must monitor the status of the resource and the fisheries harvesting that resource to make sure that the goals and objectives of the plan are being met. Fishery resources vary from year to year depending on environmental factors, and fisheries vary from year to year depending on the state of the resource and social and economic factors. The Council must ensure that the plan is flexible enough to accommodate regulatory changes that will allow the Council to achieve its biological, social, and economic goals.

Annually, the ~~Council's~~ STT will review the previous season's commercial, recreational, and tribal Indian fisheries and evaluate the performance of the plan with respect to achievement of the framework management objectives (Chapters 2, 3, and 5). Consideration will be given by the STT to the following areas:

1. Allowable harvests
2. Escapement goals, natural and hatchery
3. Mixed-stock management
4. Federally recognized tribal fishing rights
5. Allocation goals
6. Mortality factors, including bycatch
7. Achievement of optimum yield
8. Effort management systems
9. Coordination with all management entities
10. Consistency with international treaties
11. Comparison with previous seasons
12. Progress of any Council-adopted recovery plan
13. ESA consultation standards
14. Annual catch limits
15. Stock status based on the SDC identified in this FMP

This evaluation will be submitted annually for review by the Salmon Advisory Subpanel, SSC, and the Council.

Additionally, at various Council meetings, the Habitat Committee and state and tribal management entities will help keep the Council apprised of achievements and problems with regard to the protection and improvement of the environment (i.e., essential fish habitat) and the restoration and enhancement of natural production.

During the ~~Council=s~~Council's annual preseason salmon management process, issues may arise which indicate a need to consider changes to the fixed elements of the FMP. Such issues may be considered in FMP amendments on an as needed basis under the guidelines of Chapter 11.

9 SCHEDULE AND PROCEDURES FOR PRESEASON MODIFICATION OF REGULATIONS

The process for establishing annual or preseason management measures under the framework FMP contains a nearly equivalent amount of analysis, public input, and review to that provided under the former annual amendment process and will not require annual preparation of a supplemental environmental impact statement (SEIS) and regulatory impact review/regulatory flexibility analysis (RIR/RFA). This allows the Salmon Technical Team to wait to prepare its report until all of the data are available, thus eliminating the need to discuss an excessively broad range of options as presented prior to the framework plan.

The process and schedule for setting the preseason regulations will be approximately as follows:

Approximate Date	Action
First week of March	Notice published in the Federal Register announcing the availability of team and Council documents, the dates and location of the two Council meetings, the dates and locations of the public hearings, and publishing the complete schedule for determining proposed and final modifications to the management measures. Salmon Technical Team reports which review the previous salmon season, project the expected salmon stock abundance for the coming season, and describe any changes in estimation procedures, are available to the public from the Council office.
First or second full week of ~~March~~[a] March[a/]	Council and advisory entities meet to adopt a range of season regulatory options for formal public hearing. Proposed options are initially developed by the Salmon Advisory Subpanel and further refined after analysis by the STT, public comment, and consideration by the Council.
Following March Council meeting	Council newsletter, public hearing announcement, and STT/Council staff report are released which outline and analyze Council-adopted options. The STT/staff report includes a description of the options, brief rationale for their selection, and an analysis of expected biological and economic impacts.
Last week of March or first week of April	Formal public hearings on the proposed salmon management options.
First or second full week of April[a/]	Council and advisory entities meet to adopt final regulatory measure recommendations for implementation by the Secretary of Commerce.
First week of May	Final notice of Secretary of Commerce decision and final management measures in Federal Register.
May 15	Close of public comment period.

a/ Scheduling of the March and April Council meetings is determined by the need to allow for complete availability of pertinent management data, provide time for adequate public review and comment on the proposed options, and afford time to process the Council's final recommendations into federal regulations by May 1. Working backward from the May 1 implementation date, the April Council meeting is generally set as late as possible while not extending past April 12 for approval of final salmon management recommendations. The March Council meeting is set as late as possible while ensuring no less than three to four weeks between the end of the March meeting and beginning of the April meeting.

The actions by the Secretary after receiving the preseason regulatory modification recommendations from the Council will be limited to accepting or rejecting in total the Council's recommendations. If the Secretary rejects such recommendations he or she will so advise the Council as soon as possible of such action along with the basis for rejection, so that the Council can reconsider. Until such time as the Council and the Secretary can agree upon modifications to be made for the upcoming season, the previous year's regulations will remain in effect. This procedure does not prevent the Secretary from exercising his authority under Sections 304(c) or 305(c) of the Magnuson Act and issuing emergency regulations as appropriate for the upcoming season.

Preseason actions by the Secretary, following the above procedures and schedule, would be limited to the following:

1. Specify the annual abundance, total allowable harvest, and allowable ocean harvest.

2. Allocate ocean harvest to commercial and recreational fishermen and to treaty Indian ocean fishermen where applicable.

3. Review ocean salmon harvest control mechanism from previous year; make changes as required in:

    a. Management area boundaries
    b. Minimum harvest lengths
    c. Recreational daily bag limits
    d. Gear requirements (i.e., barbless hooks, etc.)
    e. Seasons and/or quotas
    f. Ocean regulations for treaty Indian fishermen
    g. Inseason actions and procedures to be employed during the upcoming season

Because the harvest control measures and restrictions remain in place until modified, superseded, or rescinded, changes in all of the items listed in "3" above may not be necessary every year. When no change is required, intent not to change will be explicitly stated in preseason decision documents.

The Framework Amendment (1984) provides further rationale for the current preseason procedures and the replacement of the old process of annual plan amendments to establish annual regulations.

10 INSEASON MANAGEMENT ACTIONS AND PROCEDURES

Inseason modifications of the regulations may be necessary under certain conditions to fulfill the Council's objectives. Inseason actions include "fixed" or "flexible" actions as described below.

10.1 FIXED INSEASON ACTIONS

Three fixed inseason actions may be implemented routinely as specifically provided in the subsections below.

10.1.1 Automatic Season Closures When the Quotas Are Reached

The Salmon Technical Team will attempt to project the date a quota will be reached in time to avoid exceeding the quota and to allow adequate notice to the fishermen. The State Directors and the Council Chairman will be consulted by the NMFS Regional Director before action is taken to close a fishery. Closures will be coordinated with the states so that the effective time will be the same for EEZ and state waters. A standard closure notice will be used and will specify areas that remain open as well as those to be closed. To the extent possible, all closures will be effective at midnight and a 48-hour notice will be given of any closure. When a quota is reached, the Regional Director will issue a notice of closure of the fishery through local news media at the same time that a notice of fishery closure is published in the *Federal Register*.

10.1.2 Rescission of Automatic Closure

If, following the closing of a fishery after a quota is reached, it is discovered that the actual catch was over-estimated and the season was closed prematurely, the Secretary is authorized to reopen the fishery if:

1. The shortfall is sufficient to allow at least one full day's fishing (24 hours) based on the best information available concerning expected catch and effort; and

2. The unused portion of the quota can be taken before the scheduled season ending.

10.1.3 Adjustment for Error in Preseason Estimates

The Secretary may make changes in seasons or quotas if a significant computational error or errors made in calculating preseason estimates of salmon abundance have been identified; provided that such correction to a computational error can be made in a timely fashion to affect the involved fishery without disrupting the capacity to meet the objectives of the management plan. Such correction and adjustments to seasons and quotas will be based on a Council recommendation and Salmon Technical Team analysis.

10.2 FLEXIBLE INSEASON ACTIONS

Fishery managers must determine that any inseason adjustment in management measures is consistent with ocean escapement goals, conservation of the salmon resource, any federally recognized Indian fishing rights, and the ocean allocation scheme in the framework FMP. In addition, all inseason adjustments must be based on consideration of the following factors:

- ~~X~~ Predicted sizes of salmon runs

- ~~X~~ Harvest quotas and hooking mortality limits for the area and total allowable impact limitations if applicable

- ~~X~~ Amount of the recreational, commercial, and treaty Indian fishing effort and catch for each species in the area to date

- ~~X~~ Estimated average daily catch per fisherman
- ~~X~~ Predicted fishing effort for the area to the end of the scheduled season
- ~~X~~ Other factors as appropriate (particularly, fisher safety affected by weather or ocean conditions as noted in Amendment 8)

Flexible inseason provisions must take into consideration the factors and criteria listed above and would include, but not be limited to, the following.

1. Modification of quotas and/or fishing seasons would be permitted. Redistribution of quotas between recreational and commercial fisheries would be allowed if the timing and procedure are described in preseason regulations. If total quotas or total impact limitations by fishery are established, subarea quotas north and south of Cape Falcon, Oregon can be redistributed within the same fishery. Other redistributions of quotas would not be authorized. Also allowable would be the establishment of new quotas and/or seasons, and establishment of, or changes to, hooking mortality and/or total allowable impact limitations during the season. Action based on revision of preseason abundance estimates during the season would be dependent on development of a Council approved methodology for inseason abundance estimation.

2. Modifications in the species which may be caught and landed during specific seasons and the establishment or modification of limited retention regulations would be permitted (e.g., changing from an all-species season to a single-species season, or requiring a certain number of one species to be caught before a certain number of another species can be retained).

3. Changes in the recreational bag limits and recreational fishing days per calendar week would be allowed.

4. Establishment or modification of gear restrictions would be authorized.

5. Modification of boundaries, including landing boundaries, and establishment of closed areas would be permitted.

6. Temporary adjustments for fishery access due to weather, adverse oceanic conditions or other safety considerations (see Council policy of September 18, 1992 regarding implementation of this action).

The flexibility of these inseason management provisions requires responsibility to assure that affected users are adequately informed and have had the opportunity for input into potential inseason management changes.

10.3 PROCEDURES FOR INSEASON ACTIONS

1. Prior to taking any inseason action, the Regional Director will consult with the Chairman of the Council and the appropriate State Directors.

2. As the actions are taken by the Secretary, the Regional Director will compile, in aggregate form, all data and other information relevant to the action being taken and shall make them available for public review during normal office hours at the Northwest Regional Office, National Marine Fisheries Service, 7600 Sand Point Way NE, Seattle, Washington 98115.

3. Inseason management actions taken under both the "fixed" and "flexible" procedures will become effective by announcement in designated information sources (rather than by filing with the Office of

the Federal Register [OFR]). Notice of inseason actions will still be filed with the OFR as quickly as possible.

The following information sources will provide actual notice of inseason management actions to the public: (1) the U.S. Coast Guard "Notice to Mariners" broadcast (announced over Channel 16 VHF-FM and 2182 KHZ); (2) state and federal telephone hotline numbers specified in the annual regulations and (3) filing with the *Federal Register*. Identification of the sources will be incorporated into the preseason regulations with a requirement that interested persons periodically monitor one or more source. In addition, all the normal channels of informing the public of regulatory changes used by the state agencies will be used.

4. If the Secretary determines, for a good cause, that a notice must be issued without affording a prior opportunity for public comment, public comments on the notice will be received by the Secretary for a period of 15 days after the effective date of the notice.

11 SCHEDULE AND PROCEDURES FOR FMP AMENDMENT AND EMERGENCY REGULATIONS

Modifications not covered within the framework mechanism will require either an FMP amendment or emergency Secretarial action. The amendment process generally requires at least a year from the date of the initial development of the draft amendment by the Council. In order for regulations implementing an amendment to be in place at the beginning of the general fishing season (May 1), the Council will need to begin the process by no later than April of the previous season. It is not anticipated that amendments will be processed in an accelerated December–to–May schedule and implemented by emergency regulations.

Emergency regulations may be promulgated without an FMP or FMP amendment. Depending upon the level of controversy associated with the action, the Secretary can implement emergency regulations within 20 days to 45 days after receiving a request from the Council. Emergency regulations can include non-resource emergencies and are generally in effect for 180 days. A second 180-day extension is possible if the public has had an opportunity to comment on the emergency regulation and the Council is actively preparing a plan amendment or proposed regulations to address the emergency on a permanent basis.

Part of the process for evaluating all future FMP amendment proposals will be to consider whether they will result in the need for temporary adjustments for fishery access due to weather, adverse oceanic conditions, or other safety considerations.

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[a]/ ~~This table may be updated periodically by formal amendments to the FMP or comprehensive technical reviews, which result in modified conservation objectives or the development of rebuilding programs in response to overfishing concerns. In addition, any stock listed under the ESA and its consultation standard or recovery plan will immediately be incorporated in the table.~~

[b]/ ~~ESA consultation standards in effect at time of adoption (March 1999). For updated ESA consultation standards, see Preseason Report III, Appendix A.~~

[c]/ ~~Management information and abundance based on 1994-1998 data. For updated Management Information, see Preseason Report I, Appendix A.~~

[a]/ ~~A description of the ESU boundaries may be found at 63 FR 11486 (March 9, 1998) for Chinook and 60 FR 38016 (July 25, 1995) for coho.~~

[b]/ ~~If the commercial allocation is insufficient to meet the projected hook-and-release mortality associated with the commercial all-salmon-except-coho season, the recreational allocation will be reduced by the number needed to eliminate the deficit.~~

[a]/ ~~None, except 20 inches off California.~~

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

APPENDIX J: PUBLIC COMMENTS AND RESPONSES RECEIVED ON THE PROPOSED RULE AND SUPPORTING ENVIRONMENTAL ASSESSMENT FOR AMENDMENT 16 TO THE SALMON FMP

Comments were received from:

- California Farm Bureau Federation
- Shasta Valley Resource Conservation District
- County of Siskiyou
- Siskiyou Resource Conservation District
- Mt. Shasta Area Audubon
- Yurok Tribe
- Hoopa Valley Tribal Council
- O'Laughlin & Paris, LLP; on behalf of San Joaquin River Group Authority
- Linda E. Averill
- U.S. Department of the Interior

There was substantial overlap among the comments received. The comments were sufficiently similar to warrant a response to reviewer's comments through the general responses below. Copies of the original comments are attached.

General Comments

Comment 1: Request for additional time to comment.

Response: NMFS has determined that extension of the comment period for this action is not possible. The Pacific Fishery Management Council (PFMC) and NMFS are operating under mandated deadlines to implement an amendment to the FMP to bring it into compliance with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended in 2007, to implement annual catch limits and accountability measures in 2011. Additionally, under the MSA, NMFS has 95 days to approve or disapprove an FMP amendment. If NMFS does not take action within that 95-day period, the amendment is approved by default. The PFMC transmitted the Amendment 16 to NMFS on September 12; therefore, the 95-day period to approve or disapprove the amendment expires on December 16. Amendment 16 has been in development since March 2009. It has been developed in an open, public process with considerable opportunities for anyone interested to provide comments. The PFMC held several meetings in Washington, Oregon, Idaho, and California of both the full Council and the Salmon Amendment Committee, all of which were open to the public. To facilitate those unable to attend Council meetings in person, the Council streams meetings live on the internet.

Comment 2: While habitat conditions in the Klamath River basin have been improving, the number of fish returning to spawn has been observed to decrease over time. For example, habitat restoration efforts have resulted in increased production of age 0+ Chinook in the Scott River. The reason for the decline in spawning adults is the decline in returning adults.

Response: Amendment 16 should result in greater spawning escapement throughout the Klamath Basin, because managing for MSY spawning escapement will currently result in managing for an escapement of 40,700 natural area adult spawners rather than 35,000.

Comment 3: The EA does not address all in-river tribal harvest, particularly that by the Karuk Tribe and occupants of the Resighini Reservation.

Response: Harvest by Yurok and Hoopa Valley tribes is established through Federally reserved rights to 50 percent of the allowable ocean harvest of Klamath River Chinook salmon. The EA assesses the impacts the proposed actions on the affected environment, which includes in-river harvest by the Yurok and Hoopa Valley tribes (sections 4.1.2.2, 4.1.5.4, 4.4.8). Additional information was added to the final EA in section 4.1.5.4 noting the rationale for *de minimis* fishing at low stock size to address minimal tribal needs. Thus, the EA adequately accounts for harvest by the Yurok and Hoopa Valley tribal members.

The Karuk tribe and Resighini Rancheria do not have federally recognized fishing rights. The Karuk tribal dipnet fisheries, and fishing conducted by members of the Resighini Rancheria, are conducted in-river under state regulations (15 CCR §7.50(b)(91.1)), and are subject to the same season and bag limit restrictions as the in-river non-Indian recreational fisheries; tribal effort is thought to be minor compared to the recreational fishery. Fish caught in these fisheries may not be sold commercially, so there are no significant economic impacts. The biological impacts are reflected in spawning escapement, which is the basis for Annual Catch Limits (ACL) and status determination criteria (SDC) which are part of the proposed action and are thoroughly analyzed in the EA. Information describing the Karuk and Resighini fisheries has been added to section 3.4.6.4 of the EA.

Comment 4: The EA fails to analyze the effects of in-river fisheries, which according to one commenter will have significant environmental effects that "will result from the implementation of Amendment 16." Such effects according to the commenters include excessive pressure on certain stocks, use of gear that is selective for larger fish, and impacts to ESA-listed coho. The draft EA fails to analyze the effects of in-river fishing on ESA-listed species. The Council and NMFS should regulate in-river fisheries. Accountability measures are not adequate because they don't address in-river harvest.
Response: The proposed action does not affect in-river fisheries, and therefore the EA is not required to address the impacts of in-river fisheries as effects of the proposed action. Neither the Council nor NMFS have statutory authority to directly regulate in-river fisheries under the Magnuson-Stevens Act, 16 USC 1800 et seq. The Council's jurisdiction is specifically limited to the area "seaward" of the west coast states (16 USC section 1852(a)(1)(F)). NMFS' authority to manage fisheries under the MSA is limited to the U.S. EEZ, and with respect to the proposed action is limited to approving or disapproving, and implementing the Council's action in Amendment 16 and writing the subsequent regulations to implement it (18 USC section 1854). As the commenters point out, federal, state, and tribal fishery managers coordinate their management of the salmon fisheries. Such coordination is necessary as salmon are impacted by fisheries under multiple management jurisdictions, and all of those impacts must be addressed to ensure that escapement goals are met and that the tribes can exercise their fishing rights. However, coordination with the entities that regulate in-river fishing does not bestow upon the Council and NMFS the statutory authority to impose regulations on that fishing. As the regulation of in-river fisheries is beyond the scope of this proposed action, and in any event is beyond the scope of the Council's and NMFS' jurisdiction under the Magnuson-Stevens Act, the extent of NMFS' authority to implement and enforce the Endangered Species Act with respect to in-river fisheries is not relevant to the scope of effects of the proposed action analyzed in this EA. In-river fisheries, however, are part of the Affected Environment, and a brief description has been added to sections 3.4.4.4, 3.4.5.4, 3.4.6.4, and 3.4.7.4 of the EA. The effects of the proposed actions on biological resources was based on spawning escapement relative to the SDC, and therefore account for all mortality sources, including in-river fisheries (Tables 4-2 and 4-5 in the EA).

Comment 5: The EA does not analyze impacts to Klamath sub-basin Chinook populations. The EA should address the disproportionate impact of fishery management on early spawners and propose approaches to quantify and minimize such impacts.
Response: The effects of implementing Amendment 16 on sub-basin populations within the Klamath Basin are acknowledged and assessed by incorporating the analysis from Salmon FMP Amendment 15 into Amendment 16 (section 4.1.5.4). There is insufficient information to analyze the effects of Amendment 16 on Klamath sub-basin populations beyond what is contained in the Amendment 15 analysis; to the extent there are "disproportionate effects" these cannot be quantified.

The focus of the comments seems to be on the adequacy of 40,700 spawners as a management objective, and how that number was derived. The value of the MSY spawning escapement recommended (40,700 natural area adult spawners) is currently the best available science. The MSA requires management decisions based on the best available science. Therefore, as new science becomes available, it will be incorporated. Amendment 16 provides a process for changing estimates of MSY if additional information suggests a better estimate is available, or sub-basin specific management objectives could be adopted; however, there is not sufficient information available to do so at this time.

Comment 6: An escapement objective of 40,700 KRFC spawners is an improvement, but inadequate. Shasta River Basin needs at least 10,000 spawners, and is unlikely to achieve that with 40,700 for the entire Klamath-Trinity system. The 40,700 escapement goal does not allow for reaching historical Chinook numbers in the Shasta River.
Response: NMFS and the Council are unaware of any information supporting an objective of 10,000 spawners for the Shasta River, there is no identified objective for the Shasta River in the Salmon FMP, and there is insufficient information to manage fisheries to achieve any specific spawning escapement on an annual basis. Therefore, the Council manages Klamath Basin on an aggregate basis using the best available science. The currently available habitat is not capable of supporting historic fish abundance due to dam construction and habitat degradation throughout the Klamath-Trinity Basin. As evidence, relatively large spawning escapements in recent years have not resulted in larger than average subsequent broods (STT 2005). The best available science indicates that 40,700 is an appropriate spawning escapement.

Comment 7: Allowing a *de minimis* fishing impact of up to 10 percent at stock abundance less than 22,000 KRFC spawners risks puts sub-basin populations at risk of falling below a critical population threshold of 720 spawners, as identified in Amendment 15.
Response: *De minimis* fishing rates on KRFC at those abundance levels would be used primarily to account for impacts in fall fisheries that occurred before the status for the returning brood was known, or to provide for minimal tribal needs. A list of considerations for implementing *de minimis* fisheries is included in the FMP language (Appendix I) and has been added to the EA (section 2.5.1.6).

Comment 8: The escapement objectives considered in the EA do not provide enough fish returning to allow those involved in habitat restoration efforts to see improvement in fish abundance.
Response: It is not clear what would be a basis for determining an adequate number of returning fish in order to demonstrate progress resulting from habitat improvement efforts in the Klamath, this is undoubtedly a subjective determination. Text has been added to the EA to note that a larger escapement goal could generally correlate to increased visibility of returning spawners in the Klamath Basin, and that there is likely a relationship between participation in habitat restoration efforts and returning adults, as well as between other aesthetic uses and returning adults (section 4.5.7).

Comment 9: MSY is based on recruitment as if all variability were a result of only inland conditions.
Response: The MSY spawning escapement objective is based on both spawner/recruit relationship, and an early life history survival term that accounts for both river out-migrant and early ocean entry survival; therefore, the estimate of MSY does not assume survival variability is only the result of inland conditions (STT 2005).

Comment 10: Reliance on “natural spawners” in Bogus Creek (below Iron Gate Hatchery) and Trinity River (below Trinity River Hatchery), i.e., hatchery strays, to “prop up” natural spawner numbers, “while the rest of the basin suffers from under-escapement as a result.
Response: The spawner escapement portion of the KRFC conservation objective is, and has been, specified in terms of natural-area adults and not natural-origin adults. The spawner/recruit relationship used to specify MSY spawning escapement for KRFC is based on the best available science, and provides a statistically significant, scientifically defensible estimate of MSY spawning escapement.

Comment 11: The EA does not analyze effects on marine nutrient cycle.
Response: The marine nutrient cycle is identified as part of the affected environment (section 3.3) and assessed qualitatively in the EA (section 4.3.1).

Comment 12: The EA fails to include reasonable alternatives, specifically a spawning escapement target for the Klamath Basin higher than 40,700, regulating in-river harvest practices, and improving in-river accountability measures.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

Response: The additional alternatives identified are beyond the scope of actions identified in the purpose and need statement. The purpose and need for Amendment 16 was to bring the Salmon FMP into compliance with the MSA, particularly requirements for ACLs and to ensure objective and measureable status determination criteria, which requires management based on MSY. There were no analyses supporting spawning escapement objectives for any purpose other than MSY. As part of its issue scoping process, the Council directed that conservation objectives should be updated as part of the Amendment 16 process only as necessary to comply with the purpose and need statement. The additional alternatives related to changing in-river harvest methods, timing, and accountability measures are not within the jurisdiction of the Council and NMFS to implement. In-river harvest is regulated by the State of California and the Yurok and Hoopa Valley Tribes. The EA did contemplate and analyze effects from the amount of in-river harvest on the affected environment. Accountability measures are intended to ensure compliance with the established ACLs or are mitigated if there is non-compliance. Mortality from all sources, including all in-river fisheries is accounted for in assessing compliance with ACLs because the metric is based on spawning escapement. Accounting for in-river impacts is also the responsibility of the state and tribes, and not within the jurisdiction of the Council or NMFS.

Comment 13: The draft EA's reliance on previous environmental review documents is inappropriate. Circumstances have changed, specifically regarding the effects of in-river fisheries and habitat improvements in the Klamath Basin.
Response: Use of previous environmental documents is appropriate as long as they are properly incorporated by reference and up to date information is included in the EA or in the referenced documents. The documents referenced in Amendment 16 are all less than 10 years old, and many are updated annually, including the stock assessment and fishery evaluation, which assesses management effectiveness annually. The stock/recruitment analysis for KRFC (STT 2005) used more recent data than 2000 to derive the 40,700 MSY spawning escapement estimate. The analysis was completed in 2005 and used data through 2004; the 2000 brood was the last complete brood available for that analysis. STT (2005) and the Amendment 15 EA (PFMC and NMFS 2007) were added to the list of documents incorporated by reference and text was added to the final Amendment 16 EA clarifying that the documents referenced in Section 1.4.2 were incorporated by reference.

The FMP describes a process for incorporating new scientific information and methodologies into the annual salmon management process, and Amendment 16 provides for reference points, include S_{MSY}, to be changed in response to new information. Thus, if scientific information becomes available that warrants a reconsideration of reference points specific to the Klamath, this can serve as a basis for reevaluation of those reference points.

Comment 14: Maximum sustainable yield is not adequate to achieve optimum yield.
Response: The scope of Amendment 16 did not include revising the current definition of achieving OY for salmon; therefore, considering alternatives for OY was not appropriate. MSY is applied on a stock specific basis while OY is applied on a coast-wide stock and fishery aggregate basis. Changing the conservation objective of one stock to address OY would not be appropriate given the current definition of OY.

Comment 15: Impacts of fishing on ESA listed species is not analyzed.
Response: The EA considers the effects of the proposed action on listed species. As stated in the EA (section 3.2), the effects of alternatives on ESA listed salmon are assessed along with target salmon stocks (section 4.1). To address impacts on ESA listed species, NMFS undertakes ESA Section 7 consultations. NMFS has issued several biological opinions on the FMP covering salmonid and non-salmonid species that are affected by the ocean salmon fisheries and fisheries are managed to meet standards set forth in those opinions. The proposed action would not change this aspect of the salmon FMP.

Comment 16: Objection to setting the lower end of the current conservation objective (i.e., 122,000) as S_{MSY}, this effectively changes the conservation objective from a range of 122,000 to 180,000 to a single value of 122,000.
Response: The form of the harvest control rule adopted requires a single value of S_{MSY} upon which to calculate annual management measures, so a single value was adopted based on the 1984 framework amendment. There was no supporting analysis to suggest that a different value was appropriate, and such an analysis was beyond the scope of

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

Amendment 16. The conservation objective as stated in the FMP (Appendix I of the EA) was unchanged at 122,000-180,000 adult spawners and is not changed by the definition of S_{MSY}, which is used to determine the point at which SRFC are overfished, rebuilt, and when *de minimis* fishing provisions apply. Defining S_{MSY} does not remove the Council and NMFS' ability to structure management measures to target higher escapement levels in response to year-specific conditions. A list of considerations for implementing *de minimis* fisheries is included in the FMP language (Appendix I) and has been added to the EA (section 2.5.1.6).

Comment 17: Questions whether managing to the low end of the conservation objective is appropriate given that the low end was established due to migratory restrictions imposed by Red Bluff Diversion Dam. Reasonable and Prudent Alternative in NMFS 2009 Biological Opinion for the Central Valley Project would require that gates be raised year-round on the dam in order to improve passage, concurrent with this project NMFS should set S_{MSY} at 180,000 adult spawners.
Response: There was no scientific support for choosing 180,000 as S_{MSY}. The S_{MSY} value used in the EA is based on the best available science. Amendment 16 provides a mechanism for updating reference points based on new scientific information, when that becomes available.

Comment 18: Questions whether even the high end of the range (180,000) is still appropriate under the "doubling goal" of the Central Valley Project Improvement act (CVPIA).
Response: As noted in response to the previous comments, the S_{MSY} value used in the EA is based on the best available scientific information. The conservation objective for SRFC is not changed by this action. The "doubling goal" of the CVPIA does not create any specific standards that make a revision to the conservation objective for SRFC necessary or appropriate.

The purpose and need for Amendment 16 was to bring the Salmon FMP into compliance with the MSA, which requires management based on MSY. There is no analysis supporting any specific spawning escapement objective for any purpose other than MSY.

Comment 19: *De minimis* fishing provisions could be counterproductive to the "doubling goal" of the CVPIA.
Response: All of the *de minimis* fishing alternatives are based on management for MSY. Managing for MSY will result in optimal production that the habitat can support. Estimates of MSY are based on long-term average escapement, and some years with escapement below S_{MSY} are expected. The low exploitation rates allowed under the *de minimis* fishing provisions will not significantly affect achievement of MSY in the long-term, as they are expected to occur infrequently. In applying the *de minimis* control rules, the Council and NMFS must consider a number of factors related to the continued productivity of the stock, and *de minimis* exploitation rates must not jeopardize the long term capacity of the stock to produce MSY on a continuing basis. As habitat is improved, estimates of MSY should be revised upward to account for the increased capacity of spawning habitat.

Comment 20: Relying on abundance of hatchery stocks to support *de minimis* fisheries is potentially harmful to genetic and phenotypic diversity in Central Valley Chinook. Statement in EA that egg transfers between hatcheries is viable mitigation for low spawner abundance is flawed.
Response: Hatchery policy is set by CDFG and USFWS, and is therefore outside the scope of Amendment 16. Conservation objectives for hatchery stocks are set by those entities and annual salmon management measures are crafted to meet them. Amendment 16 retains the provision to allow conservation objectives for hatchery stocks to be modified as hatchery policies change.

Comment 21: Contrary to analysis in the EA, San Joaquin River fall-run Chinook could suffer significant impacts under *de minimis* fishing provisions.
Response: Exploitation rates under *de minimis* fishing conditions are, by definition, intended to avoid significant impacts. San Joaquin fall Chinook are expected to experience the same ocean exploitation rates, and the same or lower freshwater exploitation rates, as SRFC; therefore the EA correctly assessed the risk to San Joaquin fall Chinook. In

addition, the alternatives for *de minimis* fisheries include consideration of the list of factors currently in the *de minimis* provision for Klamath River Fall Chinook, adopted as part of Amendment 15. These include the status of sub-stocks and the status of co-mingled stocks. The description of the FPA 6 in section 2.5.1.6 of the EA has been modified to explicitly state these considerations, which previously were included only in the FMP language (Appendix I to the EA).

Comment 22: The draft EA does not "discuss the interplay between ocean harvest and freshwater management " and should do so.
Response: The interaction of ocean and inside fisheries is described in the annual Review of Ocean Fisheries document (PFMC 2011a), which was referenced in the description of the affected environment and incorporated by reference. Language was added to the EA to emphasize the incorporation by reference (section 1.4.2). The analysis of alternatives in Amendment 16 included effects of inside fisheries on spawning escapement, and described the relationship between escapement from ocean fisheries and allowable harvest of tribal and recreational river fisheries in the Klamath Basin.

Text has been added to the EA to note that a larger escapement goal could generally correlate to increased visibility of returning spawners, and that there is likely a relationship between participation in habitat restoration efforts and returning adults, as well as between other aesthetic uses and returning adults (section 4.5.7).

Comment 23: "Producers" (communities and entities where salmon spawn and rear and are produced) should be included in harvest management and should have positions on the PFMC and Klamath Fishery Management Council (KFMC).
Response: The Klamath Act, which established the KFMC, expired on October 1, 2006, and was not reauthorized by Congress. Funding for this program was eliminated and the charter for the KFMC was discontinued. The non-agency PFMC members are nominated by governors of the four states and appointed by the Secretary of Commerce. Most appointed positions are held by representatives of fishery sectors, but that is not a requirement and the PFMC has appointed members that are not associated with commercial, recreational, or tribal fishery sectors. People interested in appointments need to contact the office of their state Governor (for additional information see 50 CFR 600.215). The Council also has advisory bodies with positions reserved for general public and environmental groups. These advisory bodies include the Salmon Advisory Subpanel and the Habitat Committee, and other ad hoc committees. People interested in appointments to advisory bodies need to follow PFMC procedures for nomination (http://www.pcouncil.org/council-operations/council-and-committees/current-vacancies/).

Comment 24: The EA fails to incorporate adaptive management – KRFC escapement should be reviewed and updated.
Response: Adaptive management is inherent in all fishery management plans and the MSA process, as informed by new information and science. Escapement of all managed salmon stocks are reviewed and updated annually in the Review of Ocean Fisheries (SAFE) document (e.g., PFMC 2011a). In addition, a process for review and updating of stock specific conservation objectives is provided in Amendment 16 and the Salmon FMP. As part of its issue scoping process, the Council directed that conservation objectives should be updated as part of the Amendment 16 process only as necessary to comply with the purpose and need statement. However, the Council noted that development and review of conservation objectives for stocks should be pursued through the Salmon Methodology Review process on a priority basis as adequate information becomes available.

Literature Cited

PFMC and NMFS. 2007. Final Environmental Assessment for Pacific Coast Salmon Plan Amendment 15: An Initiative to Provide for De minimis Fishing Opportunity for Klamath River Fall-run Chinook Salmon. Pacific Fishery Management Council, Portland, Oregon.

PFMC. 2011a. Review of 2010 Ocean Salmon Fisheries. PFMC, Portland OR 97220. 335 p.

STT. 2005. Klamath River Fall Chinook Stock-recruitment analysis. Agenda Item G.1.b, Sept 2005. PFMC, Portland OR 97220. 36p. (see: http://www.pcouncil.org/wp-content/uploads/G1b_KlamathConsObj_STT_Rpt.pdf)

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

Original Comments Attached

CALIFORNIA FARM BUREAU FEDERATION

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November 18, 2011

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Re: **NOAA-NMFS-2011-0227** – Comments on Amendment 16 to the Salmon Fishery Management Plan, Draft Environmental Assessment, and Related Documents

Dear Messrs. Stelle and McInnis:

The California Farm Bureau Federation and Siskiyou County Farm Bureau (collectively "Farm Bureau") respectfully submit this letter commenting on Amendment 16 to the Pacific Coast Salmon Fishery Management Plan for Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California ("Salmon FMP"), the draft environmental assessment ("Draft EA"), and other related documents.

The California Farm Bureau Federation is a non-governmental, non-profit, voluntary membership California corporation whose purpose is to protect and promote agricultural interests throughout the state of California and to find solutions to the problems of the farm, the farm home and the rural community. Farm Bureau is California's largest farm organization, comprised of 53 county Farm Bureaus currently representing approximately 74,298 agricultural, associate, and collegiate members in 56 counties. Farm Bureau strives to protect and improve the ability of farmers and ranchers engaged in production agriculture to provide a reliable supply of food and fiber through responsible stewardship of California's resources. As such, Farm Bureau has long been involved in policy processes related to sustainable fisheries.

Siskiyou County Farm Bureau represents agriculturalists in the Scott and Shasta valleys as well as other areas within Siskiyou County. Rivers and streams in these areas provide spawning sites for the anadromous fish referenced in Amendment 16, the Draft EA, and related documents.

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Request for Additional Time

As an initial matter, Farm Bureau respectfully requests that the comment period be extended for an additional sixty days. Although the proposed Amendment 16 appears to have been in development for some time, Farm Bureau just recently became aware of this opportunity to provide input and has had less than a week to draft this letter.

There are three reasons an extension should be granted. First, the process used by the Pacific Fisheries Management Council ("PFMC") to develop and implement the Salmon FMP has not been readily accessible to inland resource users interested in sustaining healthy salmon populations by ensuring adequate numbers of adults return to spawn. Second, Amendment 16 and accompanying documents are exceedingly technical and drafted in such a manner that it is very difficult for the public to understand. Consequently, National Marine Fisheries Service ("NMFS") should err on the side of providing the public plenty of time to digest and comment on the document. Third, by providing additional time, it would provide Farm Bureau the opportunity to further develop the concerns and issues addressed in this letter, which in turn may help NMFS and the PFMC appropriately respond to these comments.

In sum, providing additional time will likely ensure that the ultimate Amendment 16 and accompanying environmental documents are adequate; as currently drafted they are not.

Farm Bureau's Interests

Farm Bureau's members include farmers and ranchers in the Sacramento River, San Joaquin River, Eel River, Mad River, Smith River, Matole River, Russian River, and Klamath River basins as well as other salmon bearing watersheds in California. While these comments are primarily focused on the Klamath River basin, the general principles are applicable throughout the State. These members have direct and indirect interests in the long term health and sustainability of the salmon fishery. These interests include direct interests in ensuring adequate adult salmon return; not only to utilize the habitat that many farmers and ranchers have worked hard to improve, but also for the aesthetic and recreational value landowners place on spawning salmon.

Farm Bureau's members also have significant, if somewhat less direct, social and economic interests in ensuring adequate numbers of adult salmon return. A primary interest of these members have is the desire to live and work in a healthy environment. For farmers and ranchers this phrase is more than a cliché, it is a literal truth – farmers and ranchers sustain their livelihood from and in the environment. It is important to recognize that this reliance is the same as that of the tribes who also depend upon the natural resources within the Klamath River basin.

Additionally, Farm Bureau's members have an important interest in ensuring adequate numbers of adult salmon return because farmers and ranchers throughout the State, but particularly within the Klamath River basin, have been unfairly castigated as the primary cause of salmonid decline, while no attention has been given to certain other actions affecting adult returns. Consequently, farmers and ranchers need to see adult salmon return to spawn in order to be able to find relief from the disproportionate blame for poor fishery conditions. When the return of spawning adults is impaired by actions of a Federal agency, farmers and ranchers suffer real harm.

Finally, salmon make up an important part of the social fabric for all communities where they are present, but particularly within the Klamath River basin. Agriculturalists share the interests of other environmentally conscious individuals in strengthening this important component of rural culture.

Although Farm Bureau is critical of the proposed action for failing to ensure that enough adult salmon return to spawn as required for a biologically sustainable fishery, Farm Bureau is in no way questioning the rights and privileges of tribal, commercial, and recreational fishermen to harvest salmon. Our position and objective is that all resource users can live and thrive in a bountiful environment sustaining healthy fisheries, productive agriculture, and stable cultures. It is not a zero sum game. However, in order to achieve this sustainable progress, all aspects of the fishery must be analyzed and considered. Amendment 16 and the Draft EA fail to do so.

Jurisdiction of NMFS and PFMC Regarding Issues Raised in this Letter

Both NMFS and the PFMC are obligated to address the issues raised in this letter. Although the PFMC may assert that it does not have any jurisdiction over salmon fisheries management outside Council-area ocean water, such a position is untenable, particularly given the necessary implications of various cases (including *U.S. v. and Hoh v. Baldrige)* which effectively tie ocean and tribal commercial fishing together, and ongoing cooperative arrangements apparently in place with the coastal states to the same effect. Furthermore, NMFS, pursuant to its statutory authorities and obligations, is clearly required to address these issues both procedurally in accordance with National Environmental Policy Act ("NEPA") and substantively in accordance with the Endangered Species Act ("ESA").

General Comments

In recent years farmers and ranchers throughout California, but particularly within Siskiyou County, have come under increased regulatory pressure from Federal and State agencies regarding issues related to water use, water quality, and fish habitat. This increasing pressure comes in spite of (or perhaps because of) decades of habitat restoration and extensive improvements to water conservation infrastructure. It is frustrating to be told that this regulatory pressure is focused in this region because it has the "least impaired system in the state with the best chance for recovery." For example, it is because of the stewardship of the ranchers and farmers in Siskiyou County that the stream systems there are "least impaired." Farmers and ranchers in Siskiyou County care deeply about the fishery resource and consider themselves diligent and dedicated stewards of it.

Farmers and ranchers in the Klamath River basin have seen the number of fish that come home to spawn decrease over time. This is perplexing as the habitat has been steadily healing from many historical legacy problems (large scale mining, flood events, Army Corps vegetation clearing and channelization, etc). Basically, the more that has been done to improve habitat, the less fish there are to utilize that habitat. State and Federal agencies, as well as other stakeholders, have placed the blame for fewer fish on agricultural practices that they claim are detrimental to juveniles. Ignoring the irrefutable evidence that time and projects have significantly improved habitat, State and Federal agencies have remained intently focused only on the need for ever increasing habitat improvements. In their ardor, these agencies and stakeholders appear to have completely forgotten that sufficient numbers of adult salmon are an important component of healthy fisheries.

For example, the 2010 Scott River Salmon Studies Report published by the California Department of Fish and Game states, in regards to juvenile Chinook production, "The number of 0+ Chinook produced per adult is a direct measure of in-river productivity and as habitat conditions improve or diminish this measure will reflect those conditions. It is encouraging that the number of 0+ Chinook produced (in the Scott) has been increasing and has increased each season …." It is apparent from juvenile outmigration studies that in-river productivity is not the reason for the decline in spawning adults. The reason for the decline in spawning adults is the decline in returning adults – something both NMFS and the PFMC have a direct and immediate obligation to address.

<u>Comments Regarding the Proposed Action</u>

There are three basic flaws with the proposed action: 1) the Draft EA is inadequate; 2) Amendment 16 fails to adequately implement the Magnuson-Stevens Fishery Conservation and Management Act ("MSA") as reauthorized in 2006; and 3) the proposed action is inconsistent with the ESA.

1) The Draft EA is Inadequate

An environmental assessment must provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement ("EIS"). Here, the Draft EA incorrectly concludes that there will be no significant impacts because it entirely fails to analyze potentially significant impacts to the human environment, it incorrectly determines that certain impacts are less than significant, it fails to consider an adequate range of alternatives, and it improperly relies upon past environmental review documents which are stale and/or inadequate.

a. The Draft EA Fails to Consider Significant Environmental Impacts

<u>Uncounted In-river Tribal Harvest</u>
In order to appropriately consider whether implementation of Amendment 16 will have significant environmental impacts, NMFS must consider all known and knowable harvest of

salmon. The Draft EA fails to do so. Members of the Karuk Tribe and occupants of the Resignini Reservation, in accordance with their ancient cultural traditions, harvest significant numbers of salmon in the Klamath Basin. Farm Bureau is not in any way suggesting this fishery is not appropriate, only that the environmental review conducted by NMFS must consider the fact that there is a significant harvest occurring in-river other than the Hoopa and Yurok Tribal harvest. Since the Draft EA does not consider this harvest, and in fact Farm Bureau is aware of no environmental review ever being conducted on such harvest, the Draft EA is inadequate.

Impact of In-river Fisheries is not Analyzed
A glaring omission from the Draft EA is an adequate analysis of the impacts of in-river fishing on the environment. As explained throughout this letter, the methods and timing of in-river harvest have significant environmental impacts that will result from implementation of Amendment 16. Once again, this is not to say in-river harvest should not occur, only that the impacts of that harvest, particularly how and when it is conducted, must be analyzed.

The significant environmental impacts of current in-river harvest practices include: excessive pressure on early run stocks which has a particularly detrimental impact to fish spawning in the Shasta River; the use of monofilament gill nets which effectively select for size thereby reducing the number of large fish returning to the system over time; hooking mortality due to recreational fishing; and harvest practices that kill Coho salmon, a listed species.

No Analysis of Project's Impacts to Sub-basin Chinook Populations
Key to a sustainable fishery is the proper biological distribution of spawners throughout the basin. During PFMC's management of recreational, commercial, and subsistence harvest over the past several decades, the distribution of spawners in the Klamath Basin has significantly changed. Particularly impacted have been the number of adults returning to the Scott and Shasta Rivers. The Draft EA's failure to even acknowledge this fact renders it inadequate.

Also, the Draft EA, in part because of its failure to even look at sub-basin populations, over-relies upon Bogus Creek hatchery strays (from Iron Gate Hatchery) that spawn naturally and thus are counted toward the spawning escapement target of 40,700 fish. Similar reliance on hatchery strays to bolster natural spawning counts also occurs below the Trinity River Hatchery. Looking only at the spawning escapement number, the Draft EA concludes that so long as there are the 40,700 fish spawning in the Klamath River basin, there is no significant environmental impact. This is incorrect.

The actual analysis that must be done is whether the spawning escapement floor is appropriately distributed throughout the system. Failing to conduct such analysis (even though the information is available to and reviewed by NMFS and PFMC) allowed the situation to develop in the Klamath Basin where most of the fish that spawn naturally, and hence are counted as meeting Salmon FMP goals, are only in a few locations. Consequently, NMFS' conclusion that there is no significant impact due to Amendment 16 is based upon the faulty over-reliance on hatchery fish crowded into limited space. Since the Draft EA fails to analyze the environmental impacts of harvest management on different sub-basin Chinook populations, it is inadequate.

No Analysis of Marine Nutrient Cycle
The Draft EA fails to adequately analyze the importance of returning adults as a mechanism to transfer marine nutrients from the ocean to freshwater habitats. This "nutrient conveyor belt" is essential to a sustainable fishery. Without adequate adults returning to spawn, die, and thus provide imported marine nutrients, a sustainable fishery is impossible. Notwithstanding the importance of this function, the Draft EA fails to address the nutrient cycle at all.

b. The Draft EA Improperly Concludes Certain Impacts are Less than Significant

Impact of Fishing on Listed Species
The Draft EA concludes, with very little explanation or analysis, that there is no significant impact on listed species. While the Draft EA and earlier environmental review documents discuss some potential impacts to listed species in the context of ocean harvest, this analysis is not adequate. There must be comprehensive analysis of how ocean harvest (commercial and recreational) and in-river harvest (commercial, recreational, and subsistence) impacts listed species. Because the harvest of salmonids will directly flow from implementation of Amendment 16, these impacts must be analyzed.

Of particular concern are the impacts to Coho salmon of in-river fishing conducted in the Klamath River basin, some of which occurs in the course of fishing for the Chinook to be managed under amendment 16. As briefly mentioned above, current commercial, recreational, and subsistence harvest practices (methods and timing) result in the take of Coho, most significantly by the use of gill nets. Lacking any meaningful analysis of this take, it is impossible for NMFS to conclude, as it did in the Draft EA, that there will be no significant impacts to listed species.

c. Failure to Include Reasonable Alternatives

Because NMFS failed to analyze impacts to sub-basins of the Klamath River, failed to analyze the impacts of current harvest practices (particularly in-river practices), and failed to review any inland social, economic, or environmental impacts, a number of important alternatives were not considered. These include, among others, increasing the spawning escapement target above 40,700, regulating the method and timing of in-river harvest to ensure adequate distribution within the region, and improving the in-river accountability measures to ensure compliance with the MSA. Additionally, NMFS should consider developing some mechanism to include those essential to producing salmon (where they spawn) in the management process along with those whose business it is to harvest salmon.

d. The Draft EA's Reliance on Previous Environmental Review Documents is Inappropriate

Although the exact relationship between the Draft EA and previous environmental review documents is not clear, it is clear that this relationship is both significant and inappropriate. First, time has demonstrated that fisheries management is having impacts that were never analyzed in earlier environmental review documents. This includes, among other things, evidence indicating that in-river harvest practices are unduly pressuring the early Chinook runs which disproportionately reduces the number of adults returning to the Shasta River. Second, many circumstances have significantly changed since earlier environmental review documents were drafted. Additionally, significant habitat improvements have been made throughout the Klamath River basin. With more habitat available, there must be more adults permitted to return and utilize that habitat.[1]

While the PFMC has been managing salmon harvest for many years, there has been no comprehensive environmental analysis of the effectiveness of this management. Instead, NMFS, the PFMC, and other State agencies continue to make minor changes to the Salmon FMP without ever significantly reviewing the fundamental assumptions, analyses, and conclusions underpinning fisheries management. What this means is that the basic structure upon which the Salmon FMP relies has essentially remained unchanged and unreviewed for decades, even though circumstances and knowledge about these systems has improved significantly. Not only does this mean that the Draft EA's reliance on these earlier documents is inappropriate because these earlier documents are stale, but the Draft EA itself is inadequate for failing to analyze the effectiveness of fisheries management in light of these changed circumstances.

In order to address these concerns, NMFS must conduct a comprehensive review of the effectiveness of fisheries management, including in-river harvest, on the overall health of the system.

2) The Salmon FMP and Amendment 16 Fail to Properly Implement the MSA

As proposed, Amendment 16 fails to implement the requirements of the Magnuson-Stevens Fishery Conservation and Management Act as reauthorized in 2006. Simply put, the MSA is intended to ensure that all harvest is regulated in a manner that ensures the long term sustainability of the fishery and the communities that rely upon that fishery. By failing to include any meaningful analysis, description, or regulation of in-shore and in-river harvest, NMFS, the PFMC, and other responsible agencies have abrogated their duties pursuant to the MSA.

[1] It is important to note that the data utilized to estimate the maximum sustained yield of spawning escapement ended in 2000. Since that time neither the assumptions nor the data appear to have been meaningfully revisited, nor is there a mechanism in place to do so.

Review of Amendment 16 and the related documents reveal that NMFS and the PFMC appear not to assert jurisdiction over in-river areas. While there may be divisions of jurisdictional authority among various agencies, the overarching objectives of the MSA, ESA, and NEPA cannot be thwarted by attempting to duck responsibility. Even if certain agencies lack particular authority, the planning and regulatory functions of these agencies are sufficiently comprehensive and interlocking that there cannot be the regulatory gap that currently seems to exist. Right now there is an extraordinary divergence between the copious regulation of ocean trolling management measures and the nonexistent regulation of in-river fishing. While NMFS and the PFMC may have an explanation for how this gap evolved, neither Amendment 16 nor the Draft EA explain why this gap exists or how it will be addressed.

The MSA, ESA, NEPA, and numerous other Federal and State laws are all intended to address environmental impacts. Particularly, the MSA's purpose is to ensure the proper management of fishery harvest in order to ensure sustainable populations. Since Amendment 16 and the Draft EA, and hence the Salmon FMP itself, are the origin and general authorization for all salmon harvest, there is no ability for the agencies, particularly NMFS, to avoid responsibility.

a. Maximum Sustainable Yield is not Adequate

The maximum sustainable yield is not adequate to achieve the purposes of the MSA. Simply put, there are not enough adult spawners appropriately distributed among the various tributaries in the Klamath Basin to achieve a sustainable fishery. Regardless of whether this is because the target spawner escapement of 40,700 is too low, or because in-river fishing practices have disproportionately impacted returns to various sub-basins, the maximum sustainable yield for spawning escapement is not adequate. NMFS' guidelines state that optimum yield is the proper target, not absolute maximum sustained yield. Amendment 16 and the Draft EA confuse and interchange the two terms and ignore National Standards Guidelines indicating that multiple factors need to be considered, all of which will tend to push optimum yield lower than maximum sustained yield in all cases. While the inadequacy of the maximum sustainable yield for spawning escapement is likely due to inadequate environmental review, it is also contrary to the purposes of the MSA.

b. Salmon Harvested by the Karuk Tribe Are Not Considered

As explained above, members of the Karuk Tribe and residents of the Resignini Reservation harvest salmon in the Klamath Basin in accordance with their ancient cultural traditions. Reiterating that the fact this harvest occurs is not necessarily a problem, NFMS and the PFMC must nonetheless recognize that failure to analyze and account for this harvest is contrary to the requirements of the MSA and effectively undermines any intended spawner escapement. Consequently, Amendment 16, the Draft EA, and the Salmon FMP must be amended to account for and incorporate this harvest.

c. Inadequate Consideration Given to Impacts to Listed Species

Methods of harvest, particularly in-river harvest practices, impact listed species. The Draft EA gives no consideration to how these practices impact listed species even though the EA is NMFS' endorsement of an action that will result in take of listed species. For example, recreational hook release and the use of gill nets will result in the take of some unknown quantity of salmonids.

d. Failure to Effectively Regulate Harvest Methods

NMFS, the PFMC, and State agencies must analyze and regulate in-river harvest methods in order to fulfill their obligations under the MSA. There is simply no justification for NMFS' and PFMC's failure to regulate in-river harvest. At a bare minimum, NMFS and the PFMC must analyze the impacts of this fishery and ensure that the other agencies that do have jurisdiction are properly regulating this harvest. The failure of Amendment 16 and the Draft EA to address this core management topic is contrary to the MSA.

e. Accountability Measures are Not Adequate

The MSA requires certain accountability measures to be adopted in order to ensure the annual catch limits are not exceeded and are corrected if exceeded. Amendment 16 contains no accountability measures to address in-river harvest. Without such measures, it is impossible to know whether annual catch limits are exceeded or to correct exceedances that do occur.

3) Violation of the ESA

The proposed action is inconsistent with the ESA because NMFS and the PFMC failed to follow the required process in developing Amendment 16 and because the proposed action will result in unpermitted take of listed species.

a. NMFS and the PFMC have Failed to Follow the Appropriate Process

Whenever a Federal action may affect a listed species, the agency must comply with Section 7 of the ESA. The resulting biological opinion must provide the analysis necessary to ensure that action will not jeopardize the continued existence of a species. Basically, the ESA puts in place a process to ensure that Federal agencies will not take an action that would jeopardize the continued existence of a species or destroy or adversely modify critical habitat. Neither NMFS nor the PFMC have adequately followed such a process regarding Amendment 16.

Although there are apparently some precautions taken to minimize harm to listed species due to harvest, this consideration is woefully incomplete and inadequate. Nowhere does NMFS or the PFMC address the impacts of in-river harvest practices on listed species. At the same time, such harvest is clearly the direct result of NMFS' and PFMC's action amending the Salmon FMP.

Consequently, both NMFS and the PFMC are acting in conflict with the ESA by failing to adequately complete the Section 7 process.

b. Harvest Practices Result in Impermissible Take of Listed Species

For reasons that are never made clear, little attention is given to the existence or scope of take of listed species due to harvest conducted pursuant to the Salmon FMP. In addition to this dearth of information, or perhaps because of it, there is no explanation in Amendment 16 or the Draft EA of why this take is allowed. Without analysis, it is impossible to determine the extent of the take of listed species that will occur, particularly due to current in-river harvest practices since they are not even discussed. Since NMFS is obligated to enforce the ESA, failure to properly address this issue is an abrogation of its duties.

Conclusion

Farm Bureau appreciates the opportunity to provide comments on the proposed action. Ensuring the long term sustainability of salmon fisheries is very important to the agricultural community. Without it, we will continue to be mired in conflict. By addressing the concerns raised in this letter, NMFS and the PFMC will take a holistic approach to fisheries management that will help draw our communities out of this culture of conflict.

Please feel free to contact Jack Rice at (916) 561-5667 or jrice@cfbf.com with any questions.

Very truly yours,

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Jim Morris
Siskiyou County Farm Bureau

JLR:dkc

cc: Siskiyou County Farm Bureau

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

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RE: Amendment 16 to the Salmon Fishery Management Plan; ID# NOAA/NMFS 2011-0227

Gentlemen,

We would like to begin with a request for an additional 60 days time to review this assessment. We found the public input process to be very poorly noticed, particularly for interested parties directly affected but living far from the coast. We in fact can find virtually no one aware of this very important process. In addition, the technical complexity and breadth of the EA made it extremely difficult to digest and properly prepare comments on. Additional time would make it far more realistic for us to comment properly.

In the absence of additional time, we wish to provide our comments and suggestions on the Salmon Amendment 16 Draft EA, and because our knowledge and expertise is limited to the Shasta River Watershed and Upper Mid-Klamath Basin, our comments are focused on those areas, but likely to have coast-wide relevance.

From our perspective, one of the fundamental and most important intentions of NEPA is to cause decision-makers to confront the full array of outcomes consequent to a major decision, there-by allowing them to make fully informed decisions. Language supporting those beliefs is clearly stated in the NEPA legislation:

> ***Sec. 101 [42 USC § 4331].***
>
> **3.** *attain the widest range of beneficial uses of the environment without degradation, risk to health or safety,* ***or other undesirable and unintended consequences****;* (emphasis ours).

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

And

Sec. 102 [42 USC § 4332].

*(B) Identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, **which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking** along with economic and technical considerations.* (emphasis ours).

The EA, as it is currently written, can best be characterized as an examination of methods of fine tuning of a "business as usual" approach to the complex problem of managing a sustainable fishery at Maximum Sustained Yield (MSY), with no looking in the corners or closets or under the bed for things overlooked or unknown in the past that collectively would result in a different harvest level identified in both Magnuson-Stevens and NMFS's NSGI as Optimum Yield. We don't believe that such a limited assessment is wise, appropriate, or consistent with the mandates of NEPA or Magnuson Stevens. Nor do we feel that it is in the long-term best interests of the fishing communities nor of our inland communities.

The Shasta Valley RCD has been working very actively on salmon restoration in the Shasta River Watershed and upper Mid-Klamath River Basin since 1989. Our district boundary runs the length of the Klamath River and its minor tributaries from Happy Camp to the Oregon Border, along with the entire Shasta Valley. Our district encompasses a large percentage of the spawning areas in the Klamath Basin. In the course of our fishery restoration work we have developed an in-depth understanding of local salmon restoration and its bottlenecks, and based on that understanding wish to request that the following be incorporated into the NEPA review of Amendment 16, with appropriate changes made to the final recommendations prior to further consideration.

Item 1.

Regardless of which alternative is chosen, all of them overlook the critical nature of local support for the protection and improvement of inland spawning and rearing areas. As the PFMC has noted in each of its *Annual Reviews of the Ocean Fishery*, "*The Shasta River has historically been the most important chinook spawning stream in the upper Klamath River, supporting a run of 30,700 adults as recently as 1964, and 63,700 in 1935*... Since 1986, the de-facto target number of spawners (35,000) allowed to return to the entire Klamath Basin has been far too low to allow landowners or members of the public to see spawning salmon in the Shasta Watershed—they are simply dispersed too widely throughout the Klamath-Trinity basin to be visible. The net result is that the most important factor in a sustainable fishery—sustained juvenile production—is unable to generate broad public support in inland areas such as the Shasta Valley where the only other reliable basis for generating public support--salmon fishing--has long been prohibited. The likely new escapement target of 40,700 while an improvement, will not change that situation. If persons living and working in "the most important spawning tributary to the Klamath" are to continue to fully support the steps needed to meet the salmon production improvements that must come from the Shasta watershed, they absolutely must be able to see progress in the form of salmon visibly returning to spawn and in increasing numbers

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as production improves. In our experience that means spawner numbers allowed to return to the Shasta >10,000 on a regular basis. That is not going occur with a 40,700 fish target for the entire Klamath Trinity basin, and failure to move towards allowing spawners in numbers sufficient to be visible to return to the Shasta and elsewhere to bolster local support will result in the sort of "undesirable and unintended consequences" (referenced in NEPA above) to long-term salmon production that a proper NEPA review should identify and present methods to minimize. Beyond NEPA, failure to incorporate the legitimate needs of those of us living inland but with a strong interest in seeing the salmon that are an integral part of our environment also violates multiple sections of NSG1, and hence the intent of Magnuson-Stevens. Those sections include:

*(A) Optimum yield (OY). Magnuson-Stevens Act section (3)(33) defines "optimum," with respect to the yield from a fishery, as the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production **and recreational opportunities** and taking into account the protection of marine ecosystems; that is **prescribed on the basis of the MSY from the fishery, as <u>reduced</u> by any relevant economic, social, or ecological factor**; and...*

NSG1 goes on to describe some of the benefits to the nation that must be included in the establishment of Optimal Yield:

*(B) The benefits of recreational opportunities reflect the quality of both the recreational fishing experience and non-consumptive fishery uses such as ecotourism, **<u>fish watching</u>**, (emphasis ours) and recreational diving....*

For those of us living inland, watching fish is not just a recreational pastime in the fall. It serves as a validation that the salmon recovery efforts widely embraced throughout the area are both possible and successful, and most importantly, <u>worth continuing</u>. Without that ongoing validation, there is realistically no long-term hope of continuing to produce salmon in harvestable numbers from inland rivers. The EA fails to acknowledge the critical role of support for natural salmon production that is the essential underpinning to ongoing salmon harvest, and as a result fails to address the need to assure that sufficient salmon are allowed to return to spawn to be readily visible, and instead contents itself with a number that at best would barely provide a minimal number of eggs if adequately distributed.

<u>A proper NEPA review needs to assess the impact of setting an unlikely-to-be-changed target that is so low that it virtually assures that no one living near inland spawning areas has anything upon which to enthusiastically base support for salmon recovery, and then propose measures to be incorporated into the amendment for correcting that outcome. Harvest needs to be set based on a full consideration of Optimal Yield, and not just stop with Maximum Sustained Yield, as is specified in NSG1.</u>

Item 2.

Since 1986, the Klamath-Trinity system was managed in part to achieve a 33-34% spawner escapement rate (Harvest Rate Management or HRM). When adopted in 1986, that approach at least provided the hope that the number of spawning salmon would increase over time as conditions improved. In fact, that essentially never happened. It is not clear to us whether the proposed Amendment 16 will eliminate Harvest Rate Management entirely, and replace it with a single target number—40,700, or if it will be partially retained, but in any case the apparent outcome will be that every effort will be made to make sure that no more than 40,700 salmon spawn naturally in the Klamath Basin, effectively eliminating any hope of spawner run-size increases. It is essential from our perspective that only a percentage of the projected run size above the 40,700 minimum is targeted for harvest, leaving the unharvested remainder to increase the size of spawner runs and there by bolster inland enthusiasm for continued efforts to improve habitat. Such an option was not examined in the EA.

We agree that 40,700 is based on scientific data, but we see a need to acknowledge that as a result of wildly uncontrollable variables (many or most in the ocean) in survival that data is still too weak[1] to be used to set a spawner number with no fixed methodology or timing for future review and revision. We also find it indefensible to define Maximum Sustained Yield based only on spawner:recruit ratios, as if ocean conditions were irrelevant. Beyond that, we have been making significant headway throughout the district, and especially in the Shasta Watershed on fishery improvements, and believe that habitat changes here, changes not yet apparent in the pre-2001 data used to establish the 40,700 number, are significant, are not now being taken advantage of due to ongoing low spawner numbers, and will continue to be wasted if spawner escapement cannot and does not increase to take advantage of them.

The last time the topic of spawner numbers was fully considered was in 1986 when HRM was adopted. There is no reason to suggest that a number set now will be subject to review any sooner than the previous number was reviewed, and 25 years is far too long. In addition, there seems to be no specified data capture program, nor a data assessment procedure that is actually required in Amendment 16 that would drive a re-assessment of spawner targets, and particularly not on a tributary basis. Without specifying a process and frequency it seems unlikely that it will ever be done on a timely basis.

We are asking that an optimum yield target be developed that will ultimately provide the greatest overall benefit to the nation, as described in Magnuson Stevens, and further clarified by NSG1.

Put differently, Amendment 16 has improperly substituted an estimate of Maximum Sustained Yield for Optimal Yield, where optimal yield would have included provision for the above needs, resulting in a larger spawner escapement.

The NEPA review needs to assess the consequences of preventing a sharing of increased production between fishermen and persons inland needing to see a result of their salmon restoration efforts in the form of an increase in salmon spawners. It also needs to explicitly assess the importance of regularly assessing and responding to spawner distribution issues through the

[1] Pre season age 3-5 population estimates have ranged from approximately 34% to 267% of what post harvest season estimates found to be the actual population available for harvest between 1988 and 2010, yielding little truly effective harvest management.

Klamath-Trinity basin. It needs a thorough look at the disconnect inherent in setting Maximum Sustained Yield, and hence target spawner numbers based on recruitment as if all variability were a result of only inland conditions, completely ignoring the seemingly larger role played by variable ocean conditions. And based on those additional assessments, it needs to propose defined and adaptive steps and methods to do the best job possible to avoid or mitigate for them.

Item 3.

Amendment 16 seems to contain no steps to move towards the necessary ability to manage Klamath spawner numbers more on a tributary basis. The Shasta River supports the earliest fall chinook spawner run in the entire basin, and as such appears to be subject to the most severe fishing pressure by inriver commercial fishermen who have learned from many sad experiences that they are often not be able to catch their full allocation of salmon because all too often the actual inriver run was smaller than expected. We understand and sympathize with the difficult position this puts inriver fishermen in. Under present circumstances the only sensible thing for them to do is catch as many fish as possible as early in the run as possible, effectively targeting Shasta fish. As a matter of fairness, and to make the necessarily tough management decisions possible, it seems like incorporation of something akin to the deficit accounting approach (most often proposed by the Hoopa Tribe for the entire fishery) needs to be incorporated into harvest sharing so that any unintended disproportionate sharing between ocean and inriver from one year can at least hope to be corrected in the next, with a concurrent tie to longer inriver fishery closures each week to allow a reliable percentage of the earliest fish to escape harvest.

We realize that the PFMC technically has jurisdiction only over off-shore waters, but the cooperative agreements in place between tribal and state governments and the PFMC that are essential to coordinated fishery management effectively expand the scope of impact of this amendment to the entire watershed area, along with the ocean.

The NEPA review needs to assess the unintended disproportionate impact of fishery management on early spawners that is a result of often unavoidably inaccurate predictions and predictable harvest actions, and propose approaches to quantify then minimize those disproportionate impacts as and where they occur.

Item 4

Another related issue to item 3 is the increasing reliance on "natural spawners" in Bogus Creek (adjacent to Irongate Hatchery and heavily populated by hatchery strays) to effectively prop up natural spawner numbers while the rest of the basin suffers from under-escapement as a result. The same sort of problem seems to be happening in the Trinity River near Trinity River Hatchery. The proposed Amendment 16 needs to include a mechanism to address disproportionate natural spawner distribution, or at the very least establish a timeline and methodology to do so in the future to assure that no single tributary is starved for spawners as a result of longstanding under-escapement to it, while corrective measure intended to be initiated via an overfishing review are inappropriately staved off by hatchery strays.

The EA should assess options to address this problem, and propose best management practices to mitigate for it. It seems both prudent and immediately doable (utilizing Bogus Creek spawner numbers and Bogus Creek CWT recoveries) to subtract the % of first generation hatchery spawners utilizing Bogus Creek from the "natural spawner" counts as a simple and needed first step towards a more appropriate basin-wide spawner distribution in all years.

Item 5.

Since 1986 (the last time Klamath harvest policy was addressed) considerable information has come to light regarding the critical role of ocean-derived nutrients, nutrients not only needed to support the growth and survival of the next generation of juvenile salmon, but also as a critical component of the entire inland ecosystem.

In this EA's executive summary, the entire assessment of biological effects of harvest is inappropriately twisted into slightly more than 1 paragraph linked to unspecified (and from our perspective inappropriate) economic effects, with incomprehensible results:

> ***Biological and Economic Effects***
>
> *Economic effects were assessed primarily by considering the effects of the Alternatives on short- and long-term catch and effort in the ocean fisheries; therefore, effects to the biological environment that affected available harvest could be used to anticipate economic effects....*

And even the entire assessment from the body of the EA says absolutely nothing of substance:

> ***3.3 Habitat, Biodiversity, and Ecosystem Function***
>
> *Salmon EFH encompasses EFH for other Council-managed species north of Point Conception, California, and includes all waters extending from the seaward EEZ boundary into most currently occupied or historically accessible freshwater habitat. Appendix A of Amendment 14 (EFH Appendix A) describes salmon EFH and fishing and non-fishing impacts to this habitat. Critical habitat for ESA-listed salmon does not include Council-area ocean water.*
>
> *Salmon FMP stocks interact with a number of ecosystems along the Pacific Coast, including the California Current Large Marine Ecosystem, numerous estuary and freshwater areas and associated riparian habitats. Salmon contribute to ecosystem function as predators on lower trophic level species, as prey for higher trophic level species, and as nutrient transportation from marine ecosystems to inland ecosystems.*

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

Elsewhere the document (section 4.3) ducks the entire topic by stating:

> *Effects from the Alternatives on nutrient transport are not likely to differ significantly from historical levels as only minor modifications to control rules are being considered.*

This EA's assessment of biological impacts, impacts that have in fact never been assessed, is so completely inadequate as to defy meaningful comment and hence need to be properly done from scratch before even an initial EA can be deemed complete.

An additional consequence of ignoring the proper role of ocean derived nutrients is the setting of a long-term spawner escapement target based on an approach that only looked at annual production from a system long starved for essential nutrients.

The EA needs to assess the impacts of the proposed continuation of extremely high levels of salmon harvest on riverine and watershed health in order to disclose the unintended and long-term consequences of blocking perhaps 90% what was once a vast amount of nutrient input to the watershed, and not hide behind claims that because it has been ongoing for many years it will not be examined.

Item 6.

Finally, it seems as if there needs to be an assessment of the generic consequences of decades of disproportionately targeting larger and older fish in the course of salmon harvest. Certainly hatchery managers are coming to the realization of the opposite of that (their excluding of smaller and 2 year old fish from breeding) and are in the process of modifying their practices accordingly. As a result of both harvest management and fishing practices, we seldom see the larger 5-year old fish, the ones able to break through the embedded layers on the bottom of the river along with the strength to dig in the large cobbles, and even 4-year old salmon are reduced, while 2 and 3-year olds seem likely to be present in larger proportion than is natural as they more likely escape both ocean and net harvest.

The EA needs to assess (or incorporate into Amendment 16 a suitable longer term assessment process) to provide identification of negative consequences of this unintended selection against larger and older fish in the natural systems and propose mitigations as they are identified or become known.

Overall, this EA attempts to rely on a number of long-standing practices, and older reviews and assessments, none of which is current or comprehensive. The changes mandated by Magnuson-Stevens are quite comprehensive, and much has been learned since the initial act took effect.

Because salmon harvest has so many unquantified and significant impacts, the preparation of a Fishery Management Plan Amendment such as this clearly requires the preparation of a comprehensive Environmental Impacts Analysis capable of properly and comprehensively integrating the full breadth of economic, social and environmental consequences of harvest decisions, not just a cursory review of harvest mechanics as this document does.

It is seldom that there is a formal opportunity to step back and re-examine a long-standing program such as this. We find that there are many issues, both old and new, that need to be looked at afresh, and if they are not addressed now, it seems likely that they never will be. And that after all is the point of NEPA-required review.

Please direct that an Environmental Impact statement be prepared that can incorporate the items we have identified as necessary to make the program evaluation what is really needed to properly shape the fishery in a way that will make it most productive and fully integrated system-wide for the long run.

Sincerely,

Adriana Harayade for

Kerry Mauro
Board Chairman
Shasta Valley Resource Conservation District

COUNTY OF SISKIYOU

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November 18, 2011

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Via FAX , email and hard copy

RE: Amendment 16 to the Salmon Fishery Management Plan; ID # NOAA-NMFS-2011-0227

Gentlemen:

To date, while salmonids are an integral aspect of the socio-economic fabric of Siskiyou County, the County has taken little active interest in harvest issues. One reason is that our renewable natural resource industries of forest products and agriculture have kindred spirit with the folks farming the seas and the rivers. Just as farmers and forest managers are those best suited to manage the sustainable productivity of their lands and crops, so, too, are fishing dependent communities best suited to manage their fisheries, and we have previously left such decisions to them. However, just as inland natural resource industries have been forced to incorporate fishing interests into their management practices and decisions, it is past time that inland interests insist on a substantive say in fisheries management particularly in the harvest aspect.

The rationale for involvement by Siskiyou County in the harvest matters dealt with in the proposed Amendment 16 to the Salmon Fishery Management Plan couldn't be more obvious: if we are expected to produce the fish for fisherfolk to harvest, we need returning adults in sufficient numbers. If we are to produce fish in the historic numbers that are constantly held up to us as the standard by which our recovery and production efforts will be judged, we cannot do so with an escapement floor of 40,000 fish Klamath Basin-wide nor without an adaptive regime designed to distribute returning adults where they need to be on a sub-watershed by sub-watershed basis.

For example, just two weeks ago at the Siskiyou County Board of Supervisors meeting, Curtis Milliron, Fisheries Biologist for Region 1 of the California Department of Fish and Game, held up "the 1930s when they counted 80,000 chinook in the Shasta River" as an ideal that would be nice to shoot for. We will have virtually no chance at meeting that admittedly chimerical goal with the escapement floor and regime as currently proposed.

As well as the floor itself, Amendment 16 shows no consideration within the harvest to accommodate the timing of the various runs throughout the Basin. For example, the Scott and Shasta Rivers have historically had different timing between them. The Shasta appears to favor some of the earliest running fish in the system, while the Scott is typically a few weeks later. If harvest isn't managed with this in mind, it is easy to see how either run could sustain a damaging loss to the number of returning adults necessary to meet the production expectations of these two critical watersheds.

The greatest shortcoming of this Amendment is the failure or perhaps sheer statutory inability to create an enforceable escapement regime that insures that after *all combined* sources of permitted harvest there will still be sufficient numbers of returning fish in each of the key tributaries (such as the Shasta and Scott) to fulfill those rivers' role in the overall equation. Put another way, tributaries such as the Shasta and Scott will be judged not on Basin-wide production, but on their own. It won't matter whether their adults are harvested in the ocean, in the estuary or in-river, by commercial fishermen, by the tribal fishery or sport fishermen if those fish don't come back to where they need to be. Since regulation on the production end of the salmon resource will be by sub-watershed, harvest regulation **MUST** likewise provide the opportunity to meet these production demands on a sub-watershed basis.

For at least the last 20 years, conservation and restoration efforts by the timber and agricultural communities in Siskiyou County have been improving habitat conditions to a far better state than existed in some of the salmon run years we are seeking to replicate. While only recently undertaken, studies show that returning adults/outmigrant smolt ratios have been in acceptable ranges since the studies' inception. Whether the Scott and Shasta get lots of adults or just a few, they send smolts out in reasonable proportion even in tough water years. This is not to say that more can't be done habitat-wise to improve this ratio, but it certainly indicates room in the habitat to support more adults! Harvest management needs to be geared toward providing adults in those numbers. Without that integrated approach, there will be increasingly unrealistic actions taken that try to get inland sub-watersheds to produce their "quota" no matter how many adults they get. Not only will this not produce the number of salmon we all hope for, the inequity of this approach will foster a public backlash that could critically hinder salmon recovery at a time when some ESU's need every ounce of public support they can get.

While the above comments represent a rhetorical approach to the flaws in Amendment 16 as proposed, there are also substantive technical issues that exist that need to be included. Unfortunately, the County does not have the on-staff technical expertise such comments typically require. As a result, the County often "cribs" from individuals and organizations that do possess this technical capacity. In this case, I wish to include comments from an early draft by the California Farm Bureau Federation (CFBF). These comments are included with no assertion that these comments represent CFBF's official comments. Rather, the following are simply technical points relative to the proposed action that I wish to be considered as part of my comments:

Comments Regarding the Proposed Action

There are three basic flaws with the proposed action: 1) the Draft EA is inadequate; 2) Amendment 16 fails to adequately implement the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as reauthorized in 2006; and 3) the proposed action is inconsistent with the ESA.

1) The Draft EA is Inadequate

An environmental assessment must provide sufficient evidence and analysis for determining whether to prepare and environmental impact statement (EIS). Here, the Draft EA incorrectly concludes that there will be no significant impacts.

The Draft EA is inadequate because it entirely fails to analyze potentially significant impacts to the human environment and because it incorrectly determines that certain impacts are less than significant and because the Draft EA improperly relies upon past environmental review documents which are stale and/or inadequate.

The Draft EA appears to rely upon earlier environmental analyses in supporting its conclusion. Although the precise nature of this relationship is not clear from the document, it appears that the Draft EA either incorporates those earlier environmental documents by that reference, or tiers off of those conclusions. Regardless, since the Draft EA clearly relies on earlier analyses, NMFS is obliged to make certain that the assumptions, analysis, and conclusions of those earlier environmental review documents remain valid.

a. The Draft EA Fails to Consider Significant Environmental Impacts

Uncounted In-river Tribal Harvest
In order to appropriately consider whether implementation of Amendment 16 will have significant environmental impacts, NMFS must consider all known and knowable harvest of salmon. The Draft EA fails to do so. Members of the Karuk Tribe, in accordance with their ancient cultural traditions, harvest significant numbers of salmon in the Klamath Basin. Commenters are not in any way suggesting this fishery is not appropriate, only that the environmental review conducted by NMFS must consider the fact that there is a significant harvest occurring in-river other than the Hoopa and Yurok Tribal harvest. Since the Draft EA does not consider this harvest, and in fact Commenters are aware of no environmental review ever being conducted on this harvest, the Draft EA is inadequate.

Impact of in-river fisheries is not analyzed.
A glaring omission from the Draft EA is an analysis of the impacts of in-river fishing on the environment. As explained throughout this letter, the methods and timing of in-river harvest have significant environmental impacts that will result from implementation of Amendment 16. Once again, this is not to say in-river harvest should not occur, only that the impacts of that harvest, particularly how and when it is conducted, must be analyzed.

The significant environmental impacts of current in-river harvest practices include: excessive pressure on early run stocks which has a particularly detrimental impact to fish spawning in the Shasta River; the use of monofilament gill nets selects for size thereby reducing the number of large fish returning to the system over time; and use of these non-selective nets also kill coho salmon, a listed species.

No analysis of project's impacts to sub-basin Chinook populations
Key to the sustainability of a viable fishery is the proper biological distribution of spawners throughout the basin. Over the past decades of PFMC's management of recreational, commercial, and subsistence harvest, the distribution of spawners in the Klamath Basin has changed. Particularly impacted has been the number of adults returning to the Scott and Shasta Rivers. The Draft EA's failure to even acknowledge that fact renders it inadequate.

Also, the Draft EA, in part because of its failure to even look at sub-basin populations, over-relies upon Bogus Creek hatchery populations in concluding that a spawning escapement target of 40,700 fish is appropriate. Looking only at the number, the Draft EA concludes that so long as there are the 40,700 fish spawning in the Klamath River basin, there is no significant environmental impact. This is incorrect.

The actual analysis that must be done is whether the spawning escapement floor is appropriately distributed throughout the system. Failing to conduct such analysis (even though the information is reviewed by NMFS and PFMC), the situation in the Klamath Basin arose where most of the fish that spawn, and hence are counted, come in a few locations. Particularly important is the fact that an inordinate number of the spawning escapement comes from Bogus Creek which is due to hatchery straying. Consequently, NMFS' conclusion that there is no significant impact due to Amendment 16 is based upon the faulty over-reliance on hatchery fish. Since the Draft EA fails to analyze the environmental impacts of harvest on sub-basin Chinook populations, it is inadequate.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

No Analysis of Marine Nutrient Cycle

The Draft EA Fails to Adequately Analyze the Importance of Returning Adults as a Transfer of Marine Nutrients from the Ocean to Freshwater Fisheries. Salmonids provide the important function of transporting marine nutrients from the ocean to upstream ecosystems. This "nutrient conveyor belt" is essential to a sustainable fishery. Without adequate adults returning to spawn, die, and thus provide imported marine nutrients, a sustainable fishery is impossible. Notwithstanding the importance of this function, the Draft EA fails to address the nutrient cycle at all.

b. The Draft EA Improperly Concludes Certain Impacts are Less than Significant

Impact of fishing on listed species

The Draft EA concludes, with very little analysis, that there is no significant impact on listed species. This extraordinary assertion is made without adequate explanation or analysis. While the Draft EA and earlier environmental review documents do discuss impacts to some listed species in the context of ocean harvest, there is no analysis of how in-river harvest may impact listed species. Because the harvest of salmonids will directly flow from implementation of Amendment 16, these impacts must be analyzed.

Of particular concern are the impacts of in-river fishing conducted in the Klamath Basin on Coho salmon, a listed species. As briefly mentioned above, current harvest methods and timing result in the take of coho, most significantly by the use of gill nets. Lacking any meaningful analysis of this take, it is impossible for NMFS to conclude, as it did in the Draft EA, that there will be no significant impacts to listed species.

c. Failure to Include Reasonable Alternatives

Because NMFS failed to analyze impacts to sub-basins of the Klamath River, failed to analyze the impacts of in-river harvest on listed species, and failed to look at the impacts of current in-river harvest practices, a number of important alternatives were not considered. These include, among other alternatives, increasing the spawning escapement target above 40,700, regulating the method and timing of in-river harvest to ensure adequate distribution within the region, and improving the in-river accountability measures to ensure compliance with the MSA.

d. The Draft EA's Reliance on Previous Environmental Review Documents is Inappropriate

Although the exact relationship between the Draft EA and previous environmental review documents is not very clear, it is clear that this relationship is both significant and inappropriate. First, time has demonstrated that fisheries management is having impacts that were never analyzed in earlier environmental review documents. This includes, among other things, evidence indicating that in-river harvest practices are unduly pressuring the early Chinook runs which disproportionately reduces the number of adults returning to the Shasta River. Second, many circumstances have significantly changed since earlier environmental review documents were drafted. These include, but are not limited to, significant habitat improvements throughout the Klamath River basin. With more habitat available, there must be more adults permitted to return and utilize that habitat.

Furthermore, while the PFMC has been managing salmon harvest for many years, there has been no comprehensive environmental analysis of the effectiveness of this management. Instead, NMFS, the PFMC, and other State agencies continue to make minor changes without ever significantly reviewing the fundamental assumptions, analysis, and conclusions underpinning fisheries management. What this means is that the basic structure upon which the PFMC relies has essentially remained unchanged and unreviewed for decades, even though circumstances and knowledge about these systems has improved significantly. Not only does this mean that the Draft EA's reliance on these earlier documents is inappropriate because these earlier documents are stale, but the Draft EA itself is inadequate for failing to analyze the effectiveness of fisheries management.

In order to address these concerns, NMFS must conduct a comprehensive review of the effectiveness of fisheries managment, including in-river harvest, on the overall health of the system.

2) The Salmon FMP and Amendment 16 Fail to Properly Implement the MSA

As proposed, Amendment 16 fails to implement the requirements of the Magnuson-Stevens Fishery Conservation and Management Act as reauthorized in 2006. Simply put, the MSA is intended to ensure that all harvest in regulated in a manner that ensures the long term sustainability of the fishery and the communities that rely upon that fishery. By failing to provide any meaningful regulation of non-recreational in-river harvest NMFS, PFMC, and other responsible agencies have abrogated their duties pursuant to the MSA.

Review of Amendment 16 and the related documents reveal that NMFS and the PFMC simply do not assert jurisdiction over in-river areas. While there may be divisions of jurisdictional authority among various agencies, the overarching objectives of the MSA, ESA, and NEPA cannot be thwarted by attempting to duck responsibility. Even if certain agencies lack particular authority, the planning and regulatory functions of these agencies are comprehensive enough that there cannot be the regulatory gap that currently exists. Right now there is an extraordinary divergence between the copious regulation of ocean trolling management measures and the nonexistent regulation of in-river fishing. While NMFS and PFMC may have an explanation for how this gap evolved, there is no explanation for why this gap exists.

The MSA, ESA, NEPA, and numerous other Federal and State laws are all intended address environmental impacts. Particularly, the MSA's purpose is to ensure the proper management of fishery harvest in order to ensure sustainable populations. Since Amendment 16 and the Draft EA, and hence the Salmon FMP itself, are the origin and general authorization for all salmon harvest, there is no ability for the agencies, particularly NMFS, to avoid responsibility.

a. Maximum Sustainable Yield is not Adequate

The maximum sustainable yield is not adequate to achieve the purposes of the MSA. Simply put, there are not enough adult spawners appropriately distributed among the various tributaries in the Klamath Basin to achieve a sustainable fishery. Regardless of whether this is because the target spawner escapement of 40,700 is too low, or because in-river fishing practices have disproportionately impacted returns to various sub-basins, the maximum sustainable yield for spawning escapement is not adequate. While the inadequacy of the maximum sustainable yield for spawning escapement is likely due to inadequate environmental review, it is also contrary to the purposes of the MSA.

b. Salmon Harvested by the Karuk Tribe Are Not Considered

As explained above, members of the Karuk Tribe harvest salmon in the Klamath Basin in accordance with their ancient cultural traditions. Reiterating that the fact this harvest occurs is not necessarily a problem, Commenters strongly urge NFMS and PFMC to recognize that failure to analyze and account for this harvest is contrary to the requirements of the MSA. Consequently, Amendment 16, the Draft EA, and the Salmon FMP must be amended to account for and incorporate this harvest.

c. Inadequate Consideration Given to Impacts to Listed Species

Methods of harvest, particularly in-river harvest practices, impact listed species. The Draft EA gives no consideration to how these practices impact listed species even though the EA is NMFS endorsement of an action that will result in take of listed species. For example, the use of gill nets will result in the take of some unknown quantity of salmonids.

d. Failure to Effectively Regulate Harvest Methods

NMFS, PFMC, and State agencies must analyze and regulate in-river harvest methods in order to fulfill their obligations under the MSA. There is simply no justification for NMFS' and PFMC's failure to regulate in-river harvest. At a bare minimum, NMFS and PFMC must analyze the impacts of this fishery and ensure that the other agencies that do have jurisdiction are properly regulating this harvest.

e. Accountability Measures are Not Adequate

The MSA requires certain accountability measures to be adopted in order to ensure the annual catch limits are not exceeded and are corrected if exceeded. Amendment 16 contains no accountability measures to address in-river harvest. Without such measures, it is impossible to know whether annual catch limits are exceeded or to correct exceedences that do occur.

3) Violation of the ESA

The proposed action is inconsistent with the ESA because it will have significant impacts to listed species and will result in unpermitted take of listed species.

a. NMFS and the PFMC have Failed to Follow the Required

- The EA makes no findings regarding how current in-river harvest methods impact listed species.
- There is no Analysis of In-River Take Associated with Commercial, Recreational, and Subsistence Fishing

b. Harvest Practices Result in Impermissible Take of Listed Species

- The harvest practices used in-river result in the impermissible take of listed species. This fact is not adequately addressed in the EA.
- Furthermore, since NMFS is obligated to enforce the ESA, failure to properly address this issue is an abrogation of its duties.

In conclusion, an EA is inadequate to properly analyze the issues dealt with in Amendment 16. An EIS is the proper vehicle. As well, please adapt Amendment 16 to accommodate the provision of spawners on a sub-watershed basis, run timing that is associated with these sub-watersheds and, to the degree statutory authority exists, an integration of all locations (ocean, estuary and in-river) and sources (commercial, tribal, sport) of harvest into the escapement regime and floor.

Sincerely,

Ric Costales

Ric Costales, Natural Resource Policy Specialist
County of Siskiyou

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

SISKIYOU RESOURCE CONSERVATION DISTRICT
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November 18, 2011

William W. Stelle, Jr.
Regional Administrator, Northwest Region, NMFS,
7600 Sand Point Way NE.
Seattle, WA 98115-0070

Rod McInnis
Regional Administrator, Southwest Region, NMFS,
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213

Submitted Electronically via the Federal e-Rulemaking Portal http://www.regulations.gov

Re: **NOAA-NMFS-2011-0227** – Comments on Amendment 16 to the Salmon Fishery Management Plan and Related Draft Environmental Assessment.

Dear Messrs. Stelle and McInnis:

The Siskiyou RCD thanks you for the opportunity to provide comment on Amendment 16: Bringing Salmon Fishery Management Plan into compliance with the Magnuson-Stevens Act as reauthorized in 2006. We submit the following:

A. General Comments:

1. Request Extension on Comment Period: The Draft Environmental Assessment (EA) of Amendment 16 is a complex and expansive document. This is a document that is incomprehensible to the general public and needs to be re-written. The myriad of acronyms and poor development of the product makes this document unreadable. EAs, EIRs and other documents are prepared for public review and comment and therefore must be comprehensible to the public. The Siskiyou RCD is familiar with fishery issues and we still cannot fully understand this EA. We therefore request there be an extension and NMFS and PFMC re-develop the product so it is reviewable by the general public. A sample of an extremely important, but incomprehensible section is identified below:

   Under Amendment 16, OFL, ABC and ACL would be specified as escapement levels for each stock. These OFL, ABC, and ACL escapement levels would be determined annually using exploitation rates (i.e., F MSY, F ABC, and F ACL) and abundance estimates for each stock. F ABC incorporates a reduction from F MSY to account for scientific uncertainty in F MSY. F MSY and F ABC are defined in terms of the total exploitation rate across all salmon fisheries (Federal

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and nonfederal jurisdiction). Impacts in non-salmon fisheries are included in the natural mortality assumptions used to estimate population parameters for salmon stocks; therefore, all fishing mortality sources are accounted for when reference points are specified. Amendment 16 would generally leave in place existing conservation objectives for stocks in the FMP; ***the notable exception would be Klamath River fall Chinook salmon, for which the spawning escapement component of the conservation objective would change from 35,000 to 40,700 naturally spawning adults. Under the amendment, the fishery would be managed to meet the greater of either the ACL or the conservation objective in a given year.***

2. Recognition of in-river harvest and in-river management is within scope of current comment period: While the scope of Amendment 16 identifies that it is a review of adoption of off-shore management only, it is not and cannot be de-coupled from in-river harvest and combined effects. The inextricable link is verified by the proposed change in natural escapement targets for the Klamath. Therefore, all specific comments that focus on natural escapement in the Klamath are relevant and should be considered within this scope.

3. Establishment of "Standing" for inland communities whose watersheds rear and spawn (Produce) salmon on PFMC and KFMC: Opportunities to alter or redesign harvest practices are not common. An obvious and expanding fact is that there is a disconnect between those entities and communities that manage for, and harvest Salmon (hereinafter termed "Harvesters" for simplicity) do not have a formal process to interact with those communities and entities where salmon spawn and rear and are "produced" (hereinafter termed Producers). We request that the PFMC and the KFMC use this opportunity to bridge this disconnect between Producers and Harvesters and manage harvest considering the full life cycle, rather than just harvest age.

   We ask that Producers be given standing in aiding the harvest management and linking Production and Harvest both in function, emotion, and sense of community. We ask that Producers be given several positions on the PFMC and the KFMC based on regional representation. Failure to include Producers in harvest management will further divide the parties and communities as is occurring on the Klamath. This is a rare opportunity for salmon managers to plan comprehensively and include consideration of the full life-cycle and span of habitat salmon utilize. We fear the response to this request will be that that the commenter's request is outside the scope of the EA under review. If the intent of the EA includes review and approval of changes in natural escapement in the Klamath, we argue the scope of the amendment allows methods to ensure and refine processes to ensure natural escapement including inclusion of Producers into the PFMC and KFMC.

B. Specific Comments:

1) The Draft EA is Inadequate

The Draft EA is inadequate because it entirely fails to analyze potentially significant impacts to the human environment and because it incorrectly determines that certain impacts are less than significant and because the Draft EA improperly relies upon past environmental review documents which are stale and/or inadequate.

a. ***The Draft EA Fails to Consider Significant Environmental Impacts***
   1. No analysis of catch by the Karuk Tribe.
   2. Impact of Commercial fishing on listed species: allowed by-catch fails to consider alternative fishing methods and timing.
   3. Impact of in-river fisheries is not analyzed. This includes in-river harvest practices, particularly the methods used as well as the timing of harvest activities.
   4. Significantly improved and expanded spawning and rearing habitats that can receive more returning adults and rear more juvenile salmon, if natural escapement levels were increased.

b. ***The Draft EA fails to consider alternatives and incorporate adaptive management into Amendment 16:*** among other items:
   1. Klamath Natural Escapement numbers should be reviewed and updated using adaptive management: Natural escapement in the Klamath is woefully insignificant. The Amendment recommends increased Klamath natural escapement from 35,000 to 40,700. While the intent to increase natural escapement is encouraging, we feel the numbers are insufficient. Keep in mind Klamath natural escapement totals of 35,000 have been the floor for a minimum natural escapement value and has often been missed or barely attained in recent years. Managing for the minimum is frustrating to observe for communities and inland tribes who have historical and emotional ties to sufficient numbers of retuning salmon. Current existing spawning and rearing habitat for Chinook is under-utilized. Habitat conditions and extent of habitat is undeniably improving and expanding resulting in improved carrying capacity of the Klamath tributaries as identified by CDFG's rigorous population monitoring programs (The 2010 Scott River Salmon Studies Report – CDFG).

      While we do not have the data or expertise to recommend an appropriate escapement number, we expect it to be something double the current or proposed natural escapement value. Furthermore, a target number, especially managing for the natural escapement base is not an appropriate harvest management tool. We recommend that the PFMC and KFMC use adoption of Amendment 16 to include routine review and updates of the natural escapement targets and development of an adaptive process upon which an escapement number is continually developed and refined as habitats change and knowledge expands. Producer communities of salmon should have standing and the right to be involved in this decision making process.

2. Klamath Natural Escapement needs significant revision in calculation: We feel there are two significant faults with current determination of natural escapement calculations in the Klamath.

   a.) Bogus Creek should not be included as natural escapement: While Bogus Creek is a high quality stream and the property owners and managers of Bogus Creek deserve credit for their outstanding measures to maintain spawning and rearing habitat for such a significant population of salmon, it is unfair to count salmon in Bogus Creek as natural escapement when over a third of the salmon spawning in Bogus Creek are hatchery clipped fish. For purposes of accounting for natural escapement, Bogus Creek escapement should not be included as natural escapement when over a third of the fish are of hatchery origin.

   b.) Ensure in-river harvest is fully accounted for in Natural Escapement targets on Klamath: There is much debate and conflict about acknowledgement of recognized tribes, tribes with fishing rights and tribes with commercial harvest allowance in the Klamath Basin. We have no desire or authority to make recommendation about fairness or appropriateness of tribal recognition and/or provision of fishing rights, but we do want to make sure all tribal harvest is accounted for and predictable in models used to develop natural escapement in the Klamath. We understand that is not the case under the current method.

Respectfully Submitted,

Board of Directors

Siskiyou Resource Conservation District

MOUNT SHASTA AREA AUDUBON

Date: November 15, 2011

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Dear Council Members,

On behalf of Mt. Shasta Area Audubon I would request that you allow for additional time to review and comment on the ***Environmental Assessment of PFMC Salmon Amendment 16***. How the harvest allocation is determined and set is of critical importance for our efforts to improve watershed conditions. If harvest allocations for returning spawners are a fixed number then it means that no matter what is done in watersheds no change in returning spawners will ever occur. This will make it difficult if not impossible to acquire funding or support from those living in the watershed to continue restoration efforts. Since this amendment will set in place quotas for the next 25 years we need the opportunity to thoroughly analyze and comment on it. Thank you for your consideration in this most important matter.

Sincerely,

Chris Stromsness, Conservation Chair

Email: pfmc.comments@noaa.gov

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

YURØK TRIBE

190 Klamath Boulevard • Post Office Box 1027 • Klamath, CA 95548

November 17, 2011

Rod McInnis
Regional Administrator, Southwest Region
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213

Re: Comments on the proposed rule for Amendment 16 to the Pacific Salmon Plan (identified by NOAA-NMFS-2011-0227).

Aiy-yu-kwee':

On behalf of the Yurok Tribe (Tribe), I submit these comments regarding the proposed rule for Amendment 16 (A-16) to the Pacific Salmon Plan. Overall, we support much of what is proposed in this complex amendment, especially the proposal to base a portion of the harvest control rule for Klamath fall Chinook upon the estimated value for Maximum Sustainable Yield. This would represent a substantial improvement in the management of this stock. However, the Tribe remains concerned about the harvest control rule for Klamath fall Chinook at stock abundance levels less than MSY (i.e. de minimis fisheries); in particular we are concerned about proposed harvest rates when Klamath fall Chinook abundance is projected to be near or below 20,000 adult natural spawners.

The fishery resource of the Klamath River is an integral component of the Yurok way of life: for ceremonial, subsistence, and commercial purposes. The Yurok Tribe has always managed our fishery responsibly, prioritizing conservation of the resource for long-term productivity over short-term over exploitation, so that future generations of Yurok People will benefit. We are concerned that the harvest levels proposed for de minimis fisheries at times of extremely low stock abundance are not consistent with the Yurok Tribe's responsibility to prudently manage its fishery resources.

De Minimis Fisheries
As you may recall, the Yurok Tribe had serious concerns when Amendment 15 (A-15) was developed by the Pacific Fisheries Management Council (PFMC) to allow for de minimis fisheries for Klamath fall Chinook. We were particularly concerned that A-15 lacked clarity regarding harvest levels when stock abundance was projected to drop below 30,000 natural adult spawners, but our concern was appeased somewhat when the following language was inserted into the final rule for A-15:

There may be some opportunity for harvest when projected escapements are in the range of 12,000 to 22,000, but the opportunity would be limited at best, and justified only to the

1

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

degree that there are mitigating year specific circumstances. We acknowledge that, in 2006, Klamath fall Chinook harvests were approved down to a projected escapement of 22,000. However, this determination was based on the unique circumstances of that year and should not be understood as a precedent that harvest at that level will be regularly acceptable. In addition, although the Amendment allows for harvest if escapement is projected below 12,000, when we take into account the considerations stated in Amendment 15, we see little or no prospect for harvest when projected escapement is at that level.

We are pleased to see the ambiguity which was left by Amendment 15 at stock sizes below 30,000 being addressed in this Amendment. The harvest control rule in A-16 defines maximum harvest rates down to a predicted abundance of zero fish. However, we are concerned that the control rule allows excessive harvest during times of extremely low abundance (e.g. near 20,000 spawners and below). Any amount of harvest during these times of extremely low Klamath River fall Chinook abundance could have lasting detrimental effects upon the genetic integrity of substocks and the viability of the Klamath fall Chinook population.

While we had major concerns with the content of A-15, there were technical strengths in the Environmental Assessment (EA) for A-15 which are lacking in the EA for A-16. In particular, the A-15 EA considered the biological impacts of the proposed rule on Klamath fall Chinook. Analysis contained within the EA for A-15 (Appendix D) evaluated the risk that the abundance of one of three sub-stocks (Salmon, Scott, and Shasta Rivers) in the Klamath-Trinity Basin would drop below an identified genetic threshold. This analysis (summarized in the graph pasted below from the A-15 EA) shows a dramatic increase in the probability that the abundance of one of these three sub-stocks drops below the calculated genetic threshold of 720 adults as Klamath fall Chinook abundance drops below approximately 20,000 adult spawners. It should be noted that these three basins represent only three of several sub-stocks within the Klamath-Trinity Basin; the probability of a single Klamath-Trinity sub-stock's genetic threshold being violated would increase if additional stocks were assessed.

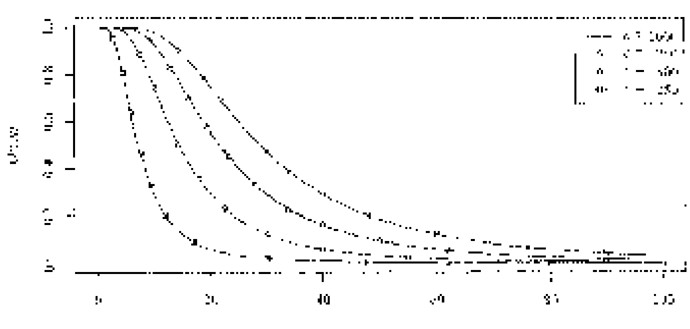

Figure D-2. Probability that KRFC adult escapement in either the Shasta, Scott, or Salmon Rivers falls below the critical level, n, as a function of total KRFC natural area adult escapement.

2

To protect the genetic viability of Klamath Basin sub-stocks, we request that the proposed control rule in A-16 be modified to reach a zero harvest rate at a Klamath fall Chinook abundance of ½ MSY (20,350 adults). If this modification to A-16 is not made, then we request that there be qualitative language inserted into the Final Rule similar to what was in A-15; language which clarifies that when Klamath fall Chinook abundance is projected to be at or below ½ MSY (i.e. 20,350) there would be little to no harvest opportunity.

Miscellaneous

There seems to be an error in the proposed rule under the heading titled "Status Determination Criteria". Part way through the second paragraph the following is stated: "The definitions of overfished, approaching overfished, and rebuilt rely on multi-year postseason estimates of spawning escapement[3] …." Footnote 3 then states "Escapement, or spawning escapement, refers to anadromous fish that survive the ocean and return to fresh water where they are available for in-river fisheries or spawning." Escapement for the purposes of determining whether Klamath fall Chinook is overfished, approaching overfished, or rebuilt has always been based upon the number of natural adult spawners, not the in-river run (prior to inriver harvest). The analysis contained within the EA for A-16 clearly uses spawning escapement to evaluate the effects of the overfished Status Determination Criteria to retrospectively determine the relative frequency of years that each stock would have been designated as overfished. When Section 2.2.1 refers to stock size (S) it references a footnote 16 which states that "Size (S) of the stock or complex for salmon is the number of adult spawners."

In summary, we support components of A-16, especially in regard to the portion of the harvest control rule for Klamath fall Chinook that manage for MSY. However, we are concerned that the proposed de minimis fisheries during times of extremely low stock abundance (e.g. 20,000 adult natural spawners and less) have a high probability of compromising the genetic integrity of sub-stocks. We request that A-16 be modified to prohibit harvest at these times of extremely low abundance. If this change is not made, then we request that language be added to the Final Rule which clarifies that when Klamath fall Chinook abundance is projected to be at or below ½ MSY (i.e. 20,350) there would be little to no harvest opportunity. If you have any questions or would like to discuss these comments, please don't hesitate to contact myself (or Dave Hillemeier, Fisheries Program Manager) at the address in the letterhead.

Finally, I would like to thank you for the opportunities we've had to discuss these issues with you and your staff during the A-16 process.

Sincerely,

Thomas O'Rourke, Chairman

3

Hoopa Valley Tribal Council

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LEONARD E. MASTEN JR
CHAIRMAN

18 November 2011

William W. Stelle, Jr., Regional Administrator
Northwest Region, NMFS
7600 Sand Point Way NE
Seattle, WA 98115-0070

To Whom It May Concern:

RE: Comments of the Hoopa Valley Tribe to the Proposed Rule to Implement Amendment 16 to the Pacific Salmon Fishery Management Plan

The Hoopa Valley Tribal Council (HVTC) retains sole management authority governing the HVT fishery prosecuted by Tribal members on the Hoopa Valley Reservation. Under its authority the HVTC allows for utilization of Klamath River Fall Chinook (KRFC) to meet the purposes of subsistence, ceremony, and commerce. Conservation of this precious resource has always been at the forefront of our cultural values.

In review of the proposed rule to implement the 16th Amendment to the Pacific Salmon Fishery Management Plan (FMP), the HVTC is supportive of the general move towards conservatism in management of marine fisheries affecting KRFC. Best science indicates that the fishery be managed for a conservation objective of SMSY = 40,700 natural area adult spawners, which compares to the present conservation objective under the FMP of 35,000 natural area adult spawners.

Amendment 16 also seeks to clarify the allowance for *de minimis* fisheries at extremely low stock sizes which remained nebulous under Amendment 15 (*de minimis* fishing) to the FMP. The Hoopa Valley Tribe has spoken in opposition to enabling mixed-stock fisheries to continue to exert fishing mortality upon KRFC at stock sizes that would return less than 22,000 natural area adult spawners to Klamath River in any year. Recognizing that the KRFC "natural adult spawners" are a complex of numerous sub-basins within Klamath River, we are especially concerned about balancing short-term economic risk to the fishery against long-term implications for genetic diversity and aggregate stock productivity for KRFC.

In the Environmental Assessment (EA) for Amendment 15 modeling results suggested that the probability of natural spawner escapement to at least one key tributary (either Salmon River, Scott River, or Shasta River) falling below an effective population size of 720 adults was approximately 50% when overall basin escapement fell to 20,800 natural area adult spawners. Hence, allowing *de minimis* fisheries at extremely low stock sizes (e.g. below 15,300 natural adult spawners) would further increase long-term risk to the productivity and yield of KRFC to dependent fisheries.

We recognize that management flexibility to allow some harvest under extremely low stock sizes is motivated primarily to enable access to more robust stocks in mixed stock fisheries. However, our fishery relies solely upon the viability of KRFC for the future benefit of our Tribal membership.

In closing, we are generally supportive of the intent of Amendment 16 to address Annual Catch Limits for KRFC and other stocks managed by the PFMC as the Amendment utilizes best available science today to establish these limits. However, we cannot support the proposed clarifications for *de minimis* fisheries which would allow fishing at extremely low stock sizes. As written, the step-F-based control rule would essentially permit *de minimis* impacts to approach zero, only as stock size approaches zero. We recommend that the there be no *de minimis* allowance for KRFC when the expected natural area adult spawner stock falls below 22,000 natural adult spawners which otherwise would be allowed under the proposed Amendment 16.

Sincerely,

Leonard E. Masten Jr.
Chairman

Cc: Don Mc Isaac, PFMC

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

O'Laughlin & Paris LLP

Attorneys at Law

Sent via Federal eRulemaking Portal http://www.regulations.gov

November 18, 2011

Rodney McInnis, Regional Administrator
Southwest Region, National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802–4213

Re: Fisheries Off West Coast States; West Coast Salmon Fisheries; Amendment 16 to the Salmon Fishery Management Plan (NOAA–NMFS–2011–0227)

Dear Mr. McInnis:

These comments are submitted on behalf of the San Joaquin River Group Authority[1] ("SJRGA"). The Pacific Fishery Management Council's proposed Amendment 16 to the Fishery Management Plan for Commercial and Recreational Salmon Fisheries off The Coasts of Washington, Oregon and California ("Salmon FMP").

Amendment 16 does not propose changing the conservation objective for Sacramento River Fall-run Chinook ("SRFC") salmon, the indicator stock for the Central Valley Fall Chinook stock complex. The conservation objective is currently a range of 122,000-180,000 natural and hatchery adult spawners, based on a maximum sustainable yield (MSY) proxy adopted in 1984. However, Amendment 16 would set S_{MSY} (the spawner abundance expected to generate MSY) at 122,000, as adopted by the Council in June. There is no discussion as to why S_{MSY} is set at the low-end of the conservation objective, as opposed to the high-end, but in setting S_{MSY} for natural and hatchery adult spawners Amendment 16 effectively changes the conservation objective from a range of 122,000-180,000 to a single value of 122,000. In recent years when there were concerns that the conservation objective would not be met, particularly from 2009-2010, the National Marine Fisheries Service ("NMFS") has recommended targeting the upper end of the conservation objective. Since the status determination criteria would see application when the conservation objective is not met it would be consistent with the recommendations of NMFS from 2009-2011 to set S_{MSY} at 180,000 natural and hatchery adult spawners.

There is little reason to continue managing to the low-end of the conservation objective. The 1984 Framework Amendment established the low-end of the conservation objective due to migratory restrictions imposed by Red Bluff Diversion Dam. (PFMC 1984) Further escapement would depend on overcoming such restrictions. The NMFS 2009 Biological Opinion for operation of the Central Valley Project mandated a Reasonable and Prudent Alternative for Red Bluff Diversion Dam that required the gates to be raised year-round by 2012 in order to improve

[1] The San Joaquin River Group Authority is a joint power authority consisting of the Oakdale Irrigation District, South San Joaquin Irrigation District, Turlock Irrigation District, Modesto Irrigation District, Merced Irrigation District, the City and County of San Francisco, the San Joaquin River Exchange Contractors Water Authority, and the Friant Water Users Authority.

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fish passage. Concurrent with this project NMFS should set S_{MSY} at 180,000 natural and hatchery adult spawners.

NMFS should also consider whether a goal range of less than 180,000 natural and hatchery adult spawners remains appropriate. (Boydstun 2001.) Since the conservation objective was adopted new restoration goals have superseded the goals that were the basis for the conservation objective. Since 1984, Congress has passed the Central Valley Project Improvement Act ("CVPIA") (Public Law 102-575) and the California Legislature has passed the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act (Fish & Game Code §6902). Both laws set a goal, known as the "doubling goal," of doubling the natural production[2] of salmon in the Central Valley from the average production of 1967-1991.[3] When the Fish & Wildlife Service issued its final plan to double natural production in 2001, it acknowledged that, although the CVPIA did not intend for restriction of harvest to be used as a means of doubling natural production, since the definition of "production" includes harvested fish, sound harvest management would only harvest excess production, allowing for enough fish to escape harvest to maintain production at the highest level the habitat can support. (AFRP 2001, Appendix A-10.) Consequently, to meet the CVPIA's intent would need to be maintained at levels that allow sufficient numbers of naturally produced fish to spawn to meet goals for doubling natural production. (AFRP 2001, pp. 104, A-10.)

Since the conservation objective preceded the CVPIA and the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act, the harvest level that will allow sufficient numbers of naturally produced fish to spawn to meet goals for doubling natural production has never been determined. In 1994, the Sacramento River Fall Chinook Review Team ("SRFCRT") assessed the status of SRFC in response to the stock's failure to meet its escapement goal from 1990-1992. (SRFCRT 1994.) The SRFCRT acknowledged the CVPIA's doubling goal, as well as some of the CVPIA's major provisions. It also acknowledged the existence of the Bay-Delta Oversight Agreement, the Four Pumps Agreement, Endangered Species Act Measures, and the San Francisco Estuary Project. Among its recommendations, it recommended retaining the SRFC escapement goal range of 122,000 to 180,000 adult fish and meeting that range in all years. However, it did not discuss whether meeting the escapement goal would result in sufficient adult spawners to double natural production. The 2004 Programmatic EIS for Pacific Salmon Fisheries Management off the Coasts of Southeast Alaska, Washington, Oregon, and California, and in the Columbia River Basin also acknowledged the existence of the CVPIA's doubling goal, describing it as a measure to "reverse trends in the decline of salmon." (San Joaquin River Group Auth. v. Nat'l Marine Fisheries Serv., ____ F.Supp. 2d ____ , 2011 WL 4591071 (Sep. 30, 2011), p. 54 fn11.) However, it did not discuss the interplay between ocean harvest and freshwater management and similarly failed to discuss whether meeting the escapement goal would result in sufficient adult spawners to double natural production. As a result, the level of SRFC escapement necessary to allow sufficient numbers of naturally produced fish to spawn to meet goals for doubling natural production has neither been discussed

[2] The term "natural production" means fish produced to adulthood without direct human intervention in the spawning, rearing, or migration processes
[3] The federal and state doubling goals are slightly different, with the former requiring a plan to double the natural production of anadromous fish and the latter for a plan to double the natural production of salmon and steelhead.

nor determined.[4] The Final Draft Environmental Assessment and Regulatory Impact Report ("Draft EA") for Amendment 16 continues to ignore the CVPIA and the interplay between ocean harvest and freshwater management.

The proposed *de minimis* fishing provisions, in particular, could prove highly counterproductive to doubling natural production. According to the Draft EA, the "*de minimis* fishing provisions are intended to allow harvest at low stock abundance in exchange for reduced future production; however, by definition, *de minimis* means lacking significance or importance" (Draft EA, p. 116). Under the current control rule, when the Sacramento Index (i.e., abundance) is predicted to be below the conservation objective (i.e., 122,000), no fishing is allowed and the exploitation rate is zero. By comparison, the final Preferred Alternative would continue to allow fishing at mortality rates of 0.10 at potential spawner abundances from 45,800 to 91,500 SRFC and fishing rates < 0.10 below 45,800. (Draft EA, Figure 4-2b.) This would have allowed for continued fishing in 2008 when SRFC escapement was only 66,000. (Id.) According to the Draft EA "productivity of the SRFC stock is likely sufficient for some level of *de minimis* fisheries," because other Pacific Chinook stocks "suggest high productivity at low stock sizes" and because SRFC are mostly hatchery fish and "[h]atchery stocks can be highly productive and are generally able to support very high exploitation rates." (Draft EA, p. 118) These two arguments are incongruent with the state and federal "doubling goal" laws and were not supported in the Draft EA with scientific research.

The Draft EA contains no spawner-recruit analysis for SRFC. However, it states that other Chinook stocks "suggest high productivity at low stock sizes." (Draft EA, p.118) This vague statement implies that the SRFC can be sustained at a low abundance, but this contrasts with a recent review of the SRFC fishery collapse, which found that the SRFC abundance is becoming increasingly variable and less resilient (Lindley et al. 2009). Historically, the Central Valley fall-run were the largest run of salmon in the Central Valley, with an annual run estimated around a million fish; however, in the later half of the 20th century the annual production fell to around 100,000 to 350,000 adults, and most recently annual escapement dropped well below 100,000 (Lindley et al. 2009). The Central Valley fall-run Chinook is currently listed as 'Vulnerable' by the American Fisheries Society, a 'Species of Concern' by NMFS and a 'Species of Special Concern' by the California Department of Fish and Game (California Natural Diversity Database 2011). Since the CVPIA and the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act were passed considerable efforts have been spent in the Central Valley to meet the requirements of these laws.[5] For the Central Valley fall-run the doubling goal target is 750,000. Average Chinook salmon production for the period 1992-2008 has exceeded the doubling goal target only on Clear, Butte, and Battle Creeks, where considerable investments in flow and passage have occurred (USBR and USFWS 2009). Thus, productivity has not been high enough for the Central Valley fall-run to meet these production goals; a *de minimis* fishery would reduce SRFC production further and counteract the considerable restoration efforts conducted each year to that end.

[4] The goal for doubling natural production in the San Joaquin River system alone is approximately 78,000 fish.
[5] A list of projects, by both fiscal year and watershed, is available at http://www.fws.gov/stockton/afrp/projects.cfm. The SJRGA and many of its member agencies are partners in facilitating these projects.

The Draft EA further suggests that the SRFC stock can also support a *de minimis* fishery, because the majority of the catch are hatchery fish and "[h]atchery stocks can be highly productive and are generally able to support very high exploitation rates." This directly contradicts the goals of the CVPIA and Salmon, Steelhead Trout, and Anadromous Fisheries Program Act, which both seek to *reduce* reliance on hatcheries. The fishery's reliance on hatchery stock has been seen in California as a detriment to rebuilding a sustainable Central Valley fall-run stock. A recent analysis of the status of the Central Valley fall-run Chinook salmon ESU concluded that while there is no immediate risk of extinction, considering the reliance of the population on hatchery fish and the influence of hatchery fish on the decline of wild runs, substantial effort will be needed to sustain a population that can support a commercial fishery (Moyle et al. 2008). The lack of genetic and phenotypic diversity in the Central Valley has been compared to an undiversified financial portfolio. With the Californian salmon fishery heavily reliant on one particular stock (i.e. Central Valley hatchery Chinook), there is no buffer against a fluctuating 'market' to minimize the economic and ecological risks (Lindley et al. 2009). Lindley et al. 2009 suggests, "the key to reducing variation in production is increasing the diversity of SRFC" and not "simply increasing the production of fall Chinook salmon from hatcheries as they are currently operated."

The Draft EA indicates that egg transfers between hatcheries are a viable mitigation for low spawner abundance and states, "The indirect effects on hatchery egg take from the *de minimis* fishing Alternatives are not significant because of the ability to mitigate shortfalls through egg transfers from other facilities" (Draft EA, p.118). Rather than supporting a stock at low abundance, broodstock transfers among hatcheries in the Central Valley can have potential negative effects on diversity of SRFC stock, and consequently the abundance (Lindley et al. 2009). A recent Environmental Impact Report on the California state hatchery and stocking program stated that these types of stock transfers could result in "differences in adult and juvenile size, resistance to disease, and other traits than those that the receiving stock developed over time in response to its environment. A change in these traits may result in lower survival, productivity, diversity and abundance" (ICF Jones and Stokes 2010, p.4-112). The potential for negatively impacting the diversity of the SRFC stock, and increasing fluctuations in abundance, indicates that broodstock transfers are not a viable strategy for addressing low abundance under the proposed *de minimis* fishing Alternatives.

Management of the SRFC is intended "to provide adequate escapement of natural and hatchery production for Sacramento and San Joaquin fall and late-fall stocks" (PFMC 2003). Thus, while management focuses on the SRFC portion of the stock, it is important to consider the effects of harvest on San Joaquin River fall-run Chinook ("SJFC") abundance as well. The Pacific Salmon Management Plan (2003) describes the San Joaquin system as "severely degraded by water development projects and pollution" with SJFC comprising "<10% of the total Central Valley fall run," which suggests that they do not make up an important component of the Central Valley stock. Despite their low numbers, the naturally spawning SJFC may contribute important phenotypic diversity to the Central Valley fall-run stock, which is becoming more genetically homogenized each year. As stated in the Draft EA, risks associated with the indicator stocks, such as SRFC, could potentially affect risk to other stocks within the Central Valley complex. The Draft EA considers the effects of *de minimis* fishing on SJFC (Draft EA, p.118):

> "If SRFC spawner levels are allowed to be fished to low levels as a result of ***de minimis*** fisheries, ***the abundance of San Joaquin fall Chinook could be reduced to extremely low levels***. For example, Alternative 4 and FPA 6 (and potentially Alternative 5) *de minimis* provisions allow fishing down to a SRFC spawner abundance level of 30,500, which would result in an expected SJFC abundance of $30{,}500 \times 0.04 = 1{,}220$ spawners, given the average ratio of SJFC to SRFC over the last 20 years. While this is a low abundance of SJFC spawners, escapement levels below 1,220 have been observed in previous years, and egg take have been supplemented through transfer from other Central Valley hatchery facilities" [emphasis added]

The argument that there will be no significant direct impacts, because the Central Valley Fall-run Chinook stocks are resilient and can be supported through egg transfers between hatcheries, is the same cursory argument addressed above. This analysis was not supported in the Draft EA with scientific studies and disregards the state and federal doubling goal laws. A *de minimis* fishery will greatly hamper the Central Valley-wide efforts to restore natural salmon runs. With the California salmon fishery heavily reliant on one particular stock, there is no buffer against fluctuating abundances to minimize the economic and ecological risks. Lindley et al. (2009) suggests "that reducing the volatility of abundance, even at the expense of somewhat lower average catches, would benefit the fishing industry and make fishery disasters less likely." The proposed *de minimis* fishing would pose an unnecessary risk to the sustainability of the Central Valley Fall-run Chinook stocks and fishery, and would counteract the considerable restoration efforts conducted each year to meet target goals under the CVPIA.

With the proposed S_{MSY} set at only 122,000 SRFC, and with the proposal to allow *de minimis* fishing below this S_{MSY}, discussion and consideration of issues such as the doubling goal, the interplay between ocean harvest and freshwater management, or the level of SRFC escapement necessary to allow sufficient numbers of naturally produced fish to spawn to meet goals for doubling natural production is more important now than ever before. The Draft EA should therefore discuss the interplay between ocean harvest and freshwater management, determine the level of SRFC escapement necessary to allow sufficient and consistent numbers of naturally produced fish to spawn to meet goals for doubling natural production, and, finally, consider whether the present conservation objective, the proposed S_{MSY}, and *de minimis* fishing would allow a sufficient number of naturally produced fish to spawn to meet goals for doubling natural production.

Thank you for your consideration.

Rodney McInnis
National Marine Fisheries Service
November 18, 2011
Page 6

Very truly yours,

O'LAUGHLIN & PARIS LLP

Kenneth Petruzzelli

KENNETH PETRUZZELLI

cc (via email only): SJRGA
State Water Resources Control Board
Doug Demko
Michele Palmer

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ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

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Fisheries Off West Coast States; West Coast Salmon Fisheries: Salmon Fishery Management Plan

Document: NOAA-NMFS-2011-0227-DRAFT-0001
Comment from Linda Averill

Submitter Information

Name: Linda E. Averill
Address:
900 Hiawatha Place South
Seattle, WA, 98144
Organization: taxpayer

General Comment

I am opposed to Amendment 16, which I understand would open up the ability to fish salmon stock while supposedly protecting those that are endangered.

We need to strengthen protections, not find new ways to ease up or get around them.

Regulation and protection is already way to lax.

ABC-acceptable biological catch; ACL-annual catch limit; ACT-annual catch target; AM-accountability measures; MSY-maximum sustainable yield; OY-Optimum Yield; S-spawning escapement; SDC-status determination criteria

United States Department of the Interior

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November 18, 2011

William W. Stelle, Jr.
Regional Administrator
Northwest Region
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, Washington 98115

Dear Mr. Stelle, Jr:

The Department of the Interior has reviewed the Proposed Rule to Implement Amendment 16 to the Pacific Coast Salmon Fishery Management Plan. The Department does not have any comments to offer.

We appreciate the opportunity to comment.

Sincerely,

Allison O'Brien

Allison O'Brien
Regional Environmental Officer

FINDING OF NO SIGNIFICANT IMPACT
FOR
PACIFIC COAST SALMON PLAN AMENDMENT 16:

CLASSIFYING STOCKS, REVISING STATUS DETERMINATION CRITERIA,
ESTABLISHING ANNUAL CATCH LIMITS AND ACCOUNTABILITY MEASURES,
AND *DE MINIMIS* FISHING PROVISIONS

(RIN 0648-BA55)

National Marine Fisheries Service

December 2011

The National Oceanic and Atmospheric Administration Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. §1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria.

The proposed action is to provide a framework for specifying biological and management reference points and accountability measures (AMs) that will meet the requirements of the revised MSA and National Standard 1 Guidelines (NS1Gs) to account for uncertainty in the fishery management process, reduce the probability of overfishing, and include clear and objective status determination criteria (SDC), while integrating with existing management processes and capabilities to the degree possible.

1) **Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?**

Response: No, the proposed action will not significantly impact the sustainability of target species. Amendment 16 is specifically designed to reduce the probability of overfishing target species through the establishment of accountability measures, control rules, and status determination criteria.

2) **Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?**

Response: This proposed action will not result in significant impacts to the sustainability of non-target species. Amendment 16 does not change the requirement in the current fishery management plan that for ESA-listed salmon species, annual management measures are developed consistent with the applicable Endangered Species Act (ESA) consultation standards articulated in the biological opinions analyzing the impacts on those species, as discussed in response to Question 5 below. For non-salmon species, regulations are in place under the groundfish FMP, the Halibut Act, and the Area 2A Catch Sharing Plan to limit incidental catch of halibut and groundfish to ensure that impacts to these species are sustainable. These regulations include landing/possession limits, quotas, size limits, gear restrictions, and time/area closures. Encounters of non-target salmonid species in the ocean salmon fisheries are generally minimal.

3) **Can the proposed action reasonably be expected to cause substantial damage to ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Fisheries Management Plans?**

Response: The proposed action will not cause substantial damage to the ocean or coastal habitats or essential fish habitat based on previous analysis (e.g., Appendix A of FMP Amendment 14). Amendment 16 does not affect the fact that Council area ocean salmon fisheries are a hook-and-line fishery; and hook-and-line gear does not adversely affect the ocean floor and thus does not damage ocean or coastal habitats. Nets and bottom contact gear are not permitted in the salmon fishery.

4) **Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?**

Response: This proposed action would not impact public health or safety because the Salmon FMP has provisions to adjust management measures if unsafe weather affects fishery access; these provisions are unaffected by the proposed action.

5) **Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?**

<u>Response</u>: This proposed action would not significantly affect any endangered or threatened species or its habitat. Several salmonid species that are potentially caught in the fishery are listed as threatened or endangered under the ESA. NMFS has issued biological opinions or 4(d) rules addressing the effects of the fishery on all of these species, as well as non-salmonid listed species including Puget Sound rockfish (yelloweye, canary, and bocaccio), and green sturgeon. Annual management measures are developed consistent with the biological opinions and 4(d) rules for these species. In addition, Southern Resident Killer Whales are listed as endangered under the ESA. Annual management measures are developed consistent with the ESA Section 7 consultation on the Effects of the Pacific Coast Salmon Plan on the Southern Resident Killer Whale Distinct Population Segment (SRKW). This consultation, dated May 5, 2009, concluded that fisheries conducted under the Salmon FMP were not likely to jeopardize SRKW or adversely modify its critical habitat. The proposed action does not change the consultation process and does not supersede the requirement to manage fisheries to meet consultation standards.

Ocean salmon fisheries are classified under the Marine Mammal Protection Act (MMPA) as Category III (75 FR 68468), indicating there is no record of substantive impacts to marine mammals (MMPA 118(c) I).

6) **Can the proposed action be expected to have a substantial impact on bio-diversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc)?**

<u>Response</u>: Significant impacts to biodiversity and ecosystem function are not anticipated as a result of this action. The trophic niche of salmon in the ocean as both predator and prey is not expected to be significantly impacted by the proposed action, as they are not the only, or primary, predator in the marine environment, and, as stated in item 5 above, ocean fisheries do not result in substantive impacts to marine mammals. Marine nutrient transport provided to freshwater habitat by post-spawning salmon carcasses is not likely to be significantly impacted by the proposed action because control rules in Amendment 16 are designed to ensure spawning escapement levels that will produce maximum sustainable yield, and are similar to or above escapement levels targeted under the existing FMP. Under the proposed action, some stocks, e.g. mid-Columbia River spring Chinook salmon, would not be classified as in the fishery; therefore, the proposed action may result in the un-designation of

essential fish habitat (EFH) for those stocks. However, most of the areas currently designated as EFH are designated as such for multiple stocks, and are also designated as critical habitat for ESA-listed species; therefore, the result of removing some stocks from the fishery management unit, on habitat, is not expected to be significant.

7) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: There were no identified significant natural or physical environmental effects as a result of the proposed action. Economic effects of the proposed action are summarized in Section 4.9 of the EA. Generally, short-term positive economic effects were correlated with short- or long-term negative biological effects, and long-term positive economic effects with long-term positive biological effects. Economic effects were expected from SDC, ACL, AM, and *de minimis* fishing Alternatives. The economic effects from all the alternatives, like the biological effects, were determined to be not significant.

8) Are the effects on the quality of the human environment likely to be highly controversial?

Response: The impacts of the proposed action are not expected to be controversial due to of the best available science by the Salmon Amendment Committee in advising the Pacific Fisheries Management Council (PFMC) during alternative development.

9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

Response: No significant impacts are expected to occur on any of the above areas. No ground disturbing activity is part of this proposed action.

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The effects of this proposed action are not anticipated to be highly uncertain or involve unknown risks. The proposed action amends an FMP that has been in place since 1984. Salmon fisheries conducted under the FMP have been monitored and analyzed for many years; thus, it is very unlikely that there are unknown risks associated with this proposed action.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: The proposed action would not have any significant cumulative effects. The proposed action is specifically designed to end and prevent overfishing through implementation of objective status determination criteria, accountability measures, and annual catch limits, and thus to ensure that fishing on stocks in the FMP is sustainable. Amendment 16, and the FMP generally, allows for changes to accommodate new scientific information about impacts to resources affected by the fisheries.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

Response: No significant effects of this proposed action are anticipated on cultural, scientific, or historical resources. No ground disturbing activity is anticipated. Treaty tribal catch allocations are factored into management measures. Tribes have representation on the PFMC and were involved in the development of the proposed action.

13) Can the proposed action reasonably be expected to result in the introduction or spread of non-indigenous species?

Response: Activities under the proposed action will not involve the transport of non-indigenous species. The fishing vessels participating in the proposed action would not increase the risk of introduction through ballast water or hull fouling. Disposition of the catch does not include any translocation of living marine resources, nor use of any nonindigenous species as bait.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

Response: The action will not be setting precedents for future actions with significant effects because fishery management measures are structured each year based on best available scientific information.

15) Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment?

Response: This proposed action will not threaten a violation any federal, state, or local law or requirement imposed for the protection of the environment.

16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: Cumulative effects were analyzed in Section 4.5 of the EA. While several actions and events are described that could impact cumulative effects related to the proposed action, none were determined to result in substantial cumulative adverse effects. The proposed action would modify the existing fishery management plan, which provides for annual review of new scientific information such as that regarding stock status , stock abundance, and the impacts of other fisheries so that annual management measures can be designed that avoid adverse cumulative effects. In addition, the control rules and other measures in the proposed action may be changed based on new information regarding changes in the larger environment that affect stocks in the fishery. Changes in status of protected species will continue to be accommodated under the FMP. Changes to stocks included in the Fishery Management Unit could result in changes to cumulative impacts on target species; however, application of control rules under the proposed action should prevent any impacts from being significant. Expansion of ocean mark-selective fisheries could result in shifting management constraints and fishing pressure on some stocks. Changes in use of ocean areas (e.g., establishing marine protected areas or energy development) could result in shifting fisheries impacts among stocks, but are not thought to have a substantial effect. Climate change could have a negative impact, but not likely to be substantial in the near term. Cyclical changes, such as El Niño events, are part of the historical baseline, and are not likely to be substantial. Marketing strategies can affect the ex-vessel value of the fisheries, but are difficult to anticipate. Aesthetic values, e.g. presence of salmon in inland streams, should benefit from the proposed action through spawning escapements managed under the control rules established in Amendment 16.

The West Coast Salmon Harvest Programmatic EIS (PEIS) (NMFS 2003) provides a comprehensive summary of cumulative effects regarding west coast salmon, including a general inventory of actions that are known to adversely affect salmon habitat. The PEIS examines the degree to which necessary survival improvements will need to come from other sources of human-induced mortality and provides examples of current remedial activities designed to improve the status of salmon stocks. Cumulative impacts of annual salmon measures, implemented under the proposed action, on salmon and their habitat are not projected to be significant as long as the conservation objectives are met.

Determination

In view of the information presented in this document and the analysis contained in the final EA prepared for Amendment 16 to the Pacific Coast Salmon Plan, it is hereby determined that the proposed action will not significantly impact the quality of the human environment as described above and in the supporting EA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environmental Impact Statement for this action is not necessary.

William Stelle | 12/6/2011

William W. Stelle, Jr.
Regional Administrator, NOAA Fisheries,
Northwest Region

Date