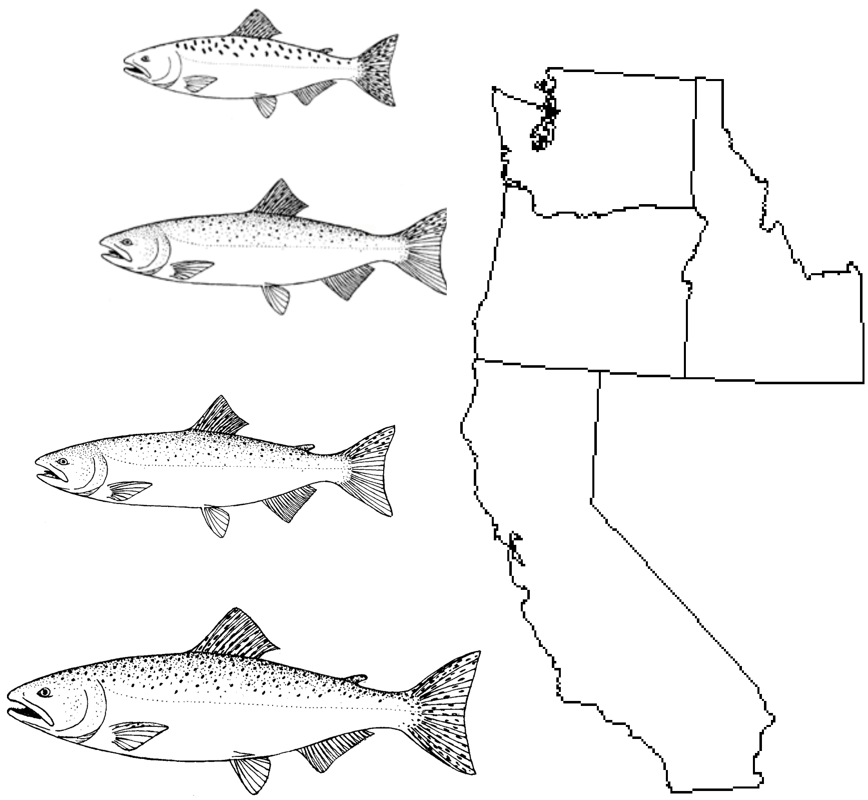
PRESEASON REPORT I

STOCK ABUNDANCE ANALYSIS FOR 2010 OCEAN SALMON FISHERIES



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LIST OF ACRONYMS AND ABBREVIATIONS

BY	brood year
CDFG	California Department of Fish and Game
CoTC	Coho Technical Committee (of the PSC)
Council	Pacific Fishery Management Council
CRFMP	Columbia River Fishery Management Plan
CVI	Central Valley Index
CWT	coded-wire tag
EEZ	exclusive economic zone (from 3-200 miles from shore)
EMAP	Environmental Monitoring and Assessment Program
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FMP	fishery management plan
FRAM	Fishery Regulatory Assessment Model
ISBM	individual stock-based management
Jack CR	Columbia River jacks (coho)
Jack OC	Oregon coastal and Klamath River Basin jacks (coho)
Jack OPI	Jack CR + Jack OC (coho)
KMZ	Klamath management zone (ocean zone between Humbug Mountain and Horse Mountain where management emphasis is on Klamath River fall Chinook)
KOHM	Klamath Ocean Harvest Model
KRFC	Klamath River fall Chinook
KRTT	Klamath River Technical Team
LCN	lower Columbia River natural (coho)
LRB	lower Columbia River bright (Chinook)
LRH	lower Columbia River hatchery (tule fall Chinook returning to hatcheries below Bonneville Dam)
LRW	lower Columbia River wild (bright fall Chinook spawning naturally in tributaries below Bonneville Dam)
MCB	mid-Columbia River brights (bright hatchery fall Chinook released below McNary Dam)
MOC	mid Oregon coast
MSM	mixed stock model
MSY	maximum sustainable yield
NA	not available
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOC	north Oregon coast
OCN	Oregon coast natural (coho)
OCNL	Oregon coast natural lake (coho)
OCNR	Oregon coast natural river (coho)
ODFW	Oregon Department of Fish and Wildlife
OPI	Oregon Production Index (coho salmon stock index south of Leadbetter Point)
OPIH	Oregon Production Index public hatchery
PDO	Pacific Decadal Oscillation
PRIH	Private hatchery
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
RER	rebuilding exploitation rate
RK	Rogue/Klamath (coho)

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

RMP	Resource Management Plan (for exemption from ESA section 9 take prohibitions under limit 6 of the 4(d) rule)
ROPI	Rogue Ocean Production Index (Chinook)
SAB	Select Area brights
SCH	Spring Creek Hatchery (tule fall Chinook returning to Spring Creek Hatchery)
SHM	Sacramento Harvest Model
SI	Sacramento Index
SRFC	Sacramento River fall Chinook
SRS	Stratified Random Sampling
STEP	Salmon Trout Enhancement Program
STT	Salmon Technical Team (formerly the Salmon Plan Development Team)
URB	upper river brights (naturally spawning bright fall Chinook normally migrating past McNary Dam)
VSI	visual stock identification
WCVI	West Coast Vancouver Island
WDFW	Washington Department of Fish and Wildlife

INTRODUCTION

This is the second report in an annual series of four reports prepared by the Salmon Technical Team (STT) of the Pacific Fishery Management Council (Council) to document and help guide salmon fishery management off the coasts of Washington, Oregon, and California. This report will be formally reviewed at the Council's March meeting. The third and fourth reports in this series will be developed at the close of the March and April Council meetings, respectively, to analyze the impacts of the Council's proposed and final ocean salmon fishery management recommendations for 2010.

This report provides 2010 salmon stock abundance forecasts, and an analysis of the impacts of 2009 regulations, or regulatory procedures, on the projected 2010 abundance. This analysis is analogous to that of a no-action alternative in a National Environmental Policy Act (NEPA) analysis, and is intended to give perspective in developing 2010 management measures. The report focuses on Chinook, coho, and pink salmon stocks that have been important in determining Council fisheries in recent years, and on stocks listed under the Endangered Species Act (ESA) with established National Marine Fisheries Service (NMFS) ESA consultation standards.

Chapter I provides a summary of stock abundance forecasts. Chapters II and III provide detailed stock-by-stock analyses of abundance, a description of prediction methodologies, and accuracy of past abundance forecasts for Chinook and coho salmon, respectively. Chapter IV summarizes abundance and forecast information for pink salmon. Four appendices provide supplementary information as follows: Appendix A provides a summary of Council stock management goals; Appendix B contains pertinent data for Oregon production index (OPI) area coho; Appendix C contains the Council's current harvest allocation schedules, and; Appendix D details justification for a minor change in the Sacramento Index predictor.

STT Concerns

Sacramento River fall Chinook (SRFC) adult escapement continues its declining trend, with the 2009 estimate representing the lowest escapement on record. The 2008 jack escapement of approximately 4,000 SRFC, while extremely low relative to historical data, was an increase over the 2007 jack escapement and was thought to signify a change in the stock abundance trajectory. However, the 2009 adult escapement was lower than forecast in the absence of nearly all fisheries, indicating that the recovery of this stock has yet to begin. The causes of the most recent escapement shortfall are not yet known, and it is unclear whether the SRFC stock will behave in the future as it has in the past. The 2010 Sacramento Index, forecast using the 2009 jack return, suggests a substantial increase in preseason adult ocean abundance of SRFC relative to recent years. Yet, given forecast uncertainty and the lack of demonstrable increases in adult abundance or escapement to date, the STT remains concerned about SRFC recovery.

CHAPTER I - ABUNDANCE FORECASTS

Abundance forecasts in 2010 are summarized for key Chinook and coho salmon stocks in Tables I-1 and I-2, respectively. A cursory comparison of preseason forecast and postseason abundance estimates for selected stocks is presented in Figures I-1 and I-2. More detailed analyses of this subject are covered in Chapter II (Chinook) and III (coho). Information on pink salmon abundance and forecasts, which are only significant in odd-numbered years, is contained in Chapter IV. Council Salmon Fishery Management Plan (FMP) management goals are presented in Table I-3 and Appendix A, Table A-1.

In addition to the key stocks with abundance forecasts listed in Tables I-1 and I-2, Council management decisions for the 2010 ocean salmon fishing seasons may be constrained by other stocks, such as those listed under the ESA or subject to the PSC agreement, which may not have abundance forecasts made, or do not have abundance forecasts available in time for inclusion in this report. These include the following ESU's: Sacramento River Winter, Central Valley Spring, California Coastal, Lower Columbia River, and Snake River Fall Chinook; and Central California and Southern Oregon/Northern California coho, as well as Interior Fraser (including Thompson River) coho.

Table I-3 provides a summary of Salmon FMP stock spawning escapement projections for 2010 under 2009 regulations, as well as postseason estimates of these quantities for earlier years, which are compared to FMP conservation objectives. For some stocks, postseason estimates of these metrics were either incomplete or unavailable when the Review of 2009 Ocean Salmon Fisheries was published. A preliminary determination of stock status under the FMP Overfishing Criteria was available for some of these stocks in time for this report; however, some estimates are still unavailable. The STT will report to the Council on stocks not meeting conservation objectives at the March 2010 Council meeting, and may further update the status of stocks present in Table I-3 at that time.

A number of stocks are not subject to the FMP Overfishing Criteria, including ESA listed stocks and stocks minimally impacted by Council-area ocean fisheries. However, the status of several stocks listed in Table I-3 that are subject to the FMP Overfishing Criteria should be noted at this stage of the management process. In particular:

- Western Strait of Juan de Fuca natural coho failed to meet its FMP conservation objective for four consecutive years (2005-2008); a 2009 spawning escapement estimate was not available in time for this report.
- Grays Harbor and Queets natural coho failed to meet their FMP conservation objectives in 2006 and 2007, and 2008; 2009 spawning escapement estimates were not available in time for this report.
- Oregon coastal Chinook failed to meet its FMP conservation objective in 2007 and 2008, but met the objective in 2009; a forecast for 2010 was not available.
- Sacramento River fall Chinook (SRFC) failed to meet its FMP conservation objectives in 2007, 2008, and 2009, triggering an Overfishing Concern under the terms of the Salmon FMP

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

Production Source and Stock or Stock Group	2002	2003	2004	2005	2006	2007	2008	2009	2010	Methodology for 2010 Prediction and Source
Sacramento Index										
Fall	-	-	-	-	-	-	54.6[a/]	122.2	245.5	Linear regression analysis of jack escapement on SI of the following year. STT
Klamath River (Ocean Abundance)										
Fall	362.5	310.2	216.3	239.8	110.0	546.2	190.7	505.7	331.5	Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. KRTT.
Oregon Coast										
North and South/Local Migrating										None.
Columbia River (Ocean Escapement)										
Upriver Spring	333.7	145.4	360.7	254.1[b/]	88.4	78.5	269.3	298.9	470.0	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Willamette Spring	73.8	109.8	109.4	116.9	46.5	52.0	34.0	37.6	62.7	Age-specific linear regressions of cohort returns in previous run years. ODFW staff.
Sandy Spring	4.3	4.8	5.2	7.4	8.2	7.9	6.8	5.2	3.7	Recent year average. ODFW staff.
Cowlitz Spring	3.1	4.9	15.9	12.7	3.0	6.4	5.2	4.1	12.5	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	1.6	3.6	6.0	4.5	1.5	4.0	3.7	0.9	0.9	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Lewis Spring	2.0	3.1	5.4	7.6	1.8	5.9	3.5	2.2	6.0	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Upriver Summer	77.7	87.6	102.8	62.4[b/]	49.0	45.6	52.0	70.7	88.8	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
URB Fall	281.0	280.4	292.2	352.2	253.9	182.4	162.5	259.9	310.8	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
SCH Fall	144.4	96.9	138.0	114.1	50.0	21.8	87.2	59.3	169.0	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
LRW Fall	18.7	24.6	24.1	20.2	16.6	10.1	3.8	8.5	9.7	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
LRH Fall	137.6	115.9	77.1	74.1	55.8	54.9	59.0	88.8	90.6	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
MCB Fall	96.2	104.8	90.4	89.4	88.3	68.0	54.0	94.5	72.6	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW

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

Production Source and Stock or Stock Group		2002	2003	2004	2005	2006	2007	2008	2009	2010	Methodology for 2010 Prediction and Source
Washington Coast (Ocean Escapement)											
Willapa Bay Fall	Natural	3.7	2.4	4.1	3.2	2.0	2.0	2.5	2.0	2.0	Based on average 1987-2006 returns/spawner applied to Brood Years 2005-2008. WDFW staff.
	Hatchery	18.8	14.2	14.7	17.4	29.8	29.8	27.0	34.8	31.1	Based on average 1996-2006 returns/release applied to Brood Years 2005-2008, adjusted by brood performance. WDFW staff.
Quinault Spring/Summer	Natural	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Quinault Fall	Hatchery	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Queets Spring/Summer	Natural	NA	NA	NA	NA	NA	NA	NA	0.4	NA	
Queets Fall	Natural	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Hatchery	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Hoh Spring/Summer	Natural	1.6	1.9	1.5	1.5	1.4	1.6	0.9	1.1	0.8	Age specific mean cohort ratios and linear regression analysis using recent 5 year mean.
Hoh Fall	Natural	4.2	3.1	4.2	3.8	4.0	2.7	2.9	2.6	3.3	Age specific mean cohort ratios and linear regression analysis using recent 5 year mean.
Quillayute Spring	Hatchery	1.2	1.0	1.4	1.2	1.7	1.3	1.7	2.0	1.5	Mean return per release using most recent 4 years, adjusted means for age-5 and age-6.
Quillayute Summer/Fall	Natural	6.7	7.4	7.8	6.7	6.8	7.7	6.0	6.8	7.5	Summer: Recent 5 year mean return per spawner. Fall: Recent 3 year mean return rates from cohort analysis.
Puget Sound[c]											
Nooksack/Samish	Hatchery	52.8	45.8	34.2	19.5	16.9	18.8	35.3	23.0	30.3	Brood release times average return/release rate (2006-2008 return years).
East Sound Bay	Hatchery	1.6	1.6	0.8	0.4	0.4	0.4	0.8	0.1	2.3	Brood release times average return/release rate (2005-2008 return years).
Skagit Summer/Fall	Natural	13.8	13.7[d]	20.4[d]	23.4[d]	24.1[d]	15.0[d]	23.8[d]	23.4[d]	13.0[d]	Age-specific average return rate per spawner adjusted with brood year sibling return method.
	Hatchery	0.0	0.0[d]	0.5[d]	0.7[d]	0.6[d]	1.1[d]	0.7[d]	0.6[d]	0.9[d]	Age-specific average return rate per smolt and appropriate year smolt releases.
Stillaguamish	Natural	2.0[e]	2.0[e]	3.3[e]	2.0[e]	1.6[e]	1.9[e]	1.1[e]	1.7[e]	1.4[e]	Natural plus supplemental production from average of FRAM CWT reconstruction and an independent environmental model to link to return rates of specific age classes. FRAM CWT reconstruction uses BY 1993-2003 tagged fish survival rates for supplemental forecast, and BY 1986-1993 recruits/spawner for the natural return.
Snohomish	Natural	6.7[e]	5.5[e]	15.7[e]	14.2[e]	8.7[e]	12.3[e]	6.5[e]	8.4[e]	9.9[e]	Recent year average brood recruits/spawner applied to the 2005-2008 parent escapements. Hatchery forecasts based on average CWT survival rates from Wallace Hatchery applied to releases (yearlings: BY 1996-97; fingerlings: BY 2000-2003).
	Hatchery	6.8[e]	9.4[e]	10.1[e]	9.9[e]	9.6[e]	8.7[e]	8.8[e]	4.9[e]	5.6[e]	Yearlings based on CWT groups for Wallace Hatchery (BYs 1987 and 1992-1996). Fingerlings based on survival estimate from Tulalip Hatchery 1998-2003.

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

Production Source and Stock or Stock Group		2002	2003	2004	2005	2006	2007	2008	2009	2010	Methodology for 2010 Prediction and Source
Tulalip	Hatchery	5.8[e/]	6.0[e/]	7.6[e/]	9.2[e/]	10.0[e/]	8.1[e/]	4.1[e/]	4.0[e/]	3.4[e/]	CWT survival rates (1998-2003) multiplied by release numbers for brood years 2005-2008.
South Puget Sound	Natural	16.9	19.6	17.5	17.7	21.3	17.0	21.1	17.2	12.7	Puyallup R. based on age-specific return per spawner rates for 1996-2007 return year. For Nisqually, recent age-4 average (2005-2008) of runsizes; a majority of Nisqually natural returns are expected to be hatchery origin. Green R. spawning escapement in terms of natural origin adults.
	Hatchery	90.8	86.6	86.5	83.1	85.8	92.1	101.3	93.0	97.4	Average return at age multiplied by cohort release for Green, Carr Inlet, and Area 10E. Nisqually based on return rates/spawner for age-3 and age-5; age-4/3 sibling relationship for age-4.
Hood Canal	Natural	2.9[d/]	3.6[d/]	2.4[d/]	3.1[d/]	2.5[d/]	3.8[d/]	2.6[d/]	2.5[d/]	2.4[d/]	Natural fish based on the Hood Canal terminal run reconstruction-based relative contribution of the individual Hood Canal management units in the 2006-2009 return years.
	Hatchery	21.1[d/]	30.2[d/]	27.2[d/]	27.5[d/]	27.7[d/]	43.6[d/]	34.2[d/]	40.1[d/]	42.6[d/]	Brood 2006 fingerling lbs released from WDFW facilities in 2007, multiplied by the average of postseason estimated terminal area return rates (total terminal run / hatchery fingerling lbs released three years previous) for the last four return years (2006-2009).
Hoko	Natural	-	-	-	-	-	-	1.1[e/]	1[e/]	1.8[e/]	Sibling regressions.
Strait of Juan de Fuca	Natural	3.6[d/]	3.4[d/]	3.6[d/]	4.2[d/]	4.2[d/]	4.4[d/]	3.2[d/]	2.4[d/]	1.9[d/]	Dungeness and Elwha hatchery estimated by four-year average 2004-2007 releases times average return rates. Dungeness wild estimated by smolts times average hatchery return rate. Elwha estimate separates hatchery and wild fish based on 2008 otolith sampling.
	Hatchery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Hatchery production included in naturals.

a/ Does not include the river harvest component. SI forecasts after 2008 include river harvest.

b/ Beginning in 2005, the upriver spring/summer designation was changed, with stream type Snake Basin summer fish being combined with the spring stock.

c/ Unless otherwise noted, forecasts are for Puget Sound run size (4B) available to U.S. net fisheries. Does not include fish caught in troll and recreational fisheries.

d/ Terminal run forecast.

e/ Expected spawning escapement without fishing.

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

Production Source and Stock or Stock Group		2002	2003	2004	2005	2006	2007	2008	2009	2010	Methodology for 2010 Prediction and Source
OPI Area (Total Abundance) (California and Oregon Coasts and Columbia River)		434.1	984.6	777.9	542.9	460.2	849.2	276.1	1,284.7	556.0	Abundance of all OPI components based on cohort reconstruction including all fishery impacts using Mixed Stock Model (MSM); prior to 2008 only fishery impacts south of Leadbetter Point were used (traditional OPI accounting). OPITT, see Chapter III for details.
OPI Public	Hatchery	361.7	863.1	623.9	389.9	398.8	593.6	216.1	1,073.1	408.0	OPIH: 1969-2008 Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2009 adults. Columbia/Coastal proportions based on jacks; Columbia early/late proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		161.6	440.0	313.6	284.6	245.8	424.9	110.3	672.7	245.3	
Columbia River Late		143.5	377.9	274.7	78.0	113.8	139.5	86.4	369.7	144.2	
Coastal N. of Cape Blanco		36.6	29.3	16.6	11.5	8.6	7.0	1.7	7.3	4.4	
Coastal S. of Cape Blanco		20.0	15.9	19.0	15.8	30.6	22.2	17.7	23.4	14.1	
Lower Columbia River	Natural	NA	NA	NA	NA	NA	21.5	13.4	32.7	15.1	Oregon: recent 3-year average; Washingtion: natural smolt production multiplied by 2007 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	71.8	117.9	150.9	152.0	60.8	255.4	60.0	211.6	148.0	Rivers: Bakun upwelling anomaly, January sea surface temperature anomaly, and ocean regime index regressed on MSM ocean recruits; Lakes: recent three year average return.
STEP[a/]	Hatchery	0.6	3.6	3.1	1.0	0.6	0.2	-	-	-	No forecast since 2007; releases discontinued.
Washington Coast											A variety of methods were used for 2010, primarily based on smolt production and survival. See text in Chapter III for details.
Willapa	Natural	21.6	31.8	36.7	35.9	30.3	24.4	35.1	33.5	20.4	
	Hatchery	40.4	57.5	55.0	56.4	37.7	37.2	25.5	59.4	78.7	
Grays Harbor	Natural	55.4	58.0	117.9	91.1	67.3	59.4	42.7	59.2	NA	
	Hatchery	56.8	64.0	67.8	54.4	52.4	74.0	53.1	63.5	NA	
Quinault	Natural	29.4	47.7	50.5	44.9	28.8	18.6	17.4	16.3	16.7	
	Hatchery	12.3	20.6	18.2	33.6	34.5	22.7	24.5	26.2	26.6	
Queets	Natural	12.5	24.0	18.5	17.1	8.3	13.6	10.2	31.4	NA	
	Hatchery	16.0	24.9	17.1	17.4	11.9	19.1	10.3	13.5	NA	
	Supplemental[b/]	2.0	1.3	2.5	2.4	-	-	-	-	-	
Hoh	Natural	8.5	12.5	8.1	7.6	6.4	5.4	4.3	9.5	7.6	
Quillayute Fall	Natural	22.3	24.9	21.2	18.6	14.6	10.8	10.5	19.3	22.0	
	Hatchery	15.0	15.2	20.9	22.1	10.4	18.1	13.0	39.5	17.7	

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

Production Source and Stock or Stock Group		2002	2003	2004	2005	2006	2007	2008	2009	2010	Methodology for 2010 Prediction and Source
Quillayute Summer	Natural	1.2	1.8	1.1	0.8	1.1	1.0	1.1	2.2	2.8	
	Hatchery	4.9	5.4	6.1	6.1	4.0	6.4	4.2	12.9	3.2	
North Coast Independent Tributaries	Natural	6.4	14.8	12.7	8.5	8.1	3.2	3.2	11.1	4.2	
	Hatchery	8.1	11.0	4.3	5.6	3.2	4.1	5.0	14.1	5.7	
WA Coast Total	Natural	157.3	215.5	266.7	224.5	164.9	136.4	124.5	182.5	73.7	
	Hatchery	155.5	199.9	191.9	198.0	154.1	181.6	135.7	229.1	131.9	
Puget Sound											
Strait of Juan de Fuca	Natural	21.2	20.1	35.7	20.7	26.1	29.9	24.1	20.5	8.5	A variety of methods were used for 2010, primarily based on smolt production and survival. See text in Chapter III and Joint WDFW and tribal annual reports on Puget Sound Coho Salmon Forecast Methodology for details.
	Hatchery	14.0[b/]	24.0[b/]	28.7[b/]	26.5[b/]	20.5	18.4	9.5	7.0	7.8	
Nooksack-Samish	Natural	22.0	16.4	27.5	17.0	18.3	5.2	14.8	7.0	9.6	
	Hatchery	105.4	66.2	75.5	89.5	81.1	53.1	47.1	25.5	36.0	
Skagit	Natural	98.5	116.6	155.8	61.8	106.6	26.8	61.4	33.4	95.9	
	Hatchery	14.1	10.4	22.8	9.1	22.5	8.9	18.3	11.7	9.5	
Stillaguamish	Natural	19.7	37.8	38.0	56.7	45.0	69.2	31.0	13.4	25.9	
	Hatchery	-	1.3	0.5	0.2	1.2	0.0	0.1	0.0	5.4	
Snohomish	Natural	123.1	203.0	192.1	241.6	139.5	98.9	92.0	67.0	99.4	
	Hatchery	60.3	35.4	48.3	59.1	96.4	25.7	53.5	53.6	24.5	
South Sound	Natural	40.4	103.6	61.3	45.7	45.3	18.2	27.3	53.6	25.3	
	Hatchery	222.5	315.6	288.4	222.2	256.1	181.7	170.0	188.8	186.4	
Hood Canal	Natural	34.9	32.4	98.7	98.4	59.4	42.4	30.4	48.6	33.2	
	Hatchery	31.3[b/]	48.0[b/]	43.1[b/]	60.6[b/]	57.9	54.8	35.0	52.0	51.2	
Puget Sound Total	Natural	359.8	529.9	609.2	541.9	440.2	290.6	281.0	243.5	297.8	
	Hatchery	447.6	501.0	507.3	465.2	535.7	342.6	333.5	338.6	320.8	

a/ Program ended in 2005.

b/ Strait of Juan de Fuca and Hood Canal Hatchery numbers in 2002-2005 include natural coho from secondary (hatchery) management zones.

TABLE I-3. Achievement of conservation objectives for key stocks listed in Table 3-1 of the Pacific Coast Salmon Plan. Bolded numbers indicate a failure to meet the conservation objective. Stocks listed under the Endangered Species Act are not included. (Page 1 of 2)

Stock and Conservation Objective (thousands of spawners; spawners per mile; impact or replacement rate)										**Overfishing Criteria**		
CHINOOK	2002	2003	2004	2005	2006	2007	2008	2009[a/]	2010[b/]	Alert[c/]	Concern[d/]	Exception[e/]
Sacramento River Fall 122.0 - 180.0 adult spawners	769.9	523.0	286.9	396.0	269.2	**87.9**	**64.5**	**39.5**	245.4	No	**Yes**	No
Klamath River Fall - < 66%-67% avg. spawner reduction rate but no less than 35.0 adult natural spawners annually	65.6	87.6	**24.1**	**26.8**	**30.2**	60.7	**30.9**	44.6	86.1	No	**Yes**	No
Southern, Central and Northern Oregon Coast Spring and Fall No less than 60 adult spawners/mile[f/]	222.8	230.6	171.7	89.1	63.8	**39.2**	**34.1**	60.7	NA	No	No	No
Upper Columbia River Bright Fall 43.5 adults over McNary Dam Council area base period impacts <4%	141.7	180.0	170.6	134.8	91.0	58.7	101.9	104.5	>43.5	No	No	Exp. Rate
Columbia River Summer Chinook 80.0 to 90.0 adults over Bonneville Dam Council area base period impacts <2%	127.4	114.8	NA	NA	NA	NA	NA	NA	NA	No	No	Exp. Rate
In 2004 state and tribal co-managers changed the stock definition from Chinook passing Bonneville Dam after May 31 to Chinook passing Bonneville Dam after June 14, with a goal of 29,000 at the river mouth	92.8	83.1	65.5	60.4	77.9	37.0	55.5	53.9	>29.0	No	No	Exp. Rate
Grays Harbor Fall - 14.6 adult spawners (MSP)	**11.3**	19.4	29.3	19.5	17.1	**12.4**	15.3	NA[g/]	NA[g/]	No	No	Exp. Rate
Grays Harbor Spring - 1.4 adult spawners	2.6	1.9	5.0	2.1	2.5	**0.7**	**1.0**	NA[g/]	NA[g/]	No	No	Exp. Rate
Queets Fall - no less than 2.5 adult spawners (MSY)	2.6	5.0	5.1	4.6	3.1	**0.9**	3.1	NA[g/]	NA[g/]	No	No	Exp. Rate
Queets Spring/Summer - no less than 0.7 adult spawners	0.7	**0.2**	**0.6**	**0.3**	**0.3**	**0.4**	**0.3**	**0.5**	**0.5**	Limited[e/]	No	Exp. Rate
Hoh Fall - no less than 1.2 adult spawners (MSY)	4.4	1.6	3.2	4.2	1.5	1.6	2.8	1.5	3.3	No	No	Exp. Rate
Hoh Spring/Summer - no less than 0.9 adult spawners	2.5	1.2	1.8	1.2	0.9	**0.8**	**0.7**	0.9	**0.8**	No	No	Exp. Rate
Quillayute Fall - no less than 3.0 adult spawners (MSY)	6.1	7.4	3.8	6.4	5.6	3.1	3.6	3.1	6.5	No	No	Exp. Rate
Quillayute Spring/Summer - 1.2 adult spawners (MSY)	**1.0**	1.2	**1.1**	**0.9**	**0.6**	**0.5**	**0.9**	**0.9**	1.2	Limited[e/]	No	Exp. Rate

Stock and Conservation Objective
(thousands of spawners; spawners per mile; impact or replacement rate)

COHO	2002	2003	2004	2005	2006	2007	2008	2009[a]	2010[b]	Overfishing Criteria Alert[c]	Concern[d]	Exception[e]
Grays Harbor - 35.4 adult spawners (MSP)	110.1	85.0	61.7	45.1	**14.5**	**24.3**	**34.1**	NA	>35.4	No	**Yes**	No
Queets - 5.8 to 14.5 adult spawners (MSY range) Includes supplemental adults prior to 2006.	13.8	9.8	7.5	6.5	**5.7**	**4.7**	**4.6**	NA	>5.8	No	**Yes**	No
Hoh - 2.0 to 5.0 adult spawners (MSY range)	9.0	6.3	4.7	4.7	**1.3**	3.1	2.5	4.6	>2.0	No	No	No
Quillayute Fall - 6.3 to 15.8 adult spawners (MSY range)	23.0	14.8	13.4	11.5	**5.2**	**6.2**	6.9	8.4	>6.3	No	No	No
Western Strait of Juan de Fuca - 11.9 adult spawners	17.1	13.8	12.0	**6.8**	**2.0**	**4.4**	**2.4**	NA	h/i/	No	**Yes**	No
Eastern Strait of Juan de Fuca - 0.95 adult spawners	3.0	3.2	7.8	3.4	1.8	3.1	1.2	NA	h/i/	No	No	No
Hood Canal - 21.5 adult spawners (MSP)	69.3	171.2	146.9	38.1	**13.7**	46.7	**11.8**	NA	i/	No	No	No
Skagit - 30.0 adult spawners (MSP)	56.0	88.7	118.5	34.7	**7.7**	52.0	**24.1**	NA	i/	No	No	No
Stillaguamish - 17.0 adult spawners (MSP)	27.3	45.7	59.2	25.8	**8.5**	38.7	**12.9**	22.2	i/	No	No	No
Snohomish - 70.0 adult spawners (MSP)	161.6	182.7	252.8	109.0	75.8	**18.6**	**35.1**	99.0	i/	No	No	No

a/ Preliminary data.

b/ Preliminary approximations based on preseason abundance projections and last year's regulations or season structures.

c/ Conservation Alert - triggered during the annual preseason process if a natural stock or stock complex, listed in Table 3-1 of the salmon FMP, is projected to fall short of its conservation objective (MSY, MSY proxy, MSP, or floor in the case of some harvest rate objectives [e.g., 35,000 natural Klamath River fall Chinook spawners]).

Actions for Stocks that are not Exceptions - The Council will close salmon fisheries within its jurisdiction which impact the stocks, except in the case of Washington coastal and Puget Sound salmon stocks and fisheries managed under U.S. District Court orders. In these cases, 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, that may vary from the MSY or MSP conservation objectives. For all natural stocks that 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 state and tribal fishery managers identify the probable causes, if known. If the stock has not met its conservation objective in the previous two years, the Council will request state and tribal managers to do a formal assessment of the primary factors leading to the shortfalls and report to the Council no later than the March meeting prior to the next salmon season.

d/ Overfishing concern - triggered if, in three consecutive years, the postseason estimates indicate a natural stock, listed in Table 3-1 of the salmon FMP, has fallen short of its conservation objective (MSY, MSP, or spawner floor as noted for some harvest rate objectives).

Actions required for Stocks that are not Exceptions - Within one year, the STT to recommend and the Council to adopt management measures to end the overfishing concern and recover the stock in as short a time as possible, preferably within ten years or less. The HC to provide recommendations for habitat restoration and enhancement measures within a suitable time frame.

e/ Exception-application of the conservation alert and overfishing criteria and subsequent Council actions do not apply for (1) hatchery stocks, (2) natural stocks with a cumulative adult equivalent exploitation rate of less than 5% in ocean fisheries under Council jurisdiction during the FRAM base periods, and (3) stocks listed under the ESA.

Conservation Alert and Overfishing Concern Actions for Natural Stocks that are Exceptions (those with exploitation rates limited to less than 5% in base period Council-area ocean fisheries) - Use the expertise of STT and HC to confirm negligible impacts of proposed Council fisheries, identify 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 monitor 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.

f/ Based on the sum of south/local and north migrating spawners per mile weighted by the total number of miles surveyed for each of the two components (2.2 miles for south/local and 7.5 miles for northern stocks).

g/ Preseason forecasts are not available for some of Washington coastal Chinook stocks.

h/ As a result of Council action in 2009, the Eastern and Western Strait of Juan de Fuca stocks have been combined into a single stock beginning in 2010.

i/ As a result of Council action in 2009, this stock will be managed consistent with the PST allowable exploitation rates for Puget Sound coho management units beginning in 2010. Conservation objectives for this stock for the purpose of determining an overfishing concern are under review, and will likely be modified during 2010.

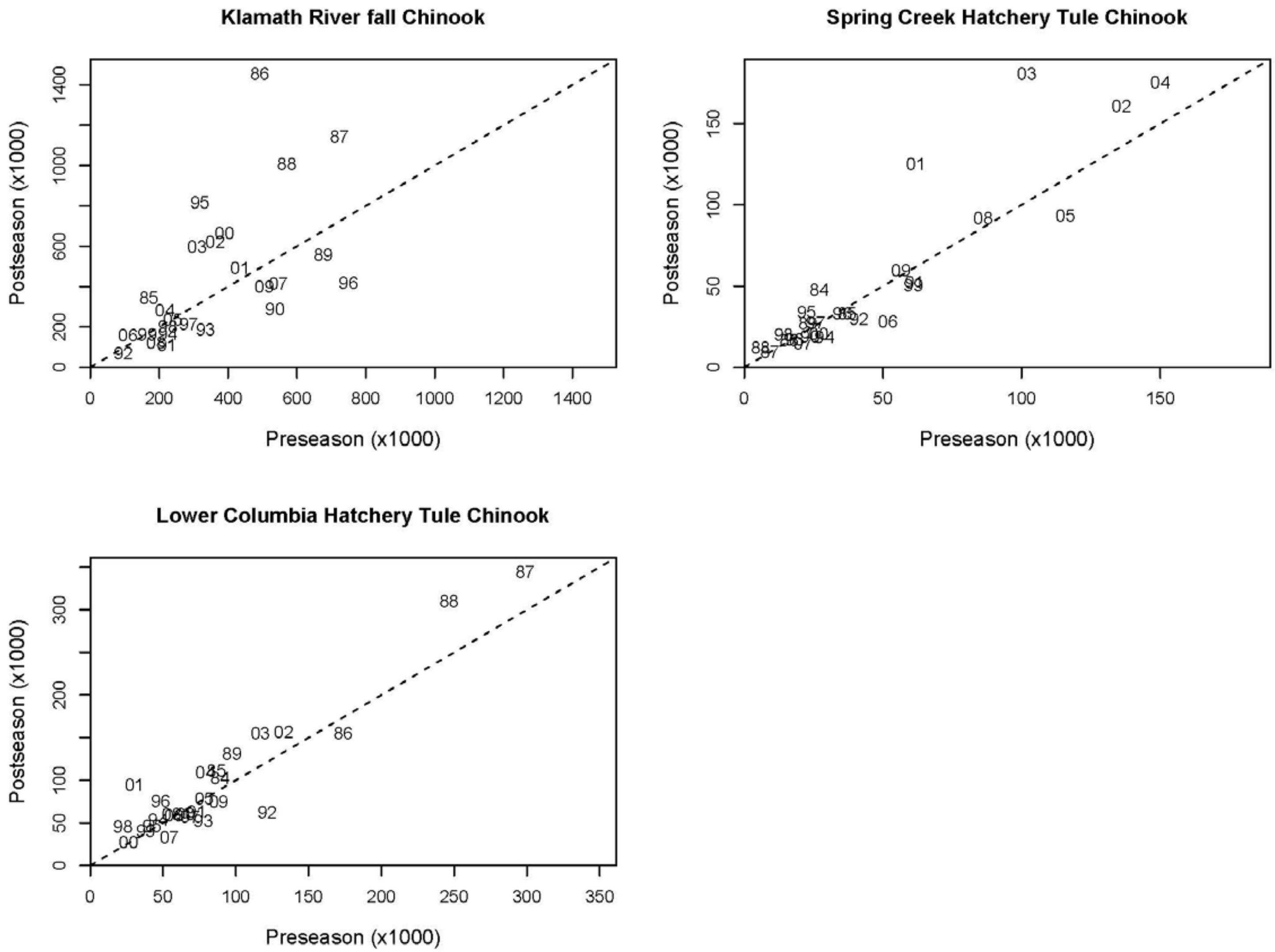

FIGURE I-1. Selected preseason vs. postseason forecasts for Chinook stocks with significant contribution to Council area fisheries.

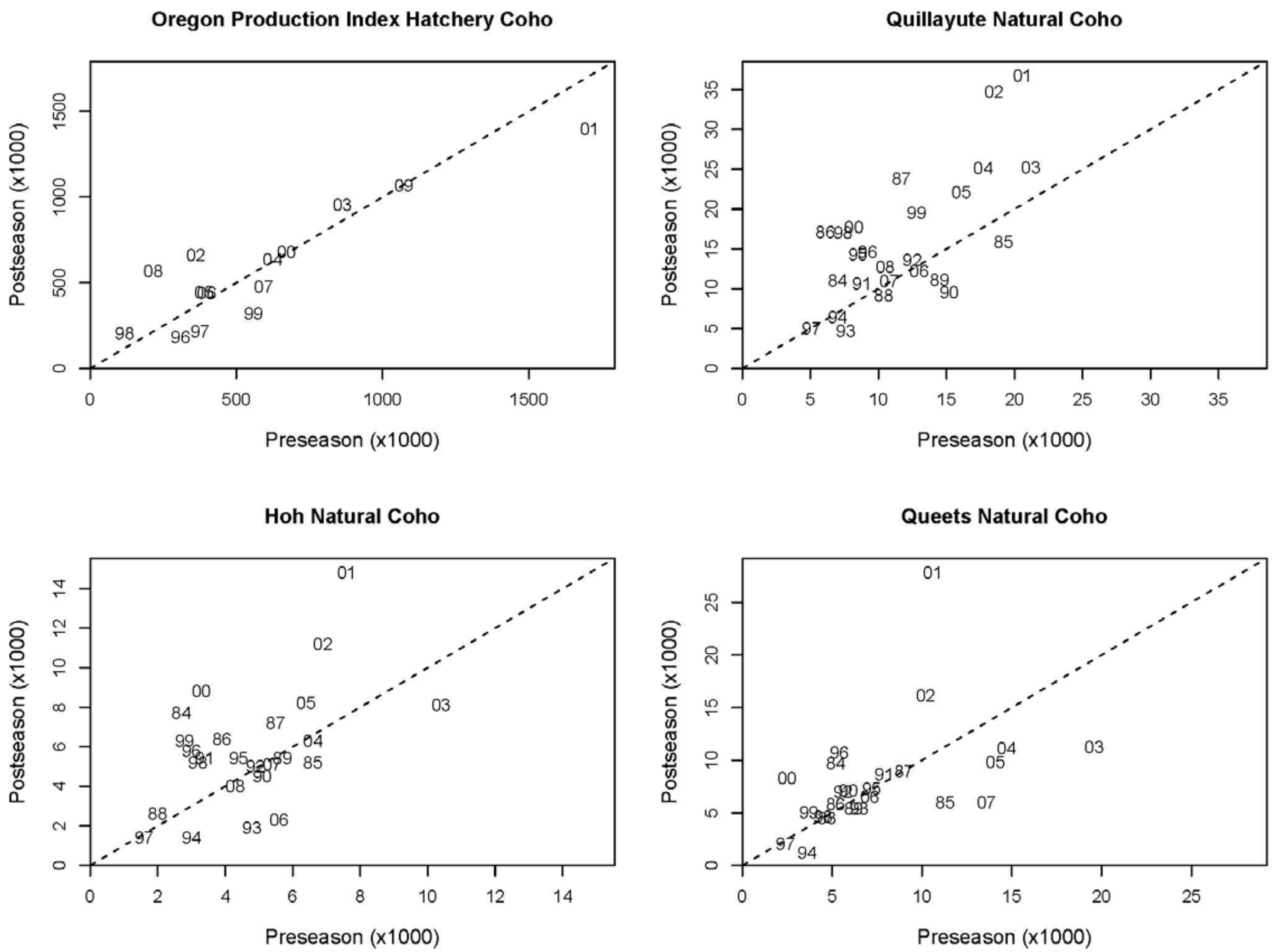

FIGURE I-2a. Selected preseason vs. postseason forecasts for coho stocks with significant contribution to Council area fisheries.

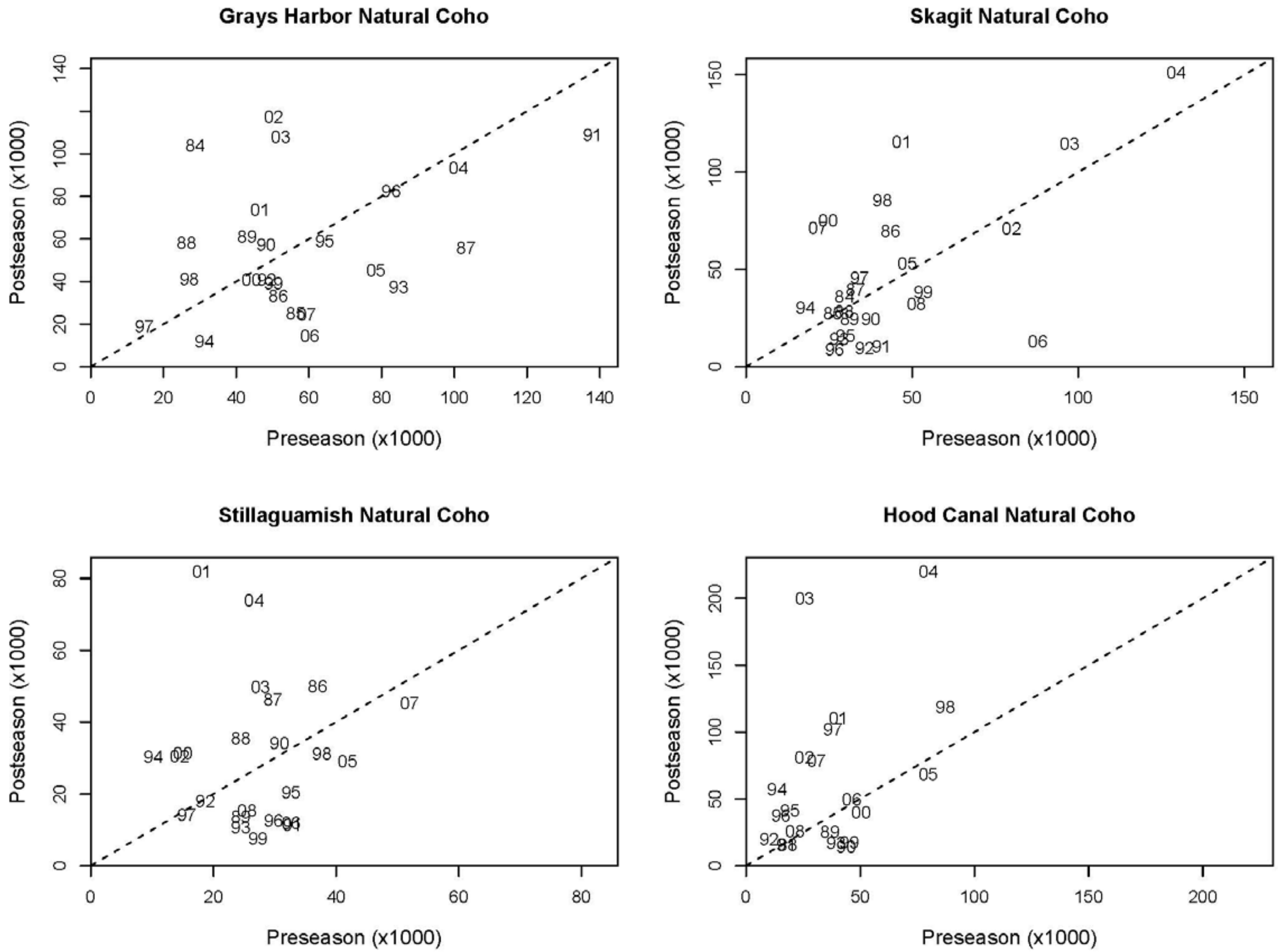

FIGURE I-2b. Selected preseason vs. postseason forecasts for coho stocks with significant contribution to Council area fisheries.

CHAPTER II - CHINOOK SALMON ASSESSMENT

CHINOOK STOCKS SOUTH OF CAPE FALCON

SACRAMENTO RIVER FALL CHINOOK SALMON

Predictor Description

The Council's Salmon FMP sets the escapement goal for SRFC as a range from 122,000 to 180,000 hatchery and natural adults. This stock comprises a large proportion of the Chinook spawners returning to Central Valley streams and hatcheries. The Sacramento Index (SI) is the sum of (1) SRFC ocean fishery harvest south of Cape Falcon between September 1 and August 31, (2) SRFC impacts from non-retention ocean fisheries when they occur, (3) the recreational harvest of SRFC in the Sacramento River Basin, and (4) the SRFC adult spawner escapement (Table II-1, Figure II-1). The SI harvest index is the ocean harvest of SRFC landed south of Cape Falcon divided by the SI, and has varied significantly since 1983 (Table II-1). Since 1990, the SI harvest index has generally declined over time. In 2009, owing to the closure of nearly all ocean Chinook fisheries south of Cape Falcon, the SI harvest index was less than one percent.

The STT based its forecast of the SI on a zero-intercept linear model relating the previous year (*t*-1) SRFC jack escapement to the SI in year *t* (Figure II-2). The zero-intercept linear model was used again in 2010 since the very low jack escapement in 2007 and 2008 suggests that age-4 and older carryover would be minimal. The SI predictor for 2010 includes all data since 1990, while the SI forecasts in 2008 and 2009 excluded the 2005 data point due to concerns over the excessive influence of this data point on the predictor. Justification for including the 2005 data point for the 2010 SI forecast is presented in Appendix D.

In addition to the mean SI predictor model, 95 percent prediction intervals for the SI are displayed in Figure II-2. To estimate prediction intervals, errors in the zero-intercept linear model were assumed to be additive and normally distributed. The interpretation of this interval is that a single future observation would be expected to be contained within this interval with 95 percent probability. The additive error structure of this model results in the lower bound of the prediction interval including zero for SI forecasts made at low jack escapement levels. While this may be somewhat unrealistic (one would expect a nonzero SI in year *t* to result from a nonzero jack escapement in year *t*-1), the STT concludes that the error structure used for this model best approximates the true uncertainty in this forecast at the current time.

Predictor Performance

In 2009 the SI preseason forecast of 122,196 was 3.1 times its postseason value of 39,805.

2010 Stock Status

A total of 9,216 SRFC jacks were estimated to have escaped to Sacramento River basin hatcheries and natural spawning areas in 2009. The resulting 2010 SI forecast is 245,483 adult SRFC (Figure II-2). For the 2010 SI forecast, the upper bound of the 95 percent prediction interval is 532,657, and the lower bound is zero.

Evaluation of 2009 Regulations on 2010 Stock Abundance

A repeat of 2009 regulations, consisting of a short recreational Chinook fishery in the KMZ, coho-only fisheries in much of Oregon, and a closure of Sacramento River basin fall run Chinook fisheries, would be expected to result in a SRFC escapement of 245,107, which is above the 122,000 to 180,000 adult escapement goal range.

KLAMATH RIVER FALL CHINOOK

Predictor Description

For Klamath River fall Chinook, linear regressions are used to relate September 1 ocean abundance estimates of age-3, age-4, and age-5 fish to that year's river run size estimates of age-2, age-3, and age-4 fish, respectively (Table II-2). Historical abundance estimates were derived from a cohort analysis of CWT information (brood years 1979-2005). The y-intercept of the regressions is constrained to zero, which gives the biologically reasonable expectation that a river run size of zero predicts an ocean abundance remainder of zero for the same cohort. The abundance of age-2 fish is not forecasted because no precursor to age-2 fish of that brood is available. Ocean fisheries harvest small numbers of age-2 KRFC.

Predictor Performance

Since 1985, the preseason ocean abundance forecasts for age-3 fish have ranged from 0.33 to 2.72 times the postseason estimates; for age-4 fish from 0.47 to 2.60 times the postseason estimates; and for the adult stock as a whole from 0.34 to 2.03 times the postseason estimates (Table II-3). The September 1, 2008 age-3 forecast (474,900) was 1.29 times its postseason estimate (368,252). The age-4 forecast (25,200) was 1.09 times its postseason estimate (23,029); and the age-5 forecast (5,600) was 0.79 times its postseason estimate (7,066) (Table II-3).

Management of KRFC harvest since 1986 has attempted to achieve specific harvest rates on fully-vulnerable age-4 and age-5 fish in ocean and river fisheries (Table II-4). The Council has used a combination of quotas and time/area restrictions in ocean fisheries in an attempt to meet the harvest rate objective set each year. Since 1992, fisheries have been managed to achieve 50/50 allocation between tribal and non-tribal fisheries. Tribal and recreational river fisheries have been managed on the basis of adult Chinook quotas.

The Council's FMP conservation objective for KRFC (Amendment 9) permits an average natural spawner reduction rate via fisheries of no more than 0.67, with a minimum escapement of 35,000 natural spawning adults. The plan allows for any ocean and river harvest allocation that meets the spawner reduction rate constraint, provided it also meets the minimum escapement goal. The regulations adopted in 2009 were expected to result in 40,700 natural area spawning adults and an age-4 ocean harvest rate of less than one tenth of one percent. Postseason estimates of these quantities were 44,589 natural area adult spawners and an age-4 ocean harvest rate of zero (Table II-5).

2010 Stock Status

The forecast September 1, 2009 (preseason) ocean abundance of KRFC is 223,400 age-3 fish, the age-4 forecast is 106,300, and the age-5 forecast is 1,800 fish.

Late-season ocean fisheries in 2009 (September through November) were estimated to have harvested zero age-3, 77 age-4, and zero age-5 KRFC. This harvest will be deducted from the ocean fishery's allocation in determining the 2010 allowable ocean harvest.

Evaluation of 2009 Regulations on 2010 Stock Abundance

A repeat of 2009 fishery regulations, which consisted of a ten day recreational season in the KMZ (three days in August, seven days in September), a river recreational harvest quota of 30,800, and a tribal allocation of 50 percent (of the overall adult harvest), would be expected to result in 41,800 natural area adult spawners. This projection exceeds the spawner floor and the Council objective of targeting no less than 40,700 natural area adult spawners while KRFC is subject to an Overfishing Concern. The forecast age-4 ocean harvest rate of less than one tenth of one percent meets the NMFS ESA consultation standard for California Coastal Chinook. If the ocean fisheries (recreational and commercial) were closed from January through August 2010 between Cape Falcon and Point Sur, and the Klamath River fisheries (tribal and recreational) were closed in 2010, the expected number of natural area adult spawners would be 86,100.

Amendment 15 to the Salmon FMP (implemented March 26, 2008) provides for potential limited harvest of KRFC in ocean salmon fisheries during years that might otherwise be closed due to a projected shortfall in meeting the 35,000 natural spawner conservation objective, as long as this would not jeopardize the long term capacity of the stock to produce maximum sustainable yield on continuing basis. In 2010, there is no basis for invoking *de minimis* fishing under Amendment 15 because KRFC is not projected to fall short of the 35,000 floor. The Council recommended a target natural spawning escapement of 40,700 adult KRFC until the Overfishing Concern is ended, and when implementing *de minimis* fisheries during this period, provide for an age-4 ocean impact rate of no more than 10 percent when preseason stock abundance forecasts result in pre-fishing spawning escapement projections of less than about 54,000. Because the KRFC projected escapement absent fishing is greater than 54,000, Amendment 15 would not apply.

OTHER CALIFORNIA COASTAL CHINOOK STOCKS

Other California coastal streams that support fall Chinook stocks which contribute to ocean fisheries off Oregon and California, include the Smith, Little, Mad, Eel, and Mattole rivers, and Redwood Creek. Except for the Smith River, these stocks are included in the California coastal Chinook ESU, which is listed as threatened under the ESA. Current information is insufficient to forecast the ocean abundance of these stocks, however, the NMFS ESA consultation standard restricts the Klamath River fall Chinook age-4 ocean harvest rate to no more than 16.0 percent to limit impacts on these stocks. As indicated in the previous section, the postseason estimate of this rate for 2009 is zero, with a preseason forecast of less than one-tenth of one percent based on 2009 management measures. If the ocean fisheries were closed from January through August 2010 between Cape Falcon and Point Sur, the expected age-4 ocean harvest rate for 2010 would be less than one-tenth of one percent (77 age-4 KRFC were harvested during the September through November 2009 period).

OREGON COAST CHINOOK STOCKS

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

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

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

South/Local Migrating Chinook (SOC group)

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

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

Umpqua and Rogue spring Chinook contribute to ocean fisheries primarily as age-3 fish. Mature Chinook enter the rivers primarily during April and May and generally prior to annual ocean fisheries. Quantitative abundance predictions are not made for these stocks.

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

Predictor Description and 2010 Stock Status for NOC and MOC Groups

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

Natural spawner escapement is assessed yearly from the Nehalem through Sixes rivers. Peak spawning counts of adults are obtained from standard index areas on these rivers and monitored to assess stock trends (*Review of 2009 Ocean Salmon Fisheries*, Chapter II, Table II-4 and Figure II-3). Natural fall Chinook stocks from both the NOC and MOC dominate production from this subgroup. Also present in lesser numbers are naturally-produced spring Chinook stocks from several rivers, and hatchery fall and/or spring Chinook released in the Trask, Nestucca, Salmon, Alsea, and Elk rivers.

Basin-specific forecasts constitute the overall aggregate forecasts and are derived in conjunction with annual PSC Chinook model input and calibration activities; however they were not available at publication time.

North Oregon Coast

Since 1977, the Salmon River Hatchery production has been CWT'd for use primarily as a PSC indicator stock for the NOC stock component. Because these fish are primarily harvested in fisheries north of the Council management area, the STT has not reviewed the procedure by which this indicator stock is used in estimating annual stock status. The annual spawner counts decreased from 2002 through 2008 despite excellent parental escapements indices in 2001 to 2004. The 2009 spawner counts were a 53 percent increase from 2008 (*Review of 2009 Ocean Salmon Fisheries*, Appendix B, Table B-11). The 2010 NOC stock abundance is expected to be greater than the 2009 abundance.

Based on the density index of total spawners, the generalized expectation for NOC stocks in 2010 is above recent years average abundance. Specifically, the 2009 spawner density in standard survey areas for the NOC averaged 60 spawners per mile, the lower bound of the FMP aggregate goal of 60 to 90 spawners per mile.

Mid Oregon Coast

Since 1977, the Elk River Hatchery production has been CWT'd for potential use as a PSC indicator stock for the MOC stock aggregate. Age specific ocean abundance forecasts for 2010 are not currently available, but are being developed. The STT has not undertaken a review of the methods used by Oregon Department of Fish and Wildlife (ODFW) staff in developing these abundance forecasts.

The annual spawner counts have been decreasing since 2004 despite excellent parental escapements indices in 2001 to 2004 (*Review of 2009 Ocean Salmon Fisheries*, Appendix B, Table B-11). The 2009 MOC average spawner per mile from standard survey areas was 68 adult spawners per mile, an improvement over the low escapements seen in the previous two years (*Review of 2009 Ocean Salmon Fisheries*, Appendix B, Table B-11). Fall Chinook escapement goals are currently under development for the South Umpqua and Coquille basins of the MOC.

Predictor Description and 2010 Stock Status for South/Local Migrating Chinook

Quantitative abundance predictions are not made for all of these stocks, although an abundance index for Rogue River fall Chinook has been developed. General trends in stock abundance for SOC Chinook stocks are assessed through escapement indices (*Review of 2009 Ocean Salmon Fisheries*, Chapter II, Table II-4 and Figure II-3).

Carcass recoveries in Rogue River index surveys covering a large proportion of the total spawning area were available for 1977-2004. Using Klamath Ocean Harvest Model (KOHM) methodology, these carcass numbers, allocated into age-classes from scale data, were used to estimate the Rogue Ocean Population Index (ROPI) for age-3 to age-5 fish. A linear regression was developed using the escapement estimates (all ages) in year t based on seining at Huntley Park (1976-2004) to predict the ROPI in year t + 1 (1977-2005). The 2009 Huntley Park escapement estimate and the resulting 2010 ROPI forecast was then scaled to the historical carcass survey-based ROPI. The 2010 ROPI forecast (17,300) consisting of age-3 (9,800), age-4 (6,500) and age-5 (1,100) are based on the average annual age-class strengths of the carcass-based ROPIs from 1991-2005. This data-set was truncated at 1991 because significant harvest restrictions that could affect age structure began that year. The 2010 ROPI is slightly higher than the recent three-year average of 11,000 (Table II-6).

Other Stocks

Fall Chinook escapement goals and forecasts are currently under development for stocks south of the Elk River. These stocks are minor contributors to general season mixed stock ocean fisheries. Standard fall Chinook spawning index escapement data were available for the smaller SOC rivers (Winchuck, Chetco, and Pistol rivers). The average spawner per mile from standard survey areas was 61 adult spawners per mile, the highest observed since 2004 (*Review of 2009 Ocean Salmon Fisheries*, Appendix B, Table B-8).

Evaluation of 2009 Regulations on 2010 Stock Abundance

The FMP conservation objective for Oregon coast Chinook is 150,000 to 200,000 natural adult spawners, and attainment of this goal is assessed using peak spawner counts of 60 to 90 fish per mile in nine standard index reaches. The aggregate stock had been meeting or exceeding this goal since 1984 and had been generally increasing until 2003. Beginning in 2004 the escapement had been declining until 2009.

In 2007 and 2008, the stock failed to meet its goal for the first time since 1983. In 2009 the goal was achieved with 61 fish per mile. No forecast is available for this stock, but given recent trends, it seems likely that it would meet its goal again in 2010 under 2009 fishing seasons.

CHINOOK STOCKS NORTH OF CAPE FALCON

COLUMBIA RIVER FALL CHINOOK

Predictor Description and Past Performance

Columbia River fall Chinook stocks typically form the largest contributing stock group to Council Chinook fisheries north of Cape Falcon. Abundance of these stocks is a major factor in determining impacts of fisheries on weak natural stocks critical to Council area management. Abundance predictions are made for five major fall stock units characterized as being hatchery or natural production, and originating above or below Bonneville Dam. The upriver brights (URB) and lower river wild (LRW) are primarily naturally-produced stocks. The lower river hatchery (LRH) tule, Spring Creek Hatchery (SCH) tule, and mid-Columbia brights (MCB) are primarily hatchery-produced stocks. The MCB include the lower river bright (LRB) stock as a small naturally-produced component. LRB spawn in the mainstem Columbia River near Beacon Rock and are believed to have originated from MCB hatchery strays. The tule stocks generally mature at an earlier age than the bright fall stocks and do not migrate as far north. Minor stocks include the Select Area brights (SAB), a Big Creek Hatchery stock originally from Rogue River stock.

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

The 2010 return of each fall Chinook stock group is forecasted using relationships between successive age groups within a cohort. The database for these relationships was constructed by combining age-specific estimates of escapement and inriver fishery catches for years since 1964 (except for MCB, which started in 1980). Typically, only the more recent broods are used in the current predictions. Fall Chinook stock identification in the Columbia River mixed stock fisheries is determined by sampling catch and escapement for CWTs and visual stock identification (VSI). Age composition estimates are based on CWT data and scale reading of fishery and escapement samples, where available. These stock and age data for Columbia River fall Chinook are the basis for the return data presented in the *Review of 2009 Ocean Salmon Fisheries* (Appendix B, Tables B-15 through B-20). The 2009 returns for the five fall Chinook stocks listed in this report may differ somewhat from those provided in the *Review of 2009 Ocean Salmon Fisheries*, since ocean escapement estimates may have been updated after that report was printed.

Performance of the preliminary inriver run size estimation methodology can be assessed, in part, by examining the differences between preseason forecasts and postseason estimates (Table II-7). The recent 10-year average March preliminary preseason forecasts as a percentage of the postseason estimates for the URB, LRW, LRH, SCH, and MCB are 1.03, 1.03, 0.93, 1.04, and 0.97 respectively. The only March preliminary preseason forecast to show a bias was LRH, which was under predicted between 1994 and 2006; however since 2005, the prediction record has improved substantially. The other four stocks have been both over and under predicted.

Ocean escapement forecasts developed for the March Council meeting do not take into account variations in marine harvest. The STT combines the initial inriver run size (ocean escapement; Table II-7) with expected Council area fishery harvest levels and stock distribution patterns to produce adjusted ocean escapement forecasts based on the proposed ocean fishing regulations. These revised forecasts are available at the end of the Council preseason planning process in April and should provide a more accurate prediction of ocean escapement.

2010 Stock Status

The preliminary forecast for 2010 URB fall Chinook ocean escapement is 310,800 adults, about 147 percent of last year's return and about 128 percent of the recent 10-year average of 242,690.

No preseason forecast for 2010 ocean escapement of ESA-listed Snake River wild fall Chinook is currently available. However, the Columbia River TAC is expected to develop a run size estimate for this stock prior to the April Council meeting.

Ocean escapement of LRW fall Chinook in 2010 is forecast at 9,700 adults, about 129 percent of last year's forecast, and about 63 percent of the recent 10-year average return of 15,290. The forecast is greater than last year's actual return and the spawning escapement goal of 5,700 in the North Fork Lewis River may be achieved this year depending on fishing regulations.

The preliminary forecast for 2010 ocean escapement of LRH fall Chinook is for a return of 90,600 adults, about 118 percent of last year's return and 107 percent of the recent 10-year average of 84,920.

The preliminary ocean escapement forecast of SCH fall Chinook in 2010 is the largest forecast on record at 169,000 adults, about 345 percent of last year's return and 180 percent of the 10-year average of 93,870.

The preliminary forecast for the 2010 ocean escapement of MCB fall Chinook is 72,600 adults, about 99 percent of last year's return and about 84 percent of the recent 10-year average of 86,390.

Evaluation of 2009 Regulations on 2010 Stock Abundance

Applying 2009 regulations to the forecasted 2010 abundance of Columbia River fall Chinook would result in ocean escapements meeting spawning escapement goals for all major stocks. Compared to actual 2009 returns, the 2010 ocean escapement forecasts are higher for all stocks except MCB. Compared to 2009 forecast ocean escapement, the 2010 forecasts are higher for all major stocks except MCB.

WASHINGTON COAST CHINOOK

Predictor Description and Past Performance

Council fisheries have only minor impacts on Washington coast Chinook stocks, and except for Willapa Bay Chinook, Hoh River Chinook and Quillayute River Chinook, forecast data is unavailable in time for publication of this report; therefore, preseason abundance estimates are not presented. However, abundance estimates are provided for Washington Coastal stocks in subsequent preseason fishery impact assessment reports prepared by the STT.

2010 Stock Status

The 2010 Willapa Bay hatchery fall Chinook ocean escapement forecast is 31,135, which is lower than the 2009 prediction of 34,817. The 2010 natural fall Chinook ocean escapement forecast is 2,023, about the same as last year's prediction of 1,951, but still less than the WDFW spawning escapement goal of 4,350.

For the Hoh River, the 2010 natural spring/summer Chinook ocean escapement forecast is 814, below the FMP conservation objective of 900. The natural fall Chinook forecast is 3,250, above the FMP conservation objective of 1,200.

The 2010 Quillayute hatchery spring Chinook ocean escapement forecast is 1,477 and the natural summer/fall Chinook forecast is 7,468 (1,184 summer, 6,284 fall). The FMP conservation objectives are spawning escapements of 1,200 summer Chinook and 3,000 fall Chinook.

PUGET SOUND CHINOOK

Run-size expectations for various Puget Sound stock management units are listed in Table I-1. A comparison of preseason and postseason forecasts for recent years is detailed in Table II-8. The STT has not undertaken a review of the methods employed by state and tribal staffs in preparing these abundance forecasts. Methodologies for estimates are described in the annual Puget Sound management reports (starting in 1993, reports are available by Puget Sound management unit, not by individual species). Forecasts for Puget Sound stocks generally assume production is dominated by age-4 adults. Puget Sound Chinook were listed as threatened under the ESA in March 1999. Southern U.S. fisheries that impact Puget Sound Chinook are constrained by terms of a Resource Management Plan (RMP), and are exempted from ESA Section 9 take prohibitions under Limit 6 of the 4(d) rule.

2010 Stock Status

Spring Chinook

Spring Chinook originating in Puget Sound are expected to remain depressed. Runs in the Nooksack, Skagit, White, and Dungeness rivers are of particular concern.

Summer/Fall Chinook

The 2010 preliminary forecast for Puget Sound summer/fall stocks is for a return of 225,664 Chinook, slightly higher than the 2009 preseason forecast of 222,371. The 2010 natural Chinook return forecast of 42,981 (includes supplemental category forecasts) is lower than the 2009 forecast of 56,568.

Since ESA listing and development of the RMP, fishery management for Puget Sound Chinook has changed from an escapement goal basis to the use of stock specific exploitation rates and “critical abundance thresholds.” This new approach is evaluated on an annual basis through the RMP.

Evaluation of 2009 Regulations on 2010 Stock Abundance

Council fisheries north of Cape Falcon have only a minor impact on most stocks that originate in Washington coastal and Puget Sound rivers. These stocks have northerly marine distribution patterns and are therefore impacted primarily by Canadian and Alaskan fisheries. An evaluation of 2009 Council area regulations on projected 2010 abundance would not provide a useful comparison of fishery impacts in relation to conservation objectives.

SELECTIVE FISHERY CONSIDERATIONS FOR CHINOOK

As the North of Falcon region has moved forward with mass marking of hatchery Chinook salmon stocks, selective fishing options for non-Indian fisheries are under consideration in the ocean area from Cape Falcon, Oregon to the U. S./Canada border. Mark rates for these areas observed in the ocean fisheries last year were in the 40 to 50 percent range, but not all hatchery Chinook releases were mass marked. Based on preseason abundance forecasts, the expected mark rate for Chinook in this area for 2010 should be equal to or greater than it was in 2009.

TABLE II-1. Harvest and abundance indices for Sacramento River fall Chinook (SRFC) in thousands of fish.

	SRFC Ocean Harvest South of Cape Falcon[a/]			River Harvest	Spawning Escapement			Sacramento	SI Harvest
Year	Troll	Sport	Total	Fall	Natural	Hatchery	Total	Index (SI)[b/]	Index (%)[c/]
1983	246.1	86.1	332.1	18.1	91.4	18.8	110.2	460.5	72
1984	266.1	87.0	353.1	26.1	119.5	39.5	159.0	538.2	66
1985	355.4	158.9	514.3	39.3	209.5	29.9	239.3	792.9	65
1986	618.9	137.5	756.5	39.4	216.3	23.8	240.1	1,036.0	73
1987	686.1	173.2	859.2	32.0	174.8	20.3	195.1	1,086.3	79
1988	1,162.6	188.3	1,350.8	37.3	198.0	29.5	227.5	1,615.6	84
1989	611.7	159.2	770.8	25.0	126.7	25.9	152.6	948.4	81
1990	514.2	150.5	664.7	17.2	83.2	21.9	105.1	787.0	84
1991	298.8	90.2	389.0	26.0 [d/]	91.0	27.5	118.4	533.4	73
1992	232.4	70.1	302.6	13.3 [d/]	58.3	22.1	80.3	396.3	76
1993	342.4	115.3	457.8	27.7 [d/]	110.6	26.8	137.4	622.8	73
1994	303.2	164.7	468.0	28.9 [d/]	133.0	32.6	165.6	662.4	71
1995	735.7	387.9	1,123.6	48.5	253.5	41.8	295.3	1,467.4	77
1996	426.7	157.0	583.7	49.5	267.1	34.6	301.6	934.8	62
1997	579.7	210.2	790.0	56.6	279.6	65.2	344.8	1,191.4	66
1998	292.8	113.9	406.7	69.8 [d/]	168.1	77.8	245.9	722.4	56
1999	308.3	76.6	384.9	68.9 [d/]	353.7	46.1	399.8	853.6	45
2000	431.3	153.2	584.5	59.5 [d/]	369.2	48.3	417.5	1,061.5	55
2001	284.4	93.4	377.9	97.9	537.4	59.4	596.8	1,072.6	35
2002	447.4	184.0	631.4	89.2 [d/]	682.7	87.2	769.9	1,490.5	42
2003	501.6	106.5	608.0	85.8	413.4	109.6	523.0	1,216.8	50
2004	621.5	212.6	834.1	47.1	203.5	83.4	286.9	1,168.0	71
2005	367.6	127.0	494.6	65.0	210.7	185.3	396.0	955.6	52
2006	149.9	107.6	257.5	44.2	189.3	79.9	269.2	570.9	45
2007	120.5	32.3	152.7	14.3 [d/]	66.6	21.4	87.9	255.0	60
2008	3.2	0.9	4.1	0.1 [d/]	45.9	18.5	64.5	68.7	6
2009[e/]	0.0	0.2	0.2	0.0 [d/]	22.1	17.4	39.5	39.8	0

a/ Ocean harvest for the period September 1 (t-1) through August 31 (t).

b/ Total ocean harvest south of Cape Falcon plus Sacramento River Basin sport harvest plus total spawning escapement of SRFC. SRFC impacts from non-retention fisheries added when such fisheries occur.

c/ Total ocean harvest of SRFC as a percent of the SI.

d/ Estimates derived from CDFG Sacramento River Basin angler survey. Estimates not marked with a footnote are inferred from escapement data and the mean river harvest rate estimate.

e/ Preliminary.

TABLE II-2. Klamath River fall Chinook ocean abundance (thousands), harvest rate, and river run size estimates (thousands) by age.

	Ocean Abundance Sept. 1 (t-1)			Annual Ocean Harvest Rate Sept. 1 (t-1) - Aug. 31 (t)		Klamath Basin River Run (t)				
Year (t)	Age-3	Age-4	Total	Age-3	Age-4	Age-2	Age-3	Age-4	Age-5	Total Adults
1981	493.2	57.0	550.2	0.21	0.53	28.2	64.1	14.4	1.8	80.3
1982	561.1	133.4	694.5	0.30	0.52	39.4	30.1	33.9	2.6	66.6
1983	313.4	114.2	427.6	0.19	0.60	3.8	35.9	20.7	0.9	57.5
1984	157.3	82.8	240.1	0.08	0.38	8.3	21.7	24.4	1.1	47.2
1985	376.4	56.9	433.3	0.11	0.24	69.4	32.9	25.7	5.8	64.4
1986	1,304.4	141.7	1,446.1	0.18	0.46	44.6	162.9	29.8	2.3	195.0
1987	781.4	341.9	1,123.2	0.16	0.43	19.1	89.7	112.6	6.8	209.1
1988	756.3	234.8	991.0	0.20	0.39	24.1	101.2	86.5	3.9	191.6
1989	369.8	177.2	547.1	0.15	0.36	9.1	50.4	69.6	4.3	124.3
1990	176.1	104.0	280.1	0.30	0.55	4.4	11.6	22.9	1.3	35.9
1991	69.4	37.2	106.6	0.03	0.18	1.8	10.0	21.6	1.1	32.7
1992	39.5	28.2	67.7	0.02	0.07	13.7	6.9	18.8	1.0	26.7
1993	168.5	15.0	183.5	0.05	0.16	7.6	48.3	8.2	0.7	57.2
1994	119.9	41.7	161.6	0.03	0.09	14.4	37.0	26.0	1.0	64.0
1995	784.3	28.7	813.0	0.04	0.14	22.8	201.9	18.3	2.6	222.8
1996	192.3	225.5	417.8	0.05	0.16	9.5	38.8	136.7	0.3	175.8
1997	140.2	62.8	203.0	0.01	0.06	8.0	35.0	44.2	4.6	83.7
1998	154.8	44.7	199.5	0.00	0.09	4.6	59.2	29.7	1.7	90.6
1999	129.1	30.5	159.5	0.02	0.09	19.2	29.2	20.5	1.3	51.0
2000	617.2	44.2	661.4	0.06	0.10	10.2	187.1	30.5	0.5	218.1
2001	356.1	133.8	489.9	0.03	0.09	11.3	99.1	88.2	0.2	187.4
2002	513.6	98.9	612.5	0.02	0.15	9.2	94.6	62.5	3.7	160.8
2003	400.3	192.2	592.5	0.08	0.21	3.8	94.3	96.8	0.9	191.9
2004	159.6	105.1	264.6	0.12	0.34	9.7	33.2	40.7	5.3	79.2
2005	190.0	38.1	228.1	0.02	0.20	2.3	43.8	17.5	3.9	65.2
2006	90.6	63.4	154.0	0.01	0.10	26.9	18.5	41.6	1.3	61.4
2007	377.0	33.6	410.6	0.06	0.21	1.7	113.7	16.8	1.6	132.1
2008	71.3[a/]	81.4	152.7	0.00[a/]	0.10	25.2	18.6	50.2	1.7	70.6
2009	368.3[b/]	23.0[a/]	391.3	NA[c/]	0.00[a/]	11.9	78.7	16.4	5.7	100.7

a/ Preliminary: incomplete cohort data (age-5 unavailable).
b/ Preliminary: incomplete cohort data (age-4 and age-5 unavailable).
c/ Not estimated: incomplete cohort data (age-4 and age-5 unavailable).

TABLE II-3. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 1 of 4)

Year (t)	Preseason Forecast[a/] Sept. 1 (t-1)	Postseason Estimate Sept. 1 (t-1)	Pre/Postseason
Age-3			
1985	113,000	276,000	0.41
1986	426,000[b/]	1,304,419	0.33
1987	511,800	781,350	0.66
1988	370,800	756,261	0.49
1989	450,600	369,828	1.22
1990	479,000	176,133	2.72
1991	176,200	69,442	2.54
1992	50,000	39,502	1.27
1993	294,400	168,473	1.75
1994	138,000	119,913	1.15
1995	269,000	784,279	0.34
1996	479,800	192,271	2.50
1997	224,600	140,153	1.60
1998	176,000	154,799	1.14
1999	84,800	129,066	0.66
2000	349,600	617,189	0.57
2001	187,200	356,128	0.53
2002	209,000	513,583	0.41
2003	171,300	400,304	0.43
2004	72,100	159,566	0.45
2005	185,700	189,978	0.98
2006	44,100	90,605	0.49
2007	515,400	377,029	1.37
2008	31,600	71,259	0.44
2009[c/]	474,900	368,252	1.29
2010	223,400	-	-

TABLE II-3. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 2 of 4)

Year (t)	Preseason Forecast[a/] Sept. 1 (t-1)	Postseason Estimate Sept. 1 (t-1)	Pre/Postseason
		Age-4	
1985	56,875	57,500	0.99
1986	66,250	141,692	0.47
1987	206,125	341,875	0.60
1988	186,375	234,779	0.79
1989	215,500	177,245	1.22
1990	50,125	103,951	0.48
1991	44,625	37,172	1.20
1992	44,750	28,181	1.59
1993	39,125	15,037	2.60
1994	86,125	41,736	2.06
1995	47,000	28,725	1.64
1996	268,500	225,526	1.19
1997	53,875	62,820	0.86
1998	46,000	44,733	1.03
1999	78,750	30,456	2.59
2000	38,875	44,176	0.88
2001	247,000	133,801	1.85
2002	143,800	98,927	1.45
2003	132,400	192,173	0.69
2004	134,500	105,051	1.28
2005	48,900	38,079	1.28
2006	63,700	63,381	1.01
2007	26,100	33,614	0.78
2008	157,200	81,410	1.93
2009[c/]	25,200	23,029	1.09
2010	106,300	-	-

TABLE II-3. Comparisons of preseason forecasts and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 3 of 4)

Year (t)	Preseason Forecast[a/] Sept. 1 (t-1)	Postseason Estimate Sept. 1 (t-1)	Pre/Postseason
		Age-5	
1985	NA	11,113	NA
1986	NA	6,367	NA
1987	5,250	19,414	0.27
1988	13,250	14,632	0.91
1989	10,125	9,612	1.05
1990	7,625	7,767	0.98
1991	1,500	2,774	0.54
1992	1,250	1,444	0.87
1993	1,125	1,759	0.64
1994	500	1,468	0.34
1995	2,000	3,805	0.53
1996	1,125	787	1.43
1997	7,875	8,859	0.89
1998	3,250	2,382	1.36
1999	2,000	2,106	0.95
2000	1,375	1,051	1.31
2001	1,250	258	4.84
2002	9,700	6,933	1.40
2003	6,500	1,915	3.39
2004	9,700	17,170	0.56
2005	5,200	6,857	0.76
2006	2,200	5,236	0.42
2007	4,700	2,909	1.62
2008	1,900	2,900	0.66
2009[c/]	5,600	7,066	0.79
2010	1,800	-	-

TABLE II-3. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook. (Page 4 of 4)

Year (t)	Preseason Forecast[a] Sept. 1 (t-1)	Postseason Estimate Sept. 1 (t-1)	Pre/Postseason
		Total Adults	
1985	169,875[d]	344,613	0.49
1986	492,250[d]	1,452,478	0.34
1987	723,175	1,142,639	0.63
1988	570,425	1,005,672	0.57
1989	676,225	556,685	1.21
1990	536,750	287,851	1.86
1991	222,325	109,388	2.03
1992	96,000	69,127	1.39
1993	334,650	185,269	1.81
1994	224,625	163,117	1.38
1995	318,000	816,809	0.39
1996	749,425	418,584	1.79
1997	286,350	211,832	1.35
1998	225,250	201,914	1.12
1999	165,550	161,628	1.02
2000	389,850	662,416	0.59
2001	435,450	490,187	0.89
2002	362,500	619,443	0.59
2003	310,200	594,392	0.52
2004	216,300	281,787	0.77
2005	239,800	234,914	1.02
2006	110,000	159,222	0.69
2007	546,200	413,552	1.32
2008	190,700	155,569	1.23
2009[c]	505,700	398,347	1.27
2010	331,500	-	-

a/ Original preseason forecasts for years 1985-2001 were for May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the assumed May 1 (t) number by the Sept. 1 (t-1) through May 1 (t) survival rate in those years: 0.5 age-3, 0.8 age-4, 0.8 age-5.

b/ A scalar of 0.75 was applied to the jack count to produce the forecast because, (1) most jacks returned to the Trinity River, and (2) the jack count was outside the database range.

c/ Postseason estimates are preliminary.

d/ Does not include age-5 adults.

TABLE II-4. Summary of management objectives and predictor performance for Klamath River fall Chinook.

Year(t)	Preseason Ocean Abundance Forecast[a/] Sept. 1 (t-1)		Postseason Ocean Abundance Estimate Sept. 1 (t-1)		Preseason Age-4 Harvest Rate Forecast[b/]		Postseason Age-4 Harvest Rate Estimate[c/]		Preseason Adult Harvest Forecast		Postseason Adult Harvest Estimate	
	Age-3	Age-4	Age-3	Age-4	Ocean	River	Ocean	River	Ocean	River	Ocean	River
1986	426,000	66,250	1,304,419	141,692	0.28	0.50	0.46	0.67	72,000	37,700	302,309	46,154
1987	511,800	206,125	781,350	341,875	0.28	0.53	0.43	0.44	121,200	78,200	277,193	73,265
1988	370,800	186,375	756,261	234,779	0.31	0.53	0.39	0.52	114,100	65,400	253,905	73,854
1989	450,600	215,500	369,828	177,245	0.30	0.49	0.36	0.70	128,100	67,600	125,117	54,340
1990	479,000	50,125	176,133	103,951	0.30	0.49	0.55	0.36	85,100	31,200	114,786	11,459
1991	176,200	44,625	69,442	37,172	0.13	0.28	0.18	0.45	16,700	12,800	9,871	13,581
1992	50,000	44,750	39,502	28,181	0.06	0.15	0.07	0.27	4,200	4,200	3,140	6,787
1993	294,400	39,125	168,473	15,037	0.12	0.43	0.16	0.49	20,100	22,500	11,355	12,808
1994	138,000	86,125	119,913	41,736	0.07	0.20	0.09	0.29	10,400	14,300	7,961	13,524
1995	269,000	47,000	784,279	28,725	0.07	0.32	0.14	0.19	13,500	18,500	32,230	21,637
1996	479,800	268,500	192,271	225,526	0.17	0.66	0.16	0.39	88,400	129,100	45,147	69,241
1997	224,600	53,875	140,153	62,820	0.10	0.43	0.06	0.26	17,600	26,500	8,656	17,764
1998	176,000	46,000	154,799	44,733	0.07	0.29	0.09	0.30	10,200	14,800	4,891	17,897
1999	84,800	78,750	129,066	30,456	0.10	0.28	0.09	0.45	12,300	18,100	5,116	16,942
2000	349,600	38,875	617,189	44,176	0.11	0.53	0.10	0.25	24,000	32,400	42,048	35,066
2001	187,200	247,000	356,128	133,801	0.14	0.61	0.09	0.29	45,600	105,300	21,747	50,780
2002	209,000	143,800	513,583	98,927	0.13	0.57	0.15	0.26	30,000	70,900	28,891	35,069
2003	171,300	132,400	400,304	192,173	0.16	0.50	0.21	0.28	30,600	52,200	70,670	39,715
2004	72,100	134,500	159,566	105,051	0.15	0.38	0.34	0.48	26,500	35,800	63,885	29,807
2005	185,700	48,900	189,978	38,079	0.08	0.16	0.20	0.19	7,100	9,600	12,825	10,001
2006	44,100	63,700	90,605	63,381	0.11	0.23	0.10	0.18	10,000	10,000	10,400	10,345
2007	515,400	26,100	377,029	33,614	0.16	0.63	0.21	0.56	30,200	51,400	30,238	33,884
2008	31,600	157,200	71,259	81,410	0.02	0.43	0.10	0.38	4,500	49,500	8,681	24,180
2009[d/]	474,900	25,200	368,252	23,029	0.00	0.57	0.00	0.40	100	61,700	64	33,963
2010	223,400	106,300	-	-	-	-	-	-	-	-	-	-

a/ Original preseason forecasts for years 1986-2001 were for May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the May 1 (t) number by the assumed Sept. 1 (t-1) through May 1 (t) survival rate assumed in those years: 0.5 age-3, 0.8 age-4, 0.8 age-5.

b/ Ocean harvest rate forecast is the fraction of the predicted ocean abundance expected to be harvested Sept. 1 (t-1) through August 31(t). River harvest rate forecast is the fraction of the predicted river run expected to be harvested in river fisheries. Original ocean harvest rate forecasts for year (t), 1986-2001, were based on a May 1 (t) ocean abundance denominator; converted to Sept. 1 (t-1) abundance denominator by multiplying former values by 0.8 (the assumed age-4 survival rate between Sept. 1 (t-1) and May 1 (t) in those years).

c/ Ocean harvest rate is the fraction of the postseason ocean abundance harvested Sept. 1 (t-1) through August 31 (t). River harvest rate is the fraction of the river run harvested by river fisheries.

d/ Postseason estimates are preliminary.

TABLE II-5. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 1 of 2)

	Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t))									
	KMZ			North of	South of		Ocean	River Fisheries (t)		
Year (t)	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
					HARVEST (numbers of fish)					
Age-3										
1986	35,632	4,876	40,508	73,776	122,911	196,687	237,195	8,100	18,100	26,200
1987	17,235	5,082	22,317	43,429	56,363	99,792	122,109	11,400	11,400	22,800
1988	15,999	5,165	21,164	24,317	107,971	132,288	153,452	12,500	15,600	28,100
1989	6,456	11,783	18,239	15,315	23,729	39,044	57,283	2,700	900	3,600
1990	81	4,357	4,438	36,578	11,006	47,584	52,022	1,300	1,400	2,700
1991	0	1,022	1,022	343	810	1,153	2,175	2,123	1,277	3,400
1992	0	0	0	972	0	972	972	970	251	1,221
1993	0	822	822	833	6,424	7,257	8,079	5,426	2,917	8,343
1994	42	604	646	0	3,387	3,387	4,033	4,543	965	5,508
1995	0	999	999	12,211	14,808	27,019	28,018	11,840	5,536	17,376
1996	0	0	0	0	9,311	9,311	9,311	12,363	3,661	16,024
1997	0	232	232	620	1,215	1,835	2,067	2,166	2,736	4,902
1998	0	6	6	298	466	764	770	2,231	5,781	8,012
1999	63	180	243	1,262	433	1,695	1,938	4,981	1,748	6,729
2000	404	3,282	3,686	8,603	25,202	33,805	37,491	22,458	4,893	27,351
2001	113	105	218	2,749	6,082	8,831	9,049	17,885	7,294	25,179
2002	220	783	1,003	1,500	9,912	11,412	12,415	11,734	6,258	17,992
2003	173	679	852	1,885	27,310	29,195	30,047	6,996	5,061	12,057
2004	402	971	1,373	9,719	7,331	17,050	18,423	4,679	2,051	6,730
2005	0	568	568	619	2,381	3,000	3,568	4,394	1,641	6,035
2006	0	477	477	32	341	373	850	2,388	13	2,401
2007	770	8,097	8,867	4,192	9,362	13,554	22,421	17,543	5,734	23,277
2008[a/]	0	0	0	0	0	0	0	3,225	608	3,833
2009[a/]	0	64	64	0	0	0	64	19,820	4,655	24,475
Age-4										
1986	7,793	1,120	8,913	23,549	32,112	55,661	64,574	17,000	2,900	19,900
1987	21,736	4,427	26,163	70,645	48,832	119,477	145,640	41,000	8,500	49,500
1988	11,870	3,596	15,466	26,381	50,296	76,677	92,143	38,600	6,200	44,800
1989	6,064	9,735	15,799	32,116	16,608	48,724	64,523	41,000	7,700	48,700
1990	3,997	2,919	6,916	39,627	10,624	50,251	57,167	6,000	2,200	8,200
1991	0	1,001	1,001	1,513	4,135	5,648	6,649	7,593	2,016	9,609
1992	171	55	226	1,781	12	1,793	2,019	4,360	723	5,083
1993	0	0	0	849	1,616	2,465	2,465	3,786	243	4,029
1994	0	1,124	1,124	1,168	1,499	2,667	3,791	6,666	818	7,484
1995	0	242	242	1,879	1,771	3,650	3,892	2,957	480	3,437
1996	773	3,464	4,237	10,336	20,738	31,074	35,311	43,959	9,080	53,039
1997	3	172	175	463	2,994	3,457	3,632	8,734	2,586	11,320
1998	0	105	105	3,942	0	3,942	4,047	7,164	1,822	8,986
1999	15	381	396	1,657	696	2,353	2,749	8,789	494	9,283
2000	117	895	1,012	2,327	1,076	3,403	4,415	6,733	756	7,489
2001	1,312	1,604	2,916	5,819	3,926	9,745	12,661	20,759	4,819	25,578
2002	1,938	827	2,765	2,811	9,416	12,227	14,992	11,929	4,063	15,992
2003	833	918	1,751	7,852	29,995	37,847	39,598	22,754	4,592	27,346
2004	1,421	1,215	2,636	11,504	21,949	33,453	36,089	17,623	1,751	19,374
2005	247	317	564	5,243	1,909	7,152	7,716	3,048	304	3,352
2006	196	725	921	4,192	985	5,177	6,098	7,569	42	7,611
2007	270	2,336	2,606	1,991	2,472	4,463	7,069	8,987	502	9,489
2008	6,378	1,105	7,483	546	113	659	8,142	17,891	1,260	19,151
2009[a/]	0	0	0	0	0	0	0	5,831	696	6,527

TABLE II-5. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 2 of 2)

	Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t))									
	KMZ			North of	South of		Ocean	River Fisheries (t)		
Year (t)	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
					HARVEST RATE[b/]					
Age-3										
1986	0.03	0.00	0.03	0.06	0.09	0.15	0.18	0.05	0.11	0.16
1987	0.02	0.01	0.03	0.06	0.07	0.13	0.16	0.13	0.13	0.25
1988	0.02	0.01	0.03	0.03	0.14	0.17	0.20	0.12	0.15	0.28
1989	0.02	0.03	0.05	0.04	0.06	0.11	0.15	0.05	0.02	0.07
1990	0.00	0.02	0.03	0.21	0.06	0.27	0.30	0.11	0.12	0.23
1991	0.00	0.01	0.01	0.00	0.01	0.02	0.03	0.21	0.13	0.34
1992	0.00	0.00	0.00	0.02	0.00	0.02	0.02	0.14	0.04	0.18
1993	0.00	0.00	0.00	0.00	0.04	0.04	0.05	0.11	0.06	0.17
1994	0.00	0.01	0.01	0.00	0.03	0.03	0.03	0.12	0.03	0.15
1995	0.00	0.00	0.00	0.02	0.02	0.03	0.04	0.06	0.03	0.09
1996	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.32	0.09	0.41
1997	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.06	0.08	0.14
1998	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.14
1999	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.17	0.06	0.23
2000	0.00	0.01	0.01	0.01	0.04	0.05	0.06	0.12	0.03	0.15
2001	0.00	0.00	0.00	0.01	0.02	0.02	0.03	0.18	0.07	0.25
2002	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.12	0.07	0.19
2003	0.00	0.00	0.00	0.00	0.07	0.07	0.08	0.07	0.05	0.13
2004	0.00	0.01	0.01	0.06	0.05	0.11	0.12	0.14	0.06	0.20
2005	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.10	0.04	0.14
2006	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.13	0.00	0.13
2007	0.00	0.02	0.02	0.01	0.02	0.04	0.06	0.15	0.05	0.20
2008[a/]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.03	0.21
2009[a/]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.06	0.31
Age-4										
1986	0.05	0.01	0.06	0.17	0.23	0.39	0.46	0.57	0.10	0.67
1987	0.06	0.01	0.08	0.21	0.14	0.35	0.43	0.36	0.08	0.44
1988	0.05	0.02	0.07	0.11	0.21	0.33	0.39	0.45	0.07	0.52
1989	0.03	0.05	0.09	0.18	0.09	0.27	0.36	0.59	0.11	0.70
1990	0.04	0.03	0.07	0.38	0.10	0.48	0.55	0.26	0.10	0.36
1991	0.00	0.03	0.03	0.04	0.11	0.15	0.18	0.35	0.09	0.45
1992	0.01	0.00	0.01	0.06	0.00	0.06	0.07	0.23	0.04	0.27
1993	0.00	0.00	0.00	0.06	0.11	0.16	0.16	0.46	0.03	0.49
1994	0.00	0.03	0.03	0.03	0.04	0.06	0.09	0.26	0.03	0.29
1995	0.00	0.01	0.01	0.07	0.06	0.13	0.14	0.16	0.03	0.19
1996	0.00	0.02	0.02	0.05	0.09	0.14	0.16	0.32	0.07	0.39
1997	0.00	0.00	0.00	0.01	0.05	0.06	0.06	0.20	0.06	0.26
1998	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.24	0.06	0.30
1999	0.00	0.01	0.01	0.05	0.02	0.08	0.09	0.43	0.02	0.45
2000	0.00	0.02	0.02	0.05	0.02	0.08	0.10	0.22	0.02	0.25
2001	0.01	0.01	0.02	0.04	0.03	0.07	0.09	0.24	0.05	0.29
2002	0.02	0.01	0.03	0.03	0.10	0.12	0.15	0.19	0.06	0.26
2003	0.00	0.00	0.01	0.04	0.16	0.20	0.21	0.24	0.05	0.28
2004	0.01	0.01	0.03	0.11	0.21	0.32	0.34	0.43	0.04	0.48
2005	0.01	0.01	0.01	0.14	0.05	0.19	0.20	0.17	0.02	0.19
2006	0.00	0.01	0.01	0.07	0.02	0.08	0.10	0.18	0.00	0.18
2007	0.01	0.07	0.08	0.06	0.07	0.13	0.21	0.53	0.03	0.56
2008	0.08	0.01	0.09	0.01	0.00	0.01	0.10	0.36	0.03	0.38
2009[a/]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.04	0.40

a/ Preliminary (incomplete cohort).

b/ Ocean harvest rates are the fraction of Sept. 1 (t-1) ocean abundance harvested in these fisheries. River harvest rates are the fraction of the river run (t) harvested in these fisheries.

TABLE II-6. Rogue River fall Chinook inriver run and ocean population indices.

Return Year	Inriver Run Index in Thousands of Fish[a/]					Ocean Impact Rate by Age[b/]		Ocean Population Index in Thousands of Fish[c/]			
	Age-2	Age-3	Age-4	Age-5	Total[d/]	Age-3	Age-4-5	Age-3	Age-4	Age-5	Total
1977	2.4	1.0	0.3	0.0	3.7	0.23	0.55	9.7	1.4	0.1	11.2
1978	1.0	6.1	2.3	0.1	9.5	0.23	0.55	38.7	5.2	0.2	44.1
1979	0.2	1.0	6.5	0.0	7.7	0.23	0.55	7.8	18.8	0.1	26.7
1980	0.4	0.2	0.9	0.6	2.1	0.23	0.55	5.2	4.0	1.4	10.6
1981	1.1	3.3	1.0	0.3	5.7	0.21	0.53	9.2	3.0	0.7	12.9
1982	0.7	1.3	1.3	0.1	3.4	0.30	0.52	9.8	2.9	0.3	13.0
1983	0.3	1.1	1.5	0.0	2.9	0.19	0.60	8.6	4.4	0.1	13.1
1984	0.4	1.2	1.8	0.1	3.5	0.08	0.38	9.9	4.7	0.2	14.8
1985	2.5	1.3	3.5	0.6	7.9	0.11	0.25	9.7	6.3	0.9	16.9
1986	3.1	12.5	2.3	0.5	18.4	0.18	0.46	71.3	5.9	1.0	78.2
1987	2.6	7.8	18.1	0.4	28.9	0.16	0.43	80.3	36.3	0.6	117.2
1988	1.4	4.8	25.2	1.5	32.9	0.20	0.39	17.3	47.9	2.5	67.7
1989	0.5	1.3	4.0	2.0	7.8	0.15	0.36	8.4	7.2	3.2	18.8
1990	0.0	0.3	1.4	0.2	1.9	0.30	0.55	6.0	4.7	0.5	11.2
1991	0.2	0.4	1.9	0.5	3.0	0.03	0.18	3.5	3.2	0.6	7.3
1992	0.5	0.3	1.5	0.5	2.8	0.02	0.07	4.4	2.4	0.6	7.4
1993	0.3	3.5	1.5	0.5	5.8	0.05	0.16	16.1	3.2	0.6	19.9
1994	0.5	0.8	5.8	0.9	8.0	0.03	0.09	3.0	9.5	0.9	13.4
1995	0.2	0.6	1.4	2.0	4.2	0.04	0.13	4.3	1.7	2.3	8.3
1996	0.1	0.4	1.8	0.1	2.4	0.05	0.16	2.4	2.8	0.1	5.3
1997	0.1	0.3	1.0	0.3	1.7	0.01	0.06	5.2	1.5	0.3	7.0
1998	0.0	0.5	2.8	0.3	3.6	0.00	0.09	3.8	3.9	0.3	8.0
1999	0.2	0.3	1.6	0.5	2.6	0.01	0.09	1.5	2.7	0.6	4.8
2000	0.2	2.0	0.8	0.6	3.6	0.06	0.10	9.9	0.9	0.6	11.4
2001	0.8	2.3	4.2	0.0	7.3	0.03	0.09	14.1	5.9	0.0	20.0
2002	0.9	4.0	7.1	0.8	12.7	0.02	0.15	32.2	9.1	0.9	42.2
2003	0.9	2.3	12.0	0.4	15.6	0.08	0.21	14.4	22.1	0.5	37.0
2004	0.4	0.6	4.9	2.9	8.8	0.12	0.34	3.9	9.7	4.4	18.0
2005[f/]	NA	NA	NA	NA	NA	0.02	0.20	7.6	5.0	0.8	13.4
2006[f/]	NA	NA	NA	NA	NA	0.01	0.10	4.9	3.2	0.5	8.6
2007[f/]	NA	NA	NA	NA	NA	0.06	0.21	5.8	3.8	0.6	10.2
2008[f/]	NA	NA	NA	NA	NA	0.00	0.10	6.9[e/]	4.6	0.7	12.2[e/]
2009[f/]	NA	NA	NA	NA	NA	NA	0.00	6.1[e/]	4.0[e/]	0.7	10.7[e/]
2010[f/]	NA	NA	NA	NA	NA	-	-	9.8[g/]	6.5[g/]	1.1[g/]	17.3[g/]

a/ Index based on carcass counts in spawning survey index areas. Carcass counts in 1978, 1979, and 1980 adjusted for prespawning mortality. Age composition developed from carcass scale sampling.

b/ Exploitation rates since 1981 are based on Klamath River fall Chinook cohort analysis, 1977-1980 based on 1981-1983 average.

c/ Based on cohort reconstruction methods. Index values for 2009 predicted from regression equations; postseason estimates are not available.

d/ Excludes age-6 fish.

e/ Preliminary, complete cohort not available, mean maturity rate used to derive estimate.

f/ Spawning surveys were discontinued 2005.

g/ Preseason forecast.

TABLE II-7. Predicted and postseason returns of Columbia River adult fall Chinook in thousands of fish. (Page 1 of 3)

Year	March Preseason Forecast[a/]	April STT Modeled Forecast[b/]	Postseason Return	March Pre/Postseason	April Pre/Postseason
			URB		
1984	90.10	93.00	131.40	0.69	0.71
1985	159.10	159.10	196.40	0.81	0.81
1986	285.90	286.10	281.60	1.02	1.02
1987	436.40	436.40	420.70	1.04	1.04
1988	450.70	446.50	339.90	1.33	1.31
1989	234.00	231.80	261.30	0.90	0.89
1990	127.20	126.90	153.60	0.83	0.83
1991	88.80	88.90	103.30	0.86	0.86
1992	68.40	66.30	81.00	0.84	0.82
1993	84.50	82.70	102.90	0.82	0.80
1994	85.40	94.70	132.80	0.64	0.71
1995	103.70	125.00	106.50	0.97	1.17
1996	88.90	94.20	143.20	0.62	0.66
1997	166.40	158.00	161.70	1.03	0.98
1998	150.80	141.80	142.30	1.06	1.00
1999	147.50	102.10	166.10	0.89	0.61
2000	171.10	208.20	155.70	1.10	1.34
2001	127.20	132.70	232.60	0.55	0.57
2002	281.00	273.80	276.90	1.01	0.99
2003	280.40	253.20	373.20	0.75	0.68
2004	292.20	287.00	367.90	0.79	0.78
2005	352.20	354.60	268.70	1.31	1.32
2006	253.90	249.10	230.40	1.10	1.08
2007	182.40	185.20	112.60	1.62	1.64
2008	162.50	165.90	196.90	0.83	0.84
2009[c/]	259.90	269.80	212.00	1.23	1.27
2010	310.80	-	-	-	-
			LRW		
1984	16.70	NA	13.30	1.26	NA
1985	12.90	NA	13.30	0.97	NA
1986	15.70	NA	24.50	0.64	NA
1987	29.20	NA	37.90	0.77	NA
1988	43.30	42.10	41.70	1.04	1.01
1989	27.30	26.90	38.60	0.71	0.70
1990	23.70	23.40	20.30	1.17	1.15
1991	12.70	12.70	19.80	0.64	0.64
1992	17.40	16.70	12.50	1.39	1.34
1993	12.50	11.90	13.30	0.94	0.89
1994	14.70	13.20	12.20	1.20	1.08
1995	12.40	11.50	16.00	0.78	0.72
1996	8.80	8.10	14.60	0.60	0.55
1997	7.50	7.20	12.30	0.61	0.59
1998	8.10	7.00	7.30	1.11	0.96
1999	2.60	2.50	3.30	0.79	0.76
2000	3.50	2.70	10.20	0.34	0.26
2001	16.70	18.50	15.70	1.06	1.18
2002	18.70	18.30	24.90	0.75	0.73
2003	24.60	23.40	26.00	0.95	0.90
2004	24.10	24.20	22.30	1.08	1.09
2005	20.20	21.40	16.80	1.20	1.27
2006	16.60	16.60	18.10	0.92	0.92
2007	10.10	10.00	4.30	2.35	2.33
2008	3.80	3.80	7.10	0.54	0.54
2009[c/]	8.50	8.60	7.50	1.13	1.15
2010	9.70	-	-	-	-

TABLE II-7. Predicted and postseason returns of Columbia River adult fall Chinook in thousands of fish. (Page 2 of 3)

Year	March Preseason Forecast[a/]	April STT Modeled Forecast[b/]	Postseason Return	March Pre/Postseason	April Pre/Postseason
			LRH		
1984	70.40	89.00	102.40	0.69	0.87
1985	81.50	86.70	111.00	0.73	0.78
1986	171.60	173.90	154.80	1.11	1.12
1987	294.90	298.70	344.10	0.86	0.87
1988	267.70	246.50	309.90	0.86	0.80
1989	104.90	97.50	130.90	0.80	0.74
1990	68.50	65.50	60.00	1.14	1.09
1991	71.40	73.10	62.70	1.14	1.17
1992	113.20	121.50	62.60	1.81	1.94
1993	79.30	77.70	52.30	1.52	1.49
1994	36.10	46.50	53.60	0.67	0.87
1995	35.80	42.40	46.40	0.77	0.91
1996	37.70	48.30	75.50	0.50	0.64
1997	54.20	68.70	57.40	0.94	1.20
1998	19.20	22.50	45.30	0.42	0.50
1999	34.80	38.20	40.00	0.87	0.96
2000	23.70	26.40	27.00	0.88	0.98
2001	32.20	30.50	94.30	0.34	0.32
2002	137.60	133.00	156.40	0.88	0.85
2003	115.90	116.90	155.00	0.75	0.75
2004	77.10	79.00	108.90	0.71	0.73
2005	74.10	78.44	78.30	0.95	1.00
2006	55.80	57.50	58.30	0.96	0.99
2007	54.90	54.40	32.70	1.68	1.66
2008	59.00	55.90	60.30	0.98	0.93
2009[c/]	88.80	88.20	76.70	1.16	1.15
2010	90.60	-	-	-	-
			SCH		
1984	21.30	27.00	47.50	0.45	0.57
1985	34.90	37.10	33.20	1.05	1.12
1986	16.00	16.20	16.60	0.96	0.98
1987	9.10	9.20	9.10	1.00	1.01
1988	6.50	5.90	12.00	0.54	0.49
1989	29.50	23.00	26.80	1.10	0.86
1990	27.30	23.70	18.90	1.44	1.25
1991	56.30	61.40	52.40	1.07	1.17
1992	40.90	41.30	29.50	1.39	1.40
1993	19.90	18.20	16.80	1.18	1.08
1994	20.20	28.90	18.50	1.09	1.56
1995	17.50	22.50	33.80	0.52	0.67
1996	27.60	35.40	33.10	0.83	1.07
1997	21.90	25.70	27.40	0.80	0.94
1998	14.20	14.20	20.20	0.70	0.70
1999	65.80	61.00	50.20	1.31	1.22
2000	21.90	26.90	20.50	1.07	1.31
2001	56.60	61.90	125.00	0.45	0.50
2002	144.40	136.00	160.80	0.90	0.85
2003	96.90	101.90	180.60	0.54	0.56
2004	138.00	150.00	175.30	0.79	0.86
2005	114.10	115.79	93.10	1.23	1.24
2006	50.00	51.80	27.90	1.79	1.86
2007	21.80	21.30	14.60	1.49	1.46
2008	87.20	86.20	91.90	0.95	0.94
2009[c/]	59.30	56.50	49.00	1.21	1.15
2010	169.00	-	-	-	-

TABLE II-7. Predicted and postseason returns of Columbia River adult fall Chinook in thousands of fish. (Page 3 of 3)

Year	March Preseason Forecast[a/]	April STT Modeled Forecast[b/]	Postseason Return	March Pre/Postseason	April Pre/Postseason
			MCB		
1990	69.50	69.30	58.90	1.18	1.18
1991	48.40	48.50	35.40	1.37	1.37
1992	42.50	40.70	31.10	1.37	1.31
1993	33.00	32.30	27.50	1.20	1.17
1994	23.90	26.70	33.70	0.71	0.79
1995	25.00	30.00	34.20	0.73	0.88
1996	40.80	43.20	59.70	0.68	0.72
1997	72.10	61.90	59.00	1.22	1.05
1998	47.80	44.90	36.80	1.30	1.22
1999	38.30	27.70	50.70	0.76	0.55
2000	50.60	61.60	36.80	1.38	1.67
2001	43.50	45.30	76.40	0.57	0.59
2002	96.20	91.80	108.40	0.89	0.85
2003	104.80	94.60	150.20	0.70	0.63
2004	90.40	88.80	117.60	0.77	0.76
2005	89.40	89.73	98.00	0.91	0.92
2006	88.30	86.60	80.40	1.10	1.08
2007	68.00	69.10	46.90	1.45	1.47
2008	54.00	55.10	75.50	0.72	0.73
2009[c/]	94.40	97.90	73.10	1.29	1.34
2010	72.60	-	-	-	-

a/ March preseason forecasts are ocean escapements based on terminal run size and stock-specific cohort relationships affected by the historical "normal" ocean fisheries, generally between 1979 and the most recent adequately complete broods.
b/ STT modeled forecasts adjust March preseason forecasts for Council-adopted ocean regulations each year and should provide a more accurate estimate of expected ocean escapement.
c/ Postseason estimates are preliminary.

TABLE II-8. Comparison of preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 1 of 4)

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
	Nooksack-Samish Hatchery and Natural			**East Sound Bay Hatchery**			**Skagit Hatchery**			**Skagit Natural**		
1993	50.4	32.3	1.53	3.2	3.8	0.84	1.0	1.4	0.71	14.0	6.9	2.00
1994	46.6	28.1	1.66	3.2	0.7	4.00	1.3	5.5	0.30	8.4	5.9	1.27
1995	38.5	22.3	1.73	3.5	0.2	17.50	1.6	3.4	0.48	5.0	9.2	0.52
1996	27.0	29.2	0.92	1.7	0.5	2.43	1.0	1.2	0.83	7.1	10.9	0.58
1997	34.0	41.7	0.99	1.2	1.2	1.00	0.1	0.0	-	6.4	6.1	1.03
1998	28.0	31.5	0.95	0.5	0.3	1.67	0.0	0.0	-	6.6	15.0	0.44
1999	27.0	42.1	0.66	2.3	0.3	7.67	0.0	0.0	-	7.6	5.3	1.46
2000	19.0	32.6	0.57	5.0	0.1	50.00	0.0	0.0	-	7.3	17.3	0.42
2001	34.9	64.7	0.55	1.6	0.9	16.00	0.0	0.0	-	9.1	14.1	0.65
2002	52.8	54.3	0.99	1.6	0.9	2.29	0.0	0.1	-	13.8	20.0	0.69
2003	45.8	30.0	1.51	1.6	0.2	8.00	0.0	0.3	-	13.7	10.3	1.38
2004	34.2	17.9	1.83	0.8	0.0	200.00	0.5	0.0	-	20.3	24.3	0.83
2005	14.5	15.9	1.07	0.4	0.0	13.33	0.7	0.4	3.50	23.4	23.4	0.99
2006	16.9	30.7	0.55	0.4	0.0	25.00	0.6	0.4	1.51	24.1	22.5	1.07
2007	18.8	25.9	0.73	0.4	0.0	66.67	1.1	0.4	2.75	15.0	12.9	1.16
2008[b/]	35.3	29.1	1.21	0.8	0.0	-	0.7	0.2	3.50	23.8	15.0	1.59
2009	23.0	NA	NA	0.1	NA	NA	0.6	NA	NA	23.4	NA	NA
2010	30.3	-	-	2.3	-	-	0.9	-	-	13.0	-	-

TABLE II-8. Comparison of preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 2 of 4)

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
	Stillaguamish [c/] Natural			**Snohomish [c/] Hatchery**			**Snohomish [c/] Natural**			**Tulalip [c/] Hatchery**		
1993	NA	1.3	-	1.6	2.7	0.58	4.9	5.5	0.89	2.8	1.4	2.03
1994	NA	1.3	-	1.8	5.4	0.33	4.5	5.0	0.90	2.8	1.8	1.59
1995	1.8	0.9	1.92	2.2	4.0	0.54	4.3	4.0	1.08	2.3	8.5	0.27
1996	1.3	1.2	1.04	6.7	4.6	1.47	4.2	5.9	0.71	2.7	11.5	0.24
1997	1.6	1.2	1.36	7.7	12.0	0.64	5.2	4.4	1.19	4.0	8.7	0.46
1998	1.6	1.6	1.03	6.5	4.7	1.37	5.6	6.4	0.88	2.5	7.2	0.35
1999	1.5	1.1	1.36	7.8	4.7	1.65	5.6	4.8	1.16	4.5	15.2	0.30
2000	2.0	1.7	1.21	6.2	1.9	3.20	6.0	6.1	0.98	5.0	8.3	0.60
2001	1.7	1.4	1.22	4.1	0.9	4.57	5.8	8.4	0.69	5.5	5.1	1.08
2002	2.0	1.6	1.25	6.8	2.6	2.66	6.7	7.3	0.92	5.8	5.2	1.12
2003	2.0	1.0	1.98	9.4	5.8	1.63	5.5	5.6	0.99	6.0	8.7	0.69
2004	1.9	1.6	1.19	3.3	6.4	0.52	10.6	11.2	0.95	6.8	6.5	1.05
2005	1.7	1.2	1.42	4.4	4.0	1.10	14.1	5.0	2.82	6.4	7.4	0.86
2006	1.0	1.3	0.77	2.8	4.3	0.65	11.0	8.8	1.25	9.3	5.8	1.60
2007	1.0	0.6	1.67	3.5	6.6	0.53	12.7	4.2	3.02	8.4	6.1	1.38
2008[b/]	0.6	1.7	0.35	3.8	6.2	0.61	7.4	8.6	0.86	2.7	3.9	0.69
2009	1.7	NA	NA	4.9	NA	NA	8.4	NA	NA	4.0	NA	NA
2010	1.4	-	-	5.6	-	-	9.9	-	-	3.4	-	-

TABLE II-8. Comparison of preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 3 of 4)

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
	South Puget Sound Hatchery			**South Puget Sound Natural**			**Strait of Juan de Fuca Hatchery**			**Strait of Juan de Fuca Natural**		
1993	61.8	43.1	1.68	26.5	9.6	1.34	0.7	1.0	3.50	3.1	1.6	1.29
1994	52.7	49.9	1.08	18.0	10.5	0.60	3.9	1.2	2.44	1.0	1.0	2.00
1995	49.6	75.4	0.67	21.7	24.9	0.63	3.0	0.7	30.00	0.9	2.3	0.33
1996	51.9	53.2	0.89	19.0	16.5	0.53	2.8	1.4	14.00	0.9	2.0	0.29
1997	65.1	38.3	1.40	18.2	15.9	0.88	2.2	1.0	7.33	0.8	2.9	0.23
1998	67.8	49.6	1.24	21.8	14.6	0.79	1.7	1.7	1.00	0.9	2.1	0.47
1999	59.4	67.3	0.71	19.6	33.5	1.15	1.9	0.7	2.71	0.9	2.7	0.33
2000	77.5	47.4	1.39	17.5	39.5	1.26	2.0	1.2	1.67	1.1	1.7	0.65
2001	73.7	76.6	0.76	16.2	44.6	0.80	0.0	1.7	0.00	3.5	2.0	1.75
2002	90.8	69.2	1.07	16.9	58.5	0.79	0.0	1.6	0.00	3.6	2.2	0.97
2003	86.6	56.6	1.14	19.6	31.0	1.28	0.0	1.3	0.00	3.4	2.8	0.72
2004	86.5	66.4	1.16	17.5	24.5	0.61	0.0	1.4	0.00	3.5	4.1	0.85
2005	83.1	73.7	0.95	17.7	19.1	0.46	0.0	1.4	0.00	4.2	2.0	2.00
2006	85.8	105.1	0.82	21.3	42.2	0.50	0.0	1.2	0.00	4.2	3.0	1.39
2007	83.0	139.6	0.59	17.0	32.5	0.52	0.0	0.8	0.00	4.4	1.3	3.38
2008[b/]	101.6	94.5	1.08	21.1	27.3	0.77	0.0	0.7	0.00	4.5	1.2	3.75
2009	93.0	NA	NA	17.2	NA	NA	0.0	NA	NA	3.4	NA	NA
2010	97.4	-	-	12.7	-	-	0.0	-	-	3.7	-	-

TABLE II-8. Comparison of preseason forecasts and postseason estimates of Puget Sound run size for summer/fall Chinook in thousands of fish.[a/] (Page 4 of 4)

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
	Hood Canal Hatchery and Natural											
1993	NA	NA	-									
1994	11.7	4.7	2.44									
1995	11.5	3.7	3.03									
1996	3.9	9.9	0.41									
1997	9.0	8.1	1.10									
1998	2.7	7.8	0.34									
1999	6.7	16.3	0.41									
2000	14.0	29.0	0.47									
2001	19.2	20.1	0.90									
2002	25.3	26.6	1.31									
2003	24.0	39.6	0.76									
2004	29.6	36.5	0.86									
2005	30.5	41.1	1.36									
2006	30.2	68.1	0.44									
2007	47.5	45.9	1.03									
2008	36.8	33.2	1.11									
2009[b/]	42.6	38.3	1.11									
2010	45.0	-	-									

a/ Puget Sound run size is defined as the run available to Puget Sound net fisheries. Does not include fish caught by troll and recreational fisheries inside Puget Sound.
b/ Postseason returns are preliminary.
c/ These numbers are in terms of terminal run of Chinook returning to area 8A. This includes all adult Chinook harvested in the net fisheries in Areas 8A, 8D, the Stillaguamish and Snohomish Rivers; harvest in sport fisheries in Area 8D and the Stillaguamish and Snohomish Rivers; and escapement.

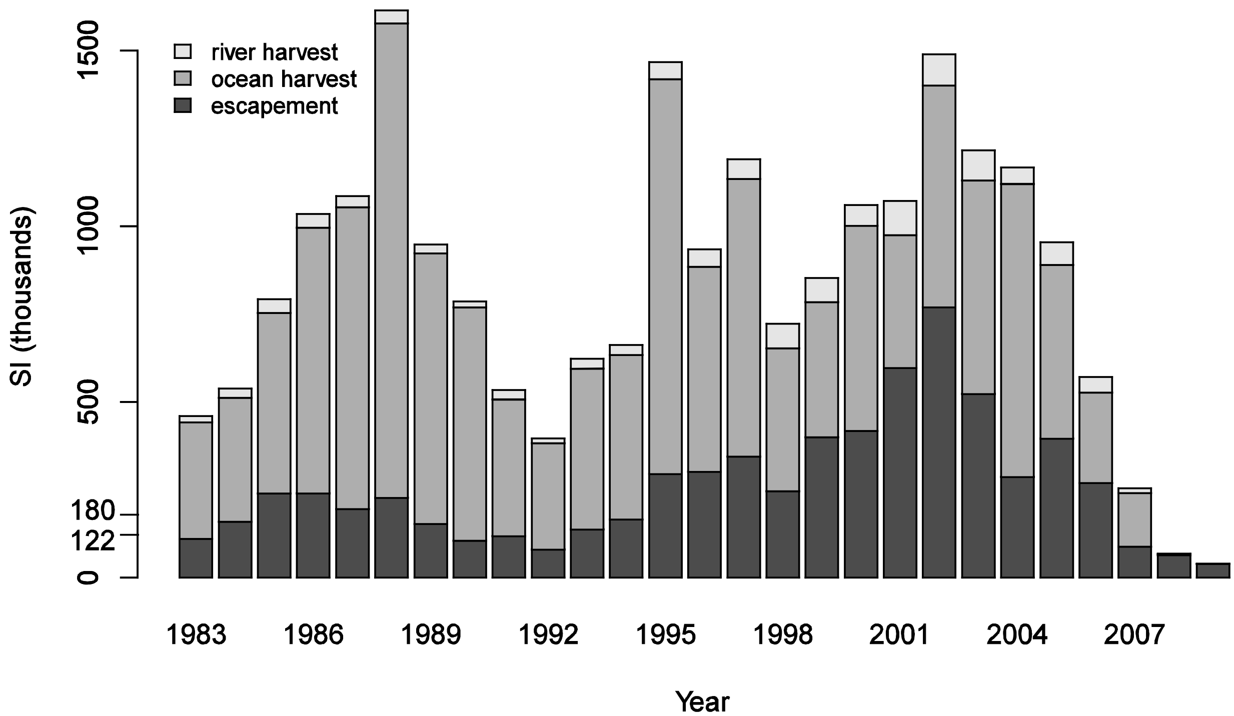

FIGURE II-1. The Sacramento Index (SI) and relative levels of its components. The Sacramento River fall Chinook escapement goal range of 122,000-180,000 adult spawners is noted on the vertical axis.

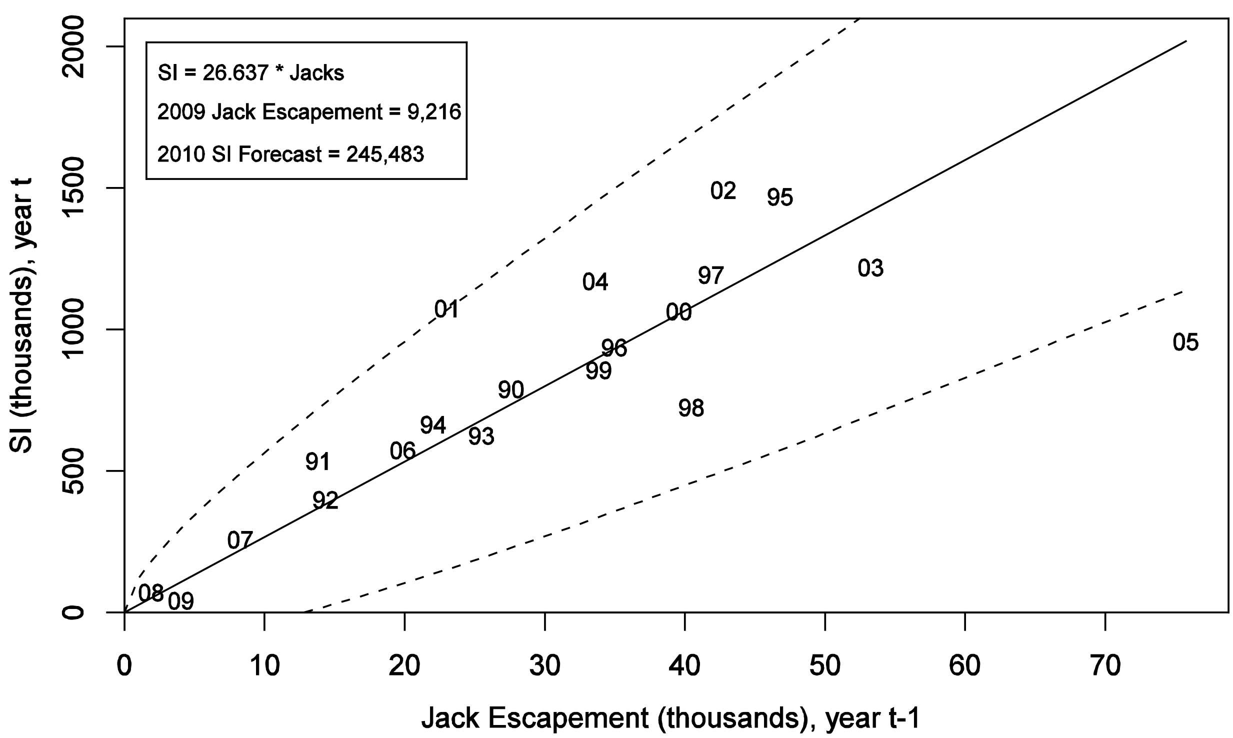

FIGURE II-2. Regression estimator for the SI based on previous year's escapement of Sacramento River fall Chinook jacks, 1990-2009. Years shown are SI years.

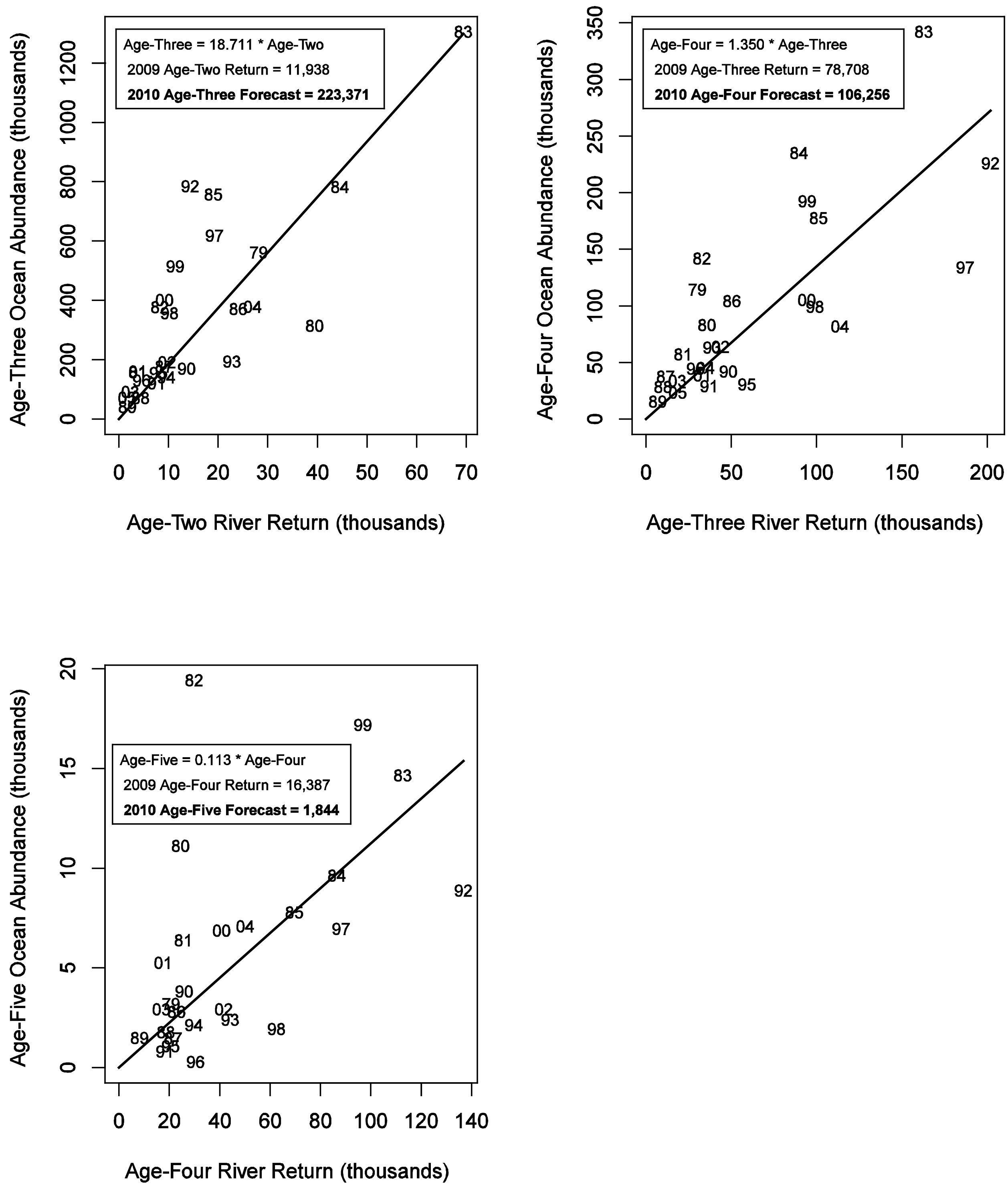

FIGURE II-3. Regression estimators for Klamath River fall Chinook ocean abundance (September 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

CHAPTER III - COHO SALMON ASSESMENT

COLUMBIA RIVER AND OREGON/CALIFORNIA COAST COHO

(OREGON PRODUCTION INDEX AREA)

The majority of coho harvested in the OPI area originate from stocks produced in rivers located within the OPI area (Leadbetter Point, Washington, to the U.S./Mexico border). These stocks include hatchery and natural production from the Columbia River, Oregon Coast, and northern California, and are divided into the following components: (1) public hatchery (OPIH), (2) Oregon coastal natural (OCN), including river and lake components, (3) Lower Columbia natural (LCN), and (4) natural and hatchery stocks south of Cape Blanco, Oregon, which include the Rogue, Klamath, and Northern California coastal stocks.

A stratified random sampling (SRS) study implemented in 1990 indicated an overestimation of annual OCN spawner escapement, which had previously been based on nonrandom standard index surveys. Because the stock composition of the OPI area ocean impacts is based on the proportions of the OPI ocean escapements, a reduction in OCN spawner escapement meant that traditional OCN ocean impacts and abundances were overestimated, while traditional ocean impact and abundance estimates for other OPI area stocks had been underestimated. Starting in 1992, the Council adopted an abundance adjustment procedure for use in assessing fishery impacts. This procedural change, based on improved estimates of OCN spawner escapements, adjusted traditional index abundances of the other OPI area stocks. To achieve targeted exploitation rates and spawner escapement goals, the various OPI area stock abundance index predictions were scaled in the Coho FRAM to reflect the results of the ongoing OCN spawner study and are referred to as SRS abundances. In 1998, after eight years of SRS abundance estimates, the historic OPI data set was rescaled to reflect the revised OCN abundance estimates. Beginning in 1998, a random site selection procedure based on the EPA's Environmental Monitoring and Assessment Program (EMAP) has been used instead of the SRS methodology. The random survey sampling provides abundance estimates consistent with SRS estimates.

Beginning in 1998, with the availability of a long-term data set in SRS values and the random survey sampling values, all OPI area stock abundances were projected using random sampling accounting. Direct comparisons of 2010 abundance forecasts with recent year preseason abundance forecasts and postseason estimates, are reported in Table III-1. All fishery impacts and escapements from the Coho FRAM are reported in random sampling values.

Beginning in 2008, a new method was developed to estimate coho abundances for both the natural and hatchery components of the Columbia River and the Oregon coast. The traditional method of stock abundance estimation used only catch data from Leadbetter Point, Washington, to the U.S./Mexico border. The assumption in the SRS accounting was that OPI stocks that were caught north of the OPI area were balanced by northern stocks that were caught inside the OPI area. This assumption was valid as long as fisheries north and south were balanced. However, in recent years, fisheries to the south have been more restrictive than those to the north, leading to underestimation of harvest of OPI area stocks. In addition, the estimation technique was not consistent with the methods used in the Coho FRAM. The Mixed Stock Model (MSM) used for constructing the FRAM base period data was used to estimate the contribution of various coho stocks, including the OPI area stocks, to ocean fisheries and was based on CWTs and associated tag rates. The MSM includes all fisheries that impact a particular stock and therefore should provide a better overall accounting of total harvest and mortality of both Columbia River and Oregon coast coho stocks. The new run size estimates are based on the 1986-1997 base period and "backwards" FRAM runs for more recent years. The Oregon Production Index Technical Team (OPITT) decided to use the MSM run reconstruction database for future accounting and forecasts. The MSM estimates were refined for use in 2009, with particular attention to the base period reconstruction for OCN coho. In 2010 the relationship between the SRS and MSM time series was reconsidered. The changes in fishery effort patterns that resulted in biased harvest estimates began in the mid- to late-1990s, so the first few years of the MSM time series should be equivalent to the SRS time series. This was used as justification to use the MSM data set as a continuation of the SRS time series starting in 1986. In 2010 the OPI hatchery and OCN predictors used the longer, merged time series. This results in a higher level of statistical significance for the predictors and lower residuals in most recent years.

PUBLIC HATCHERY COHO

OPI area public hatchery coho smolt production occurs primarily in Columbia River facilities and net pens. Several facilities located in Oregon coastal rivers and in the Klamath River Basin, California, collectively produce fewer coho. OPI area smolt releases since 1960 are reported by geographic area in Appendix B, Table B-1.

Predictor Description

Prior to 2008, the OPIH stock predictor was a multiple linear regression with the following variables: (1) Columbia River jacks (Jack CR), (2) Oregon coastal and Klamath River Basin jacks (Jack OC), and (3) a correction term for the proportion of delayed smolts released from Columbia River hatcheries (Jack CR * [SmD/SmCR]).

In 2008 the stock predictor was modified slightly from that used in previous years. Because of the shorter data set (1986-2007 vs. 1970-2007) and the near-total phase-out of coastal coho salmon hatcheries, the factor for Oregon and California jacks (Jack OC) was not significant in the regression. A simplified model with all OPI jacks combined into one term (Jack OPI) was used, and all parameters were significant. In 2010 the longer (1970-2009) time series was used with the simplified model.

The OPIH stock predictor is partitioned into Columbia River early and late stocks based on the proportion of the 2009 jack returns of each stock adjusted for stock specific maturation rates. The coastal hatchery stock is partitioned into northern and southern coastal stock components. The northern OPIH coastal stock is comprised of hatchery production from the central Oregon Coast. The southern OPIH coastal stock is comprised of hatchery production from the Rogue River basin in southern Oregon and the Klamath and Trinity basins in northern California. The 2010 partition was based on the proportion of the smolt releases in 2009.

For the 2010 abundance forecast, the data base includes 1970-2009 recruits and 1969-2008 jack returns (in thousands of fish). The model was:

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

Where:

a = -92.45
b = 19.55
c = 25.79
adjusted r^2 = 0.94

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

Predictor Performance

Recent year OPIH stock preseason abundance forecasts, partitioned by production area, stock, and as a total, are compared with postseason estimates in Table III-1. The 2009 preseason abundance prediction of 1,073,100 OPIH coho was 101 percent of the preliminary postseason estimate of 1,066,200 coho.

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

2010 Stock Status

Using the appropriate values from Appendix B, Table B-2, the OPIH abundance forecast for 2010 is 408,000 coho, 38 percent of the 2009 prediction and also 38 percent of the preliminary 2009 postseason estimate.

OREGON COASTAL NATURAL COHO

The OCN stock is composed of natural production north of Cape Blanco, Oregon from river (OCNR) and lake (OCNL) systems, which are forecasted independently.

Predictor Description

Oregon Coastal Natural Rivers

From 1988-1993, the abundance of OCNR index coho was forecasted using a modified Ricker spawner-recruit model. The predictor related OCNR recruits to the parent brood stock size incorporating an adjustment for ocean survival based on OPI hatchery smolt to jack survival the previous year. Due to a tendency to over-predict abundances, the database in the predictor was shortened from 1970-1991 to 1980-1991 in 1992 and 1993.

Because of concern that the adopted OCNR model did not adequately incorporate environmental variability, an alternative model was used to predict the 1994 and 1995 index abundances. The model used ocean upwelling, sea surface temperatures, and year to predict OCNR index coho abundance. The year term was included in the model to reflect an observed decline in stock productivity.

For 1996-1998, the environmental based model without the year component was used in predicting OCNR stock abundances. In addition, the predictions were in SRS rather than traditional index accounting. The OCNR environmental variables were annual deviation from the mean April-June Bakun upwelling index at 42° N latitude (UpAnom), and annual deviation from the mean January sea surface temperature at Charleston, Oregon (JanAnom).

For 1999-2002, the environmental-based model with the year component included was used to predict OCNR stock abundances.

For 2003-2007, the same environmental-based model without the year component that was used for 1996-1998 was used in predicting OCNR abundance.

In 2008, OPITT adopted a new abundance time series based on MSM run reconstructions and “backwards” FRAM modeling. This time series starts in 1986, in contrast to the SRS time series, which starts in 1970. There is much less contrast in the environmental variables in the shorter time period than there was in the longer period. In addition, there appears to be a weaker relationship between abundance and the environmental variables in recent years.

For 2008, several models using the MSM time series were considered. These all tended to predict higher abundances than what would reasonably be expected and none were statistically significant. In the absence of a satisfactory model, OPITT examined patterns in ocean conditions and hatchery jack returns and determined that the 2007 postseason abundance estimate of 50,000 coho was the most appropriate forecast for 2008.

In 2009 the MSM base period estimates for OCN coho were revised to resolve some of the issues raised in 2008. As the new estimates were not available until the day before the prediction was due, there was little time to explore predictive relationships. There were indications that the revised data set was better correlated with environmental data, and the new environmental indicators looked promising. For 2009 and 2010, however, a variation on the adopted predictor was chosen. The adopted predictor is based on JanAnom in the return year and UpAnom in the year of ocean entry. In some years, an additional variable, Year, was added to capture a long-term downward trend in the data that was not represented in the environmental time series. With the recent shift in ocean conditions this linear trend was no longer apparent, but the pattern in residual errors of the predictor matched the regime shifts in 1990 and 2000. Until a more objective index of regime changes can be incorporated in the predictor, an index variable called RegInd (Regime Index) was used for the 2009 and 2010 predictor. This variable flags the cold regimes (1986-1989, 2001 - 2009) with a 0 and the warm regime (1990 – 2000) with a 1, and by itself explains over 50 percent of the variability of the time series.

The model used for the 2010 forecast was:

$$\ln(\text{Recruits}(t)) = a + b * \text{UpAnom}(t-1) + c * \text{JanAnom}(t) + d * \text{RegInd}(t)$$

Where:

a	=	5.0245
b	=	0.0057
c	=	-0.2343
d	=	-0.9949
adjusted r^2	=	0.71

The OCNR stock data set and a definition of the above terms are presented in Appendix B, Table B-4.

Oregon Coastal Natural Lakes

Since 1988, except for 2008, the abundance of OCNL index coho has been predicted using the most recent three-year average adult stock abundance. OCNL coho production occurs from three lake systems (Tenmile, Siltcoos, and Tahkenitch). Production from these systems has declined substantially from the levels observed during 1950-1973, but has steadily increased in recent years. Following the same reasoning used for the OCN Rivers predictor in 2008, OPITT chose to use the 2007 postseason abundance estimate of 10,000 coho for the 2008 preseason prediction instead of using the most recent three-year average.

For 2010, OPITT chose to use the most recent three-year average adult stock abundance which predicts 16,600 coho.

Predictor Performance

Recent year OCN preseason abundance predictions are compared to postseason estimates in Table III-1. Since 2000 the OCN predictor has under estimated abundance except for 2005 and 2007. The 2009 preseason abundance prediction of 211,600 OCN coho was 82 percent of the preliminary postseason estimate of 257,000 coho.

2010 Stock Status

The 2010 preseason prediction for OCN (river and lake systems combined) is 148,000 coho, 70 percent of the 2009 preseason prediction and 58 percent of the 2009 postseason estimate (Table III-1). The 2010 preseason prediction for OCNR and OCNL components are 131,400 and 16,600 coho, respectively.

PRIVATE HATCHERY COHO

There have been no Oregon coastal PRIH coho smolt releases since 1990.

SALMON TROUT ENHANCEMENT HATCHERY COHO SMOLT PROGRAM

Predictor Description

From 1988 to 2007, preseason abundance predictions for Oregon coastal STEP index coho smolt production facilities were based on the Council-approved procedure, which involved multiplying the average smolt to adult survival rate by the ratio of the current OPI jack survival to the previous year's OPI jack survival.

Predictor Performance

Recent year STEP preseason abundance predictions are compared to postseason estimates in Table III-1.

2010 Stock Status

Due to changes with the STEP program, releases were discontinued after the 2004 brood and forecasts were discontinued in 2008 (Table III-1).

LOWER COLUMBIA RIVER NATURAL

Predictor Description

The 2010 prediction for the Clackamas River is based on the recent 3-year cohort average counts at North Fork dam. The Clackamas forecast for 2010 is 3,500 wild fish at North Fork dam. The forecast for other Oregon lower Columbia natural (LCN) populations, including the Sandy River, are 3-year averages of recent year abundances based on spawning ground counts. The 2010 forecast for these other Oregon areas combined is 3,500 coho returning to their respective tributaries.

The 2010 prediction for the Washington LCN coho populations are derived by combining estimates of natural smolt production based on watershed area and a predicted 2007 brood year marine survival rate. The 2010 adult ocean abundance forecast for Washington LCN coho is 7,900 coho.

Predictor Performance

The LCN stock predictor methodology was developed in 2007. The preseason abundance compared to the postseason estimate is presented in Table III-1. The 2009 preseason abundance prediction of 32,700 LCN coho was 81 percent of the preliminary postseason estimate of 40,400 coho.

2010 Stock Status

The 2010 prediction for LCN coho is 15,100 coho (Table III-1). This ocean abundance estimate includes both Oregon and Washington LCN components.

OREGON PRODUCTION INDEX AREA SUMMARY OF 2010 STOCK STATUS

The 2010 combined OPI area stock abundance is predicted to be 556,000 coho, which is 43 percent of the 2009 preseason prediction of 1,284,700 coho and 42 percent of the 2009 preliminary postseason estimate of 1,323,200 coho. The 2010 OPI area forecasts are compared to historical abundances in Table III-2.

WASHINGTON COAST AND PUGET SOUND COHO STOCKS

PREDICTOR DESCRIPTION AND PAST PERFORMANCE

A variety of preseason abundance estimators currently are employed for Washington coastal and Puget Sound coho stocks (Table I-2). These estimators are used to forecast preseason abundance of adult ocean (age-3) recruits.

The performance of preseason abundance forecasts (adult ocean recruits) cannot be evaluated at this time because postseason run reconstructions for U.S. and Canadian coho production units have not been completed. A comparison of expected preseason and postseason ocean escapements for Washington coastal and Puget Sound stocks in recent years is presented in Tables III-3 and III-4. Postseason estimates of 2009 ocean escapements for some of these stocks were not available. The comparison of preseason and postseason estimates of ocean escapement reflects annual errors in abundance estimates, deviations in ocean fisheries from preseason expectations, and variations in ocean distributions of stocks as described in the introduction. Fishery impact levels anticipated preseason may be substantially different than those that actually occur.

2010 STOCK STATUS

Washington Coastal Coho

Willapa Bay

The 2010 Willapa Bay hatchery coho abundance forecast is 78,700 ocean recruits compared to a 2009 preseason forecast of 59,420. The natural coho forecast is 20,400 ocean recruits, compared to a 2009 preseason forecast of 33,544. Both the hatchery and natural forecasts are based on a regression of hatchery or natural jacks on terminal adult hatchery or natural returns for the 1994-2006 brood years (1998 excluded as an outlier for the natural forecast).

Grays Harbor

For 2010, Grays Harbor natural and hatchery coho forecasts were not agreed-to by the co-managers at the time of this report. This forecast and a description of the method used will be provided at a later date..

The hatchery coho forecast consists of an estimate of smolt releases from on- and off-station sites, multiplied by the average return per release for return years 1999-2008 then expanded to ocean recruit abundance based on CWT recoveries.

Quinault River

The 2010 forecast for Quinault natural coho is 16,706 ocean recruits, a slight increase from the 2009 forecast of 16,313. This forecast is based on the mean estimate of recent ocean recruits for 2003 through 2008.

The Quinault hatchery coho forecast is 26,575 ocean recruits, virtually the same as the 2009 forecast. This return is from a release of 643,592 smolts compared to a release of 667,406 smolts the previous year, and is based on a recent 5-year average smolt return rate of 4.13 percent for the Quinault National Fish Hatchery.

Queets River

For 2010, a Queets natural and hatchery coho forecast was not agreed-to by the co-managers at the time of this report. This forecast and a description of the method used will be provided at a later date.

Hoh River

The Hoh River natural coho forecast is 7,608 ocean recruits, a decrease of 19.9 percent compared to the 2009 forecast of 9,496. This forecast is based on estimated smolt production per square mile of watershed from the Clearwater tributary to the Queets River (397 smolts/square mile), multiplied by the size of the Hoh watershed (299 square miles), for a total of 217,373 smolts. The total natural smolt production estimate was then multiplied by an expected survival rate of 3.5 percent. This survival rate is lower than the 8.0 percent used in 2009 because of a sharp downturn in jack returns in 2009 from the record returns of 2008, including hatchery jacks to the Sol Duc Hatchery, wild jack returns to the Bingham trap on the Satsop River, and Columbia River jacks. The Pacific Decadal Oscillation (PDO) was favorable during the spring outmigration period, but conditions turned warmer and less favorable later in the summer, possibly explaining NWFSC’s very low trawl catch of juvenile coho off the coasts of Washington and Oregon, and lower than average jack returns to the Coast and Columbia River. A model produced by the Quinault Tribe’s Fisheries Department using an annual PDO index derived by taking the mean of the 12 monthly PDO values during calendar year 2009, points to 6.09 percent marine survival to ocean age-3 for Queets wild coho, but when the same survivals are regressed against the NWFSC’s September trawl catch of coho, to the marine survival estimate is 2.7 percent. Given the ocean trawl results, and the estimate of natural freshwater production, the 3.5 percent survival rate is a reasonable estimate for the Hoh system natural coho.

No hatchery production is projected for the Hoh system for 2010.

Quillayute River

The Quillayute River summer natural and hatchery coho forecasts for 2010 are 2,801 and 3,198 ocean recruits, respectively. The natural component run size is based on the estimated total summer coho smolt production (56,011) and a projected ocean survival rate of 5.0 percent. This is a lower ocean survival rate than the 8.0 percent used in 2009. The Queets Pacific Decadal Oscillation model and Elwha jack returns result in a 6.0 percent marine survival estimate. The September trawls off the coasts of Washington and Oregon indicate lower coho populations and the Bingham Creek jack model indicates a marine survival estimate of 2.6 percent. The 5.0 percent marine survival estimate for the Quillayute system wild coho represents a reasonable value within the range of estimates available.

For the hatchery component, an ocean survival rate of 3.0 percent was selected. An examination of the return rates of both hatchery releases and natural smolts indicates that hatchery return rates are 1.5 to 2.0 percent below natural returns. The survival rate of 3.0 percent was multiplied by a release of 106,600 smolts. Approximately 99 percent of the fish were marked with an adipose fin clip; an additional 853 unmarked smolts were released. The 2010 forecast abundance of natural summer coho is 25 percent higher than the 2009 forecast, while the hatchery forecast is 75 percent lower than the 2009 forecast level.

The Quillayute River fall natural and hatchery coho forecasts are 22,037 and 17,742 ocean recruits, respectively. The 2010 forecast abundance of natural Quillayute fall coho is 14 percent higher, and the hatchery forecast is 55 percent lower, than their respective 2009 forecast levels. The forecast for the natural component is based on the estimated total fall coho smolt production (440,733) multiplied by an expected marine survival rate of 5.0 percent, which was derived as described for the summer natural returns above. The fall hatchery production forecast was based on the same prediction of marine survival (3.0 percent) used for the summer hatchery coho forecast, multiplied by a release of 591,426 smolts. Approximately 73.7 percent of the hatchery fish were marked with an adipose fin clip only, 12.7 percent with an adipose fin clip and coded wire tag, and 12.8 percent with coded wire tag only. An additional 0.75 percent or 4,423 smolts were estimated to have been released without a mark or tag.

The basin total coho smolt production estimate (summer and fall stocks) was derived using the estimated coho smolt production in the Clearwater Basin of 101,820, which is 1.6 times its average production during the years a smolt trap was operated on the Bogachiel River (1992-1994) and 1.7 times its average production during the years a trap was operated on the Dickey River (1987, 1988, and 1990). Using 1.61 as a multiplier of the estimated average smolt production of the Quillayute system excluding the Dickey, yields an estimated production of 349,282 coho smolts. The Dickey production yields an additional 147,462 smolts to the system. The total freshwater production for the basin is estimated to be 496,744. Smolt production was apportioned according to brood year natural spawning escapements of summer and fall coho to yield the smolt estimates for each natural population.

North Washington Coast Independent Tributaries

Production from several smaller rivers and streams along the North Washington Coast (Waatch River, Sooes River, Ozette River, Goodman Creek, Mosquito Creek, Cedar Creek, Kalaloch Creek, Raft River, Camp Creek, Duck Creek, Moclips River, Joe Creek, Copalis River, Conner Creek), which flow directly into the Pacific Ocean, is forecast as an aggregate. Generally, stock assessment programs on these systems are minimal. The 2010 forecast of natural coho production for these independent streams is 4,200 ocean recruits, based on a prediction of 500 smolts per square mile of watershed drainage, 424 square miles of watershed, and an expected marine survival rate of 2.0 percent. The marine survival projection was derived from jack-to-adult return information collected at the WDFW Bingham Creek research station (2.6 percent) and then reduced for the uncertainty associated with 2009 *El Niño* conditions.

The hatchery forecast of 5,707 ocean recruits is developed from linear regression model estimates of marine survival, predicted by the jack return rate for coho from the Makah National Fish Hatchery. The predicted marine survival of 4.7 percent for the brood year 2007 was multiplied by the 2007 brood year smolt release (162,156) from the Makah National Fish Hatchery. For the 2007 brood year release, 79 percent were marked with an adipose fin clip.

Puget Sound

The 2010 total hatchery and natural coho ocean recruit forecast for the Puget Sound region of 613,930 is 5.4 percent above the 2009 forecast of 582,462. The hatchery coho forecast of 316,133 is 6.7 percent below the 2009 forecast of 338,968, and the natural coho forecast of 297,797 is 22.3 percent above the 2009 forecast of 243,495.

Puget Sound hatchery forecasts for 2010 were generally the product of 2007 brood year (BY) smolt releases from each facility, and a predicted marine survival rate for each program. Marine survival rates were typically based on recent year average survival rates derived from CWT recovery information and/or run reconstructions, and review of relationships between jack returns and adult marine survival rates at selected hatcheries. Forecasts for natural Puget Sound coho stocks were generally derived by measured or predicted smolt production from each major watershed or region, multiplied by stock-specific marine survival rate predictions based on a jack return model from the WDFW Big Beef Creek Research Station in Hood Canal, adult recruits/smolt data generated from the WDFW Deschutes River Research Station, and a natural coho CWT tagging program at Baker Lake (Skagit River basin), or other information.

Strait of Juan de Fuca

The 2010 forecasts for Strait of Juan de Fuca (SJF) natural and hatchery coho ocean recruits are 8,463 and 7,768, respectively. As in past years, this forecast includes both Eastern and Western Strait of Juan de Fuca drainages. The natural coho forecast was derived by multiplying the estimated 2007 brood natural smolt production for the region by a predicted ocean marine survival rate developed by two different models. One of the predictive models was based on a relationship between an index of the PDO and observed survival rates, and the other a relationship of Elwha Hatchery jack returns to observed survival rates. The forecasted abundances developed by each model were averaged to produce the final forecast. The hatchery forecasts were based on applying hatchery-specific ocean recruitment rate predictions (1.29 percent for Dungeness, 0.29 percent for Elwha) to the 2007 BY smolt releases for each hatchery. The recruitment rate predictions for the hatchery stocks were based on recent 3-year averages of cohort reconstruction-based recruits/smolts released in each hatchery production unit.

The preliminary preseason forecast of 8,463 age-3 ocean recruits places Strait of Juan de Fuca natural coho in the critical abundance based status category, which results in an allowable total exploitation rate of no more than 20 percent under the Council adopted exploitation rate matrix (Appendix A, Table A-4).

Nooksack-Samish

The 2010 forecasts for Nooksack-Samish natural and hatchery coho ocean recruits are 9,600 and 35,999 respectively. The natural coho forecast is the product of projected natural smolt production from each stream basin in the region, multiplied by a marine survival rate expectation of 3.0 percent. The natural coho marine survival rate prediction is based on the Big Beef Creek jack-based marine survival prediction, with a 50 percent discount applied to reflect the significantly lower survival rates observed for extreme northern Puget Sound-origin coho in recent years relative to elsewhere in Puget Sound. The hatchery forecasts are based on the 2003-2005 BY average recruits/smolt rate for Kendall Creek Hatchery (1.0 percent), applied to the 2007 BY smolt releases for each facility in the region.

Skagit

The 2010 forecasts for Skagit River natural and hatchery coho ocean recruits are 95,880 and 9,541 (8,551 from in-river hatchery production, 990 from Oak Harbor net-pens), respectively. The natural coho forecast is the product of measured smolt production from the Skagit basin multiplied by a marine survival rate expectation of 9.1 percent. The natural coho marine survival rate is based on the average of the 1990-2009 BY (even years only) Skagit natural recruits/smolt rate. The hatchery forecasts are based on an average marine survival rate of the 2003-2005 BY Cascade Hatchery CWT-based recruits/smolt rate of 3.3 percent.

The preliminary preseason forecast of 95,880 age-3 ocean recruits places Skagit natural coho in the normal abundance based status category, which results in an allowable total exploitation rate of no more than 60 percent under the Council adopted exploitation rate matrix (Appendix A, Table A-4).

Stillaguamish

The 2010 forecast for Stillaguamish River natural coho ocean recruits is 25,900. The natural coho forecast is derived from the estimated smolt production from the basin for brood year 2007, multiplied by a 7.0 percent marine survival rate expectation, which was based on correlations with the PDO, the Vancouver Island boreal copepod anomaly, and September trawl survey coho catch.

The preliminary preseason forecast of 25,900 age-3 ocean recruits places Stillaguamish natural coho in the normal abundance based status category, which results in an allowable total exploitation rate of no more than 50 percent under the Council adopted exploitation rate matrix (Appendix A, Table A-4).

Snohomish

The 2010 forecast for Snohomish River natural coho ocean recruits is 99,400. The Snohomish regional hatchery coho forecast is 24,498; 7,600 for Skykomish River/Wallace River Hatchery facility releases, 14,898 for the Tulalip Bay facility, and 2,000 for the Possession net-pen project. The natural coho forecast used the estimated smolt production from the basin for brood year 2006, multiplied by a 7.0 percent marine survival rate expectation based, which was based on correlations with the PDO, the Vancouver Island boreal copepod anomaly, and September trawl survey coho catch.

The preliminary preseason forecast of 99,400 age-3 ocean recruits places Snohomish natural coho in the low abundance based status category, which results in an allowable total exploitation rate of no more than 40 percent under the Council adopted exploitation rate matrix (Appendix A, Table A-4).

South Sound

The 2010 forecasts for South Sound region natural and hatchery coho ocean recruits are 25,360 and 181,722 respectively. The natural coho forecast is the product of projected smolt production from each of the stream basins in the region multiplied by variable marine survival rate expectations of 2.0 to 5.0 percent for natural coho in the region. The marine survival prediction was first derived for Big Beef Creek coho and then extrapolated to other regions of Puget Sound based on assumed differences in survival among regions. The hatchery coho forecasts are typically based on the 2003-2005 BY average CWT-based recruits/smolt rate for each facility, applied to the 2007 BY smolt releases. The expected survival rates range from 2.4 to 5.9 percent for central Puget Sound hatchery programs north of the Tacoma Narrows and 0.9 to 2.6 percent for the deep South Sound region, consistent with the observed trend of lower observed survival rates for hatchery coho originating from south of the Tacoma Narrows in the past decade. Low (0.6 percent) survival was expected for coho released five months early from the Voight Creek facility due to winter flooding on the Puyallup River. For Lake Washington facilities, the Soos Creek facility’s average survival was multiplied by an adjustment factor of 75 percent to account for in-lake juvenile mortality.

Hood Canal

The 2010 forecasts for Hood Canal region natural and hatchery coho ocean recruits are 33,193 and 51,175 respectively. The natural coho forecast is based on a regression of Big Beef Creek jacks on Hood Canal natural coho run sizes. The hatchery coho forecasts are based on the 1997-2005 BY average cohort reconstruction-based recruits/smolt for each facility, applied to the 2007 BY smolt releases for each facility.

The marine survival rates used for these forecasts were 8.8 percent for George Adams Hatchery, 2.0 percent for Port Gamble Net Pens, 8.2 percent for the Quilcene National Fish Hatchery, and 4.4 percent for the Quilcene Bay Net Pens.

The preliminary preseason forecast of 33,193 age-3 ocean recruits places Hood Canal natural coho in the low abundance based status category, which results in an allowable total exploitation rate of no more than 45 percent under the Council adopted exploitation rate matrix (Appendix A, Table A-4).

SELECTIVE FISHERY CONSIDERATIONS FOR COHO

As the region has moved forward with mass marking of hatchery coho salmon stocks, selective fishing options have become an important consideration for fishery managers. Table III-5 summarizes estimates of mass mark rates for coho stocks from Southern British Columbia, Canada to the Oregon Coast, based on preseason abundance forecasts. Agencies have released coho mass marked with adipose fin clips from the 2007 brood, making these fish available to 2010 fisheries (Table III-6).

EVALUATION OF 2009 REGULATIONS ON 2010 STOCK ABUNDANCE

Escapements and fishery impacts were estimated using coho FRAM. Abundance forecasts for 2010 were updated for Washington and Oregon stocks, but forecasts for Canadian stocks are unchanged from those employed for 2009 planning. Updated forecasts for Canadian stocks are expected to become available in March 2010. To provide information on the effect of changes in abundance forecasts, the final 2009 pre-season regulatory package for ocean and inside fisheries was applied to 2010 projections of abundance.

OREGON PRODUCTION INDEX AREA

Ocean fisheries were modeled with 2009 Council regulations and 2009 expectations for non-Council area fisheries. Under this scenario, expected exploitation rates are 30.2 percent on OCN coho and 7.0 percent on Rogue/Klamath hatchery coho. Expected spawner escapement is 104,400 for OCN coho (Tables III-7 and III-8). For Columbia River hatchery coho stocks, the predicted ocean exploitation rate (excluding Buoy 10) is 62.1 percent on the Columbia River early stock and 72.9 percent on the Columbia River late stock. Predicted ocean escapements (after Buoy 10) into the Columbia River in 2010 under this exercise show that under 2009 ocean regulations, Columbia River early coho would not be expected to meet egg take goals and Columbia River late coho would be expected to meet hatchery egg take goals (without further inside fishing).

Based on parent escapement levels and observed OPI smolt-to-jack survival for 2007 brood OPI smolts, the total allowable OCN coho exploitation rate for 2010 fisheries is no greater than 15 percent under FMP Amendment 13 and no greater than 15 percent under the matrix developed by the OCN work group (Table III-9; Appendix A, Tables A-2 and A-3). The total allowable Rogue/Klamath hatchery coho marine exploitation rate is 13.0 percent (NMFS ESA consultation standard).

Lower Columbia River natural (LCN) coho were listed as Endangered under the Oregon state ESA in 1999 and have been managed under a state Recovery Plan harvest rate matrix since 2001. LCN coho were listed as threatened under the Federal ESA in 2005. From 2001 through 2005, Oregon coast hatchery stocks were used as a surrogate in FRAM; beginning in 2006 unmarked Columbia River hatchery stocks were used as a surrogate in FRAM. In 2009, NMFS allowed a 20.0 percent exploitation rate in marine area and mainstem Columbia River fisheries combined. The 20.0 percent exploitation rate was split by managers to allow about one-third for inriver fisheries and two-thirds for all marine fisheries. Under 2009 fishery regulations and 2010 abundance forecasts, the exploitation rate is predicted to be 27.5 percent for marine fisheries (excluding the Buoy 10 fishery) using combined unmarked Columbia River hatchery stocks as the proxy. There has been no guidance from NMFS so far on the allowable exploitation rate on LCN coho in 2010.

NORTH OF THE OREGON PRODUCTION INDEX AREA

Ocean escapement expectations in relation to management goals for selected naturally-spawning coho stocks, given 2010 preseason abundance forecasts and 2009 preseason projections for fishing patterns, are presented in Table III-7. The 2010 forecasts for Canadian coho stocks are not available, but are assumed to be at 2009 levels for this analysis. More detailed fishery management goals for Council area coho stocks are listed in Appendix A, Table A-1.

Under 2009 regulations, 2010 ocean escapements for natural coho stocks north of the OPI index area are expected to be at levels that would permit attainment of the former FMP spawning escapement conservation objectives. In addition, all annual management objectives for stocks subject to the PSC agreement would be met except for Hood Canal coho. The exploitation rate by U.S. fisheries south of the Canadian border on Interior Fraser coho is projected to be 12.4 percent, which is over the anticipated 10.0 percent allowable exploitation rate under the 2002 PST Coho Agreement. The Council area fisheries portion would be 8.8 percent.

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

TABLE III-1. Preliminary 1996-2010 preseason and postseason coho stock abundance estimates for Oregon production index area stocks in thousands of fish. (Page 1 of 2)

Stock	Year	Preseason	Postseason[a/]	Preseason/Postseason[a/]
Oregon Production Index Area Hatchery Total	1996	309.2	182.6	1.69
	1997	376.1	215.3	1.75
	1998	118.4	203.6	0.58
	1999	559.2	319.6	1.75
	2000	671.4	677.1	0.99
	2001	1,707.6	1,395.5	1.22
	2002	361.7	660.1	0.55
	2003	863.1	952.5	0.91
	2004	623.9	634.6	0.98
	2005	389.9	443.1	0.88
	2006	398.8	440.6	0.91
	2007	593.6	476.5	1.25
	2008	216.1	565.4	0.38
	2009	1,073.1	1,066.2	1.01
	2010	408.0	-	-
Columbia River Early	1996	142.2	98.0	1.45
	1997	206.9	129.8	1.59
	1998	63.8	126.4	0.50
	1999	325.5	174.9	1.86
	2000	326.3	378.0	0.86
	2001	1,036.5	815.9	1.27
	2002	161.6	324.7	0.50
	2003	440.0	645.7	0.68
	2004	313.6	389.0	0.81
	2005	284.6	282.7	1.01
	2006	245.8	251.4	0.98
	2007	424.9	291.0	1.46
	2008	110.3	333.9	0.33
	2009	672.7	681.4	0.99
	2010	245.3	-	-
Columbia River Late	1996	114.4	30.8	3.71
	1997	86.5	53.7	1.61
	1998	24.9	47.3	0.53
	1999	140.9	120.7	1.17
	2000	278.0	260.1	1.07
	2001	491.8	488.3	1.01
	2002	143.5	271.8	0.53
	2003	377.9	248.0	1.52
	2004	274.7	203.0	1.35
	2005	78.0	111.6	0.70
	2006	113.8	156.3	0.73
	2007	139.5	171.0	0.82
	2008	86.4	207.6	0.42
	2009	369.7	374.1	0.99
	2010	144.2	-	-

TABLE III-1. Preliminary 1996-2009 preseason and postseason coho stock abundance estimates for Oregon production index area stocks in thousands of fish. (Page 2 of 3)

Stock	Year	Preseason	Postseason[a/]	Preseason/Postseason[a/]
Oregon Coastal North of Cape Blanco	1996	38.5	28.0	1.38
	1997	60.4	19.0	3.18
	1998	21.6	19.7	1.10
	1999	59.4	14.4	4.13
	2000	48.5	23.4	2.07
	2001	127.3	46.9	2.71
	2002	36.6	41.6	0.88
	2003	29.3	34.5	0.85
	2004	16.6	21.7	0.77
	2005	11.5	10.7	1.07
	2006	8.6	7.9	1.09
	2007	7.0	1.3	5.38
	2008	1.7	7.1	0.24
	2009	7.3	7.5	0.97
	2010	4.4	-	-
Oregon and California Coastal South of Cape Blanco				
	1996	14.2	25.8	0.55
	1997	22.3	12.8	1.74
	1998	8.1	10.2	0.79
	1999	33.4	9.6	3.48
	2000	18.6	15.6	1.19
	2001	52.0	46.0	1.13
	2002	20.0	22.0	0.91
	2003	15.9	24.3	0.65
	2004	19.0	29.9	0.64
	2005	15.8	38.1	0.41
	2006	30.6	25.0	1.22
	2007	22.2	13.2	1.68
	2008	17.7	16.8	1.05
	2009	23.4	3.1	7.55
	2010	14.1	-	-
Lower Columbia River Natural	2007	21.5	19.4	1.11
	2008	13.4	27.2	0.49
	2009	32.7	40.4	0.81
	2010	15.1	-	-
Oregon Coastal Natural	1996	63.2	86.1	0.73
(Rivers and Lakes)	1997	86.4	27.8	3.11
	1998	47.2	29.2	1.62
	1999	60.7	51.9	1.17
	2000	55.9	69.0	0.81
	2001	50.1	163.2	0.31
	2002	71.8	304.5	0.24
	2003	117.9	278.8	0.42
	2004	150.9	197.0	0.77
	2005	152.0	150.1	1.01
	2006	60.8	116.4	0.52
	2007	255.4	60.0	4.26
	2008	60.0	170.9	0.35
	2009	211.6	257.0	0.82
	2010	148.0	-	-

TABLE III-1. Preliminary 1996-2009 preseason and postseason coho stock abundance estimates for Oregon production index area stocks in thousands of fish. (Page 3 of 3)

Stock	Year	Preseason	Postseason[a]	Preseason/Postseason[a]
Salmon Trout Enhancement Program[b]	1996	0.4	1.2	0.33
	1997	1.3	0.3	4.33
	1998	0.2	0.3	0.67
	1999	0.7	0.4	1.75
	2000	0.6	0.5	1.20
	2001	1.0	1.4	0.71
	2002	0.6	3.0	0.20
	2003	3.6	3.6	1.00
	2004	3.1	1.0	3.10
	2005	1.0	0.4	2.50
	2006	0.6	0.1	6.00
	2007	0.2	0.0	-
	2008	-	-	-
	2009	-	-	-
	2010	-	-	-

a/ Postseason estimates are based on preliminary data, and not all stocks have been updated with final estimates.
b/ Program was discontinued in 2005.

TABLE III-2. Oregon production index (OPI) area coho harvest impacts, spawning, abundance, and exploitation rate estimates in thousands of fish.[a/]

Year or Avg.	Ocean Fisheries[b/] Troll	Ocean Fisheries[b/] Sport	Oregon and California Coastal Returns: Hatcheries and Freshwater Harvest[c/]	Oregon and California Coastal Returns: OCN Spawners	Oregon and California Coastal Returns: Private Hatcheries	Columbia River Returns	Abundance	Ocean Exploitation Rate Based on OPI Abundance[d/]	OCN Exploitation Rate Based on Postseason FRAM
1970-1975	1,629.6	558.4	45.8	55.2	-	460.4	2,749.3	0.80	-
1976-1980	1,253.6	555.0	31.2	31.1	26.1	263.3	2,154.2	0.83	-
1981-1985	451.2	274.0	37.2	56.0	176.8	305.3	1,328.6	0.60	-
1986	638.9	320.6	79.3	70.0	453.7	1,549.1	3,026.7	0.34	-
1987	468.2	296.2	45.1	30.1	119.3	316.5	1,377.9	0.60	-
1988	844.7	297.2	61.1	56.8	116.1	670.9	1,989.2	0.57	-
1989	645.1	425.5	61.1	46.4	46.9	709.0	1,871.2	0.57	-
1990	275.9	357.1	28.7	22.5	35.6	196.7	1,128.5	0.69	-
1991	448.4	469.9	77.8	38.1	35.1	955.1	1,823.2	0.45	-
1992	67.4	256.5	51.0	44.2	-	216.1	610.0	0.51	-
1993	13.1	140.8	38.6	55.7	-	114.2	342.1	0.42	-
1994	2.7	3.0	28.1	48.5	-	169.2	250.5	0.02	0.07
1995	5.4	43.5	37.5	57.3	-	74.8	215.9	0.22	0.12
1996	7.0	31.8	45.7	79.3	-	113.0	297.3	0.14	0.08
1997	5.5	22.4	26.9	31.6	-	148.1	204.6	0.12	0.12
1998	3.5	12.8	29.4	34.3	-	168.4	265.2	0.06	0.08
1999	3.6	36.5	22.6	51.2	-	274.1	414.0	0.10	0.08
2000	25.2	74.6	33.3	81.1	-	547.6	901.0	0.13	0.07
2001	38.1	216.8	75.7	185.2	-	1,108.3	1,438.6	0.16	0.07
2002	15.0	118.7	54.0	269.0	-	499.9	990.5	0.14	0.12
2003	28.8	252.4	45.0	235.3	-	677.3	1,183.6	0.23	0.14
2004	26.2	159.3	38.1	199.9	-	442.5	826.8	0.22	0.15
2005	10.5	58.2	42.5	164.1	-	341.0	592.1	0.12	0.11
2006	4.5	47.5	29.3	132.8	-	386.4	557.1	0.09	0.06
2007	26.2	128.5	11.0	71.4	-	331.1	536.5	0.28	0.11
2008[e/]	0.6	26.4	14.8	165.8	-	488.4	736.3	0.04	0.02
2009[e/]	27.7	201.2	15.6	235.5	-	721.6	1,323.2	0.19	0.11

a/ The OPI area includes ocean and inside harvest impacts and escapement to streams and lakes south of Leadbetter Pt., Washington.

b/ Includes estimated nonretention mortality: troll fishery--hook-and-release mortality for 1982-2005 and drop-off mortality for all years; sport fishery--hook-and-release mortality for 1994-2005 and drop-off mortality for all years.

c/ Includes returns from Salmon-Trout Enhancement Program (STEP) smolt releases through the 2007 return year, after which the program was terminated.

d/ Ocean fishery impacts on private hatchery stock and returns to private hatcheries are excluded in calculating the OPI area stock aggregate ocean exploitation rate index.

e/ Preliminary.

TABLE III-3. Preseason forecasts and postseason estimates of ocean escapements for selected Washington coastal adult natural coho stocks in thousands of fish.

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
	Quillayute River Fall			**Hoh River**			**Queets River**			**Grays Harbor[a]**		
1984	7.0	11.0	0.64	2.7	7.7	0.35	5.2	9.7	0.54	28.7	103.8	0.28
1985	19.2	15.8	1.22	6.6	5.2	1.27	11.3	6.0	1.88	56.4	25.1	2.25
1986	6.1	17.1	0.36	3.9	6.4	0.61	5.2	5.8	0.90	51.6	33.3	1.55
1987	11.7	23.8	0.49	5.5	7.2	0.76	9.0	8.9	1.01	103.3	55.7	1.85
1988	10.4	9.1	1.14	2.0	2.6	0.77	4.7	4.5	1.04	26.4	58.0	0.46
1989	14.5	11.1	1.31	5.7	5.4	1.06	6.2	5.4	1.15	43.0	60.9	0.71
1990	15.2	9.5	1.60	5.1	4.5	1.13	5.9	7.1	0.83	48.3	57.3	0.84
1991	8.8	10.6	0.83	3.4	5.4	0.63	7.9	8.6	0.92	138.0	108.7	1.27
1992	12.5	13.6	0.92	4.9	5.0	0.98	5.6	7.0	0.80	48.4	40.9	1.18
1993	7.6	4.7	1.62	4.8	1.9	2.53	6.5	5.4	1.20	84.7	37.3	2.27
1994	7.0	6.4	1.09	3.0	1.4	2.14	3.6	1.2	3.00	31.3	11.8	2.65
1995	8.5	14.3	0.59	4.4	5.4	0.81	7.2	7.3	0.99	64.4	58.9	1.09
1996	9.2	14.6	0.63	3.0	5.8	0.52	5.4	10.7	0.50	82.7	87.6	0.94
1997	5.1	5.0	1.02	1.6	1.4	1.14	2.4	2.0	1.20	14.8	19.1	0.77
1998	7.4	17.0	0.44	3.2	5.2	0.62	4.5	4.6	0.98	27.1	41.0	0.66
1999	12.8	19.5	0.66	2.8	6.3	0.44	3.7	5.1	0.73	50.3	38.1	1.32
2000	8.2	17.7	0.46	3.3	8.8	0.38	2.5	8.7	0.29	44.2	41.9	1.05
2001	20.6	36.7	0.56	7.6	14.8	0.51	10.6	28.4	0.37	46.6	72.6	0.64
2002	18.5	34.7	0.53	6.9	11.2	0.62	10.2	16.1	0.63	50.3	111.3	0.45
2003	21.2	25.2	0.84	10.4	8.1	1.28	19.6	13.2	1.48	52.3	95.2	0.55
2004	17.7	25.1	0.71	6.6	6.3	1.05	14.7	10.0	1.47	101.1	66.1	1.53
2005	16.1	22.1	0.73	6.4	8.2	0.78	14.1	9.7	1.45	78.5	44.0	1.78
2006	13.0	12.2	1.07	5.6	2.3	2.43	7.1	6.4	1.11	60.3	20.3	2.97
2007	10.8	10.9	0.99	5.4	5.1	1.06	13.6	6.1	2.23	59.4	31.9	1.86
2008	10.0	12.9	0.78	3.9	4.3	0.91	8.9	6.2	1.44	41.5	45.7	0.91
2009[b]	17.8	23.3	0.76	7.9	8.2	0.96	25.5	NA	NA	53.8	NA	NA

a/ The source for postseason return estimates is Washington Department of Fish and Wildlife.

b/ Postseason returns are preliminary.

TABLE III-4. Preseason forecasts and postseason estimates of ocean escapements for selected Puget Sound adult natural coho stocks in thousands of fish.

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
		Skagit River			**Stilliguamish River**			**Hood Canal**	
1984	29.6	36.0	0.82	NA	26.9	NA	NA	57.5	NA
1985	26.1	27.4	0.95	NA	34.4	NA	NA	38.5	NA
1986	43.5	69.7	0.62	37.0	49.9	0.74	NA	82.2	NA
1987	33.0	39.4	0.84	29.7	46.3	0.64	NA	71.7	NA
1988	29.6	28.4	1.04	24.5	35.4	0.69	18.2	15.5	1.17
1989	31.2	24.4	1.28	24.5	13.5	1.81	36.8	25.5	1.44
1990	37.6	24.3	1.55	30.8	34.1	0.90	43.9	14.2	3.09
1991	40.8	10.3	3.96	32.9	11.3	2.91	17.6	15.3	1.15
1992	35.7	9.4	3.80	18.7	18.0	1.04	10.1	19.9	0.51
1993	28.1	14.2	1.98	24.5	10.6	2.31	39.5	16.7	2.37
1994	17.9	30.3	0.59	10.2	30.3	0.34	13.5	57.0	0.24
1995	30.0	15.8	1.90	32.7	20.4	1.60	19.3	41.1	0.47
1996	26.7	8.6	3.09	29.8	12.5	2.38	15.4	37.2	0.41
1997	34.2	45.7	0.75	15.7	14.1	1.12	38.1	101.8	0.37
1998	41.1	85.2	0.48	37.7	31.1	1.21	87.3	118.5	0.74
1999	53.4	38.3	1.39	27.3	7.5	3.64	45.2	17.6	2.57
2000	24.7	75.1	0.33	15.0	31.2	0.48	50.4	39.7	1.27
2001	46.9	115.6	0.41	18.1	81.8	0.22	40.5	110.0	0.37
2002	79.9	70.8	1.13	14.5	30.4	0.48	25.6	81.0	0.32
2003	97.4	114.4	0.85	27.7	49.8	0.56	25.7	199.9	0.13
2004	129.4	151.0	0.86	26.6	73.9	0.36	79.8	219.7	0.36
2005	48.6	53.1	0.92	41.9	29.1	1.44	79.8	68.3	1.17
2006	87.8	12.8	6.86	32.7	11.8	2.77	46.4	49.7	0.93
2007[b/]	21.7	71.2	0.30	52.0	45.2	1.15	30.9	78.6	0.39
2008[b/]	51.3	32.1	1.60	25.5	15.3	1.67	21.5	25.8	0.83
2009[b/]	27.2	NA	-	10.2	NA	-	36.1	NA	-

a/ Preseason forecasts are Puget Sound (4B) runsizes which are defined as the spawning escapement plus Puget Sound net fishery catch. Puget Sound runsize does not include Puget Sound troll and recreational catch. Postseason returns are Puget Sound runsizes from 1984-1995 and total terminal runsize thereafter. Total terminal runsize includes spawning and recreational catch within the terminal fisheries.

b/ Preliminary.

TABLE III-5. Mass marked 2007 brood coho available to 2010 Council fisheries. The mark used is an adipose fin clip.

	Ocean Recruits		Percent
Region	Natural	Hatchery	Mass Marked
PUGET SOUND STOCKS:			
Nooksack-Samish and 7/7A Independent	9,600	35,999	75.9%
Skagit	95,880	9,541	7.9%
Stillaguamish	25,900	0	0.0%
Snohomish	99,400	22,595	14.1%
South Puget Sound Normal	25,360	160,332	76.3%
South Puget Sound Delayed	0	26,075	97.6%
Hood Canal	33,193	51,174	54.0%
Strait of Juan de Fuca and Area 9	8,463	7,768	35.4%
Puget Sound Total	297,796	313,484	45.6%
WASHINGTON COASTAL STOCKS:			
North Coast Independent Tributaries	4,240	7,614	51.0%
Quillayute Summer	2,801	3,198	52.9%
Quillayute Fall	22,037	17,742	38.5%
Hoh	7,608	0	0.0%
Queets	0	0	NA
Quinault	16,706	26,576	53.2%
Grays Harbor	0	0	NA
Willapa Bay	20,400	78,723	75.7%
Washington Coastal Total	73,792	133,853	59.1%
COLUMBIA RIVER STOCKS:			
Columbia River Early	10,002	235,298	70.7% [a/]
Columbia River Late	5,147	139,053	80.6% [a/]
Columbia River Total	15,149	374,351	74.4% [a/]
OREGON COASTAL	148,000	18,499	4.7%
SOUTHERN BRITISH COLUMBIA STOCKS[b/]**:**			
Georgia Strait Mainland	10,674	13,914	23.2%
Georgia Strait Vancouver Island	25,602	7,014	14.4%
Johnstone Strait	13,624	7,138	24.8%
Southwest Vancouver Island	3,242	40,907	31.5%
Northwest Vancouver Island	2,066	3,494	0.0%
Lower Fraser River	1,162	35,513	81.4%
Interior Fraser River	15,625	324	0.5%
Southern British Columbia Total	71,995	108,304	29.5%

a/ Columbia River estimate of percent mass marked includes natural production.

b/ For this assessment, the percent mass marked was assumed to be the same as in 2009.

TABLE III-6. Projected coho mark rates for 2010 fisheries under base period fishing patterns (percent marked).

Area	Fishery	June	July	August	Sept
Canada					
Johnstone Strait	Recreational	-	29%	27%	-
West Coast Vancouver Island	Recreational	43%	37%	35%	39%
North Georgia Strait	Recreational	39%	39%	39%	36%
South Georgia Strait	Recreational	38%	40%	31%	34%
Juan de Fuca Strait	Recreational	44%	45%	49%	44%
Johnstone Strait	Troll	49%	39%	30%	37%
NW Vancouver Island	Troll	45%	42%	42%	40%
SW Vancouver Island	Troll	51%	48%	49%	48%
Georgia Strait	Troll	48%	49%	52%	46%
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	54%	51%	49%	49%
Strait of Juan de Fuca (Area 6)	Recreational	53%	47%	48%	45%
San Juan Island (Area 7)	Recreational	32%	41%	43%	35%
North Puget Sound (Areas 6 & 7A)	Net	-	45%	38%	44%
Council Area					
Neah Bay (Area 4/4B)	Recreational	37%	53%	51%	56%
LaPush (Area 3)	Recreational	53%	55%	57%	47%
Westport (Area 2)	Recreational	63%	63%	61%	55%
Columbia River (Area 1)	Recreational	72%	70%	68%	69%
Tillamook	Recreational	64%	60%	54%	39%
Newport	Recreational	60%	56%	53%	38%
Coos Bay	Recreational	49%	46%	34%	20%
Brookings	Recreational	42%	30%	26%	11%
Neah Bay (Area 4/4B)	Troll	52%	50%	52%	51%
LaPush (Area 3)	Troll	55%	57%	52%	51%
Westport (Area 2)	Troll	50%	54%	59%	58%
Columbia River (Area 1)	Troll	65%	64%	63%	64%
Tillamook	Troll	62%	59%	58%	55%
Newport	Troll	58%	57%	53%	50%
Coos Bay	Troll	49%	46%	40%	27%
Brookings	Troll	36%	37%	40%	54%
Columbia River					
Buoy 10	Recreational	-	-	-	71%

TABLE III-7. Estimated ocean escapements for critical natural and Columbia River hatchery coho stocks (thousands of fish) based on preliminary 2010 preseason abundance forecasts and 2009 Council regulations.[a/]

	Ocean Escapement Estimates Under 2009 Regulations[b/]		
Stock	2010 Preseason Abundance	2009 Preseason Abundance	2010 FMP Conservation Objective[c/]
Natural Coho Stocks			
Skagit	76.9	27.5	Exploitation Rate ≤60.0%[d/]
Stillaguamish	19.2	10.5	Exploitation Rate ≤50.0%[d/]
Snohomish	73.6	53.7	Exploitation Rate ≤40.0%[d/]
Hood Canal	23.4	39.1	Exploitation Rate ≤45.0%[d/]
Strait of Juan de Fuca	7.4	19.1	Exploitation Rate ≤20.0%[d/]
Quillayute Fall	19.7	18.5	6.3 - 15.8 Spawners
Hoh	5.7	8.8	2.0 - 5.0 Spawners
Queets	e/	31.4	5.8 - 14.5 Spawners
Grays Harbor	e/	56.8	35.4 Spawners
LCN	11.1 (27.5%)	31.7 (2.3%)	Exploitation Rate TBD
OCN	204.4 (30.2%)	206.9 (2.3%)	Exploitation Rate ≤15.0%
R/K	NA (7.0%)	NA (0.5%)	Exploitation Rate ≤13.0%
Hatchery Coho Stocks			
Columbia Early	96.7	636.6	18.6 Hatchery Escapement
Columbia Late	40.6	342.1	11.9 Hatchery Escapement

a/ Quota levels include harvest and hooking mortality estimates used in planning the Council's 2009 ocean fisheries and a coho catch for the Canadian troll fishery off the West Coast of Vancouver Island (WCVI).

b/ 2009 preseason regulations include the following coho quota fisheries: U.S. Canada Border to Cape Falcon: Treaty Indian troll - 60,000 non-selective; non-Indian troll - 33,600 selective; recreational - 176,400 selective; Cape Falcon to OR/CA border: recreational - 117,000 selective; troll - 11,000 nonselective. Ocean escapement is generally the estimated number of coho escaping ocean fisheries and entering freshwater. For Puget Sound stocks, ocean escapement is the estimated number of coho entering Puget Sound (Area 4B) which are available for U.S. net fisheries in Puget Sound and spawning escapement after impacts associated with the Canadian and Puget Sound troll and recreational fisheries have been deducted. For the OCN coho stock, this value represents the estimated spawner escapement in SRS accounting. For Columbia River hatchery and LCN stocks, ocean escapement represents the number of coho before the Buoy 10 fishery; the LCN exploitation rate shown is the Council fisheries exploitation rate, which had an ER forecast of 12.5% and an ESA limit of 20% including mainstem Columbia River fisheries.

c/ Goals represent Salmon FMP conservation objectives, ESA consultation standards, or hatchery escapement needs. Spawning escapement goals are not directly comparable to ocean escapement because the latter occur before inside fisheries.

d/ Assumed exploitation rate based on preliminary abundance forecasts.

e/ No runsize forecast was available; for modeling purposes, abundance was set at base period levels (Queets: 20.1; Grays Harbor: 105.2).

TABLE III-8. Comparison of Lower Columbia natural (LCN), Oregon coastal natural (OCN), and Rogue/Klamath (RK) coho projected harvest mortality and exploitation rates by fishery under Council-adopted 2009 regulations and preliminary 2010 preseason abundance estimates.

	Projected Harvest Mortality and Exploitation Rate					
	LCN		OCN		RK	
Fishery	Number	Percent	Number	Percent	Number	Percent
SOUTHEAST ALASKA	0	0.0%	0	0.0%	0	0.0%
BRITISH COLUMBIA	13	0.1%	387	0.3%	14	0.1%
PUGET SOUND/STRAITS	19	0.1%	120	0.1%	0	0.0%
NORTH OF CAPE FALCON						
Recreational	1,756	11.5%	3,420	2.3%	14	0.1%
Treaty Indian Troll	509	3.3%	1,377	0.9%	0	0.0%
Non-Indian Troll	477	3.1%	1,406	0.9%	1	0.0%
SOUTH OF CAPE FALCON						
Recreational:	1,211	7.9%				
Cape Falcon to Humbug Mt.			21,477	14.3%	170	1.5%
Humbug Mt. to Horse Mt. (KMZ)			2,433	1.6%	408	3.8%
Fort Bragg			0	0.0%	0	0.0%
South of Pt. Arena			0	0.0%	0	0.0%
Troll:	227	1.5%				
Cape Falcon to Humbug Mt.			5,906	4.0%	122	1.1%
Humbug Mt. to Horse Mt. (KMZ)			2	0.0%	0	0.0%
Fort Bragg			0	0.0%	0	0.0%
South of Pt. Arena			0	0.0%	0	0.0%
BUOY 10	3,371	22.0%	2,051	1.4%	0	0.0%
ESTUARY/FRESHWATER	NA	NA	6,502	4.3%	26	0.2%
TOTAL	7,583	49.5%	45,081	30.1%	755	6.8%

TABLE III-9. Maximum allowable fishery impact rate for OCN coho under Amendment 13 matrix (Appendix A, Table A-2) and the OCN work group matrix (Appendix A, Table A-3) based on parent escapement levels by stock component and marine survival category.[a/]

	Estimated OCN Coho Spawners by Stock Component					Hatchery	Amendment 13 Matrix			OCN Work Group Matrix[b/]		
Fishery Year (t)	Parent Spawner Year (t-3)	Northern	North-Central	South-Central	Southern	Jack Survival Rate (t-1)	Marine Survival Category	Parental Spawner Category	Maximum Allowable Impacts	Marine Survival Category	Parental Spawner Category	Maximum Allowable Impacts
1998	1995	3,900	13,600	36,500	3,400	0.04%	Low	Very Low	≤10-13%	Extremely Low	Very Low	≤8%
1999	1996	3,300	18,100	52,600	5,200	0.10%	Med	Very Low	≤15%	Low	Critical	0-8%
2000	1997	2,100	2,800	18,400	8,200	0.12%	Med	Very Low	≤15%	Low	Critical	0-8%
2001	1998	2,600	3,300	25,900	2,300	0.27%	Med	Very Low	≤15%	Medium	Critical	0-8%
2002	1999	8,900	11,800	29,100	1,400	0.09%	Med	Low	≤15%	Low	Low	≤15%
2003	2000	17,900	14,300	36,500	11,000	0.20%	Med	Low	≤15%	Med	Low	≤15%
2004	2001	33,500	25,200	112,000	12,600	0.14%	Med	Low	≤15%	Med	Low	≤15%
2005	2002	52,500	104,000	104,100	8,400	0.11%	Med	High	≤20%	Low	High	≤15%
2006	2003	59,600	68,900	99,800	6,800	0.12%	Med	High	≤20%	Low	High	≤15%
2007	2004	33,100	40,400	96,400	24,500	0.17%	Med	Med	≤20%	Med	Med	≤20%
2008	2005	16,500	51,400	86,300	10,000	0.07%	Low	High	≤15%	Extremely Low	High	≤8%
2009	2006	24,100	21,200	82,400	3,900	0.27%	Med	Low	≤15%	Med	Low	≤15%
2010	2007	17,500	12,300	36,000	5,200	0.12%	Low	Low	≤15%	Low	Low	≤15%
2011	2008	27,700	57,900	79,100	400	-	-	High	-	-	High	-
2012	2009	39,600	74,600	116,300	2,600	-	-	High	-	-	High	-

a/ Under the NMFS ESA consultation standards, the southern stock component is managed for a total allowable Marine Exploitation rate of 13%, as represented by Rogue/Klamath hatchery stocks, which is separate from these OCN coho impact rates.

b/ Developed by the OCN work group as a result of the 2000 Review of Amendment 13.

CHAPTER IV - FRASER RIVER AND PUGET SOUND PINK SALMON ASSESSMENTS

Two major runs comprise the pink salmon population available to Council fisheries during odd-numbered years: the Fraser River (British Columbia) run, which is more abundant, and the Puget Sound run. The 2009 run size forecast for Fraser pinks was 17.54 million fish; actual run size was estimated at 19.5 million. The 2009 Puget Sound pink salmon run size forecast was 5.47 million, with 5.14 million natural and 3,300 hatchery fish. The estimated actual run size was not available at the time of this report.

TABLE IV-1. Estimated annual (odd-numbered years) run sizes and forecasts for Fraser River and Puget Sound pink salmon in millions of fish.

	Puget Sound		Fraser River[a/]	
Year	Forecast	Actual	Forecast	Actual
1977	NA	0.88	NA	8.21
1979	NA	1.32	NA	14.40
1981	NA	0.50	NA	18.69
1983	NA	1.01	NA	15.35
1985	NA	1.76	NA	19.10
1987	NA	1.57	NA	7.17
1989	NA	1.93	NA	16.63
1991	NA	1.09	NA	22.18
1993	NA	1.06	NA	16.98
1995	3.4	2.08	NA	12.90
1997	NA	0.44	11.40	8.18
1999	NA	0.96	NA	3.59
2001	2.92	3.56	5.47	21.17
2003	2.32	2.90	17.30	26.00
2005	1.98	1.23	16.30	10.00
2007	3.34	2.45	19.60	11.00
2009[b/]	5.47	NA	17.54	19.50

a/ Total run size.
b/ Preliminary forecast.

APPENDIX A
SUMMARY OF COUNCIL STOCK MANAGEMENT GOALS

LIST OF TABLES

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 1 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
	- - - CHINOOK - - -		
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.			
Sacramento River Fall	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).	Yes. A conservation alert or overfishing concern will be based on a failure to meet 122,000 adult spawners.	Below conservation objective in 2007-2009; below average abundance in 2010. Contributes to ocean fisheries off California, southern and central Oregon, Washington, and British Columbia. Council management actions on this stock are directed at fisheries south of Cape Falcon.
Sacramento River Spring Threatened (1999)	Listed as threatened under ESA. NMFS ESA consultation standard/recovery plan. Present level of ocean fishery impacts limited by measures constraining harvest on Sacramento River winter and Klamath River fall Chinook.	No. NMFS ESA consultation standard provides interim rebuilding program MSY criteria undefined.	Contributes to ocean fisheries off California, but also known to occur off Oregon. Ocean fishery impacts primarily incidental to harvest of Sacramento River fall Chinook and may be lower due to differences in run timing. Stock has been affected by man-caused loss and deterioration of freshwater habitat.
Sacramento River Winter Endangered (1994)	Listed as endangered under ESA. NMFS ESA consultation standard specifies duration and timing of commercial and recreational fisheries south of Pt. Arena.	No. NMFS ESA consultation standard provides interim rebuilding program.	Believed to contribute predominantly to ocean fisheries south of Pt. Arena. Ocean fishery impacts incidental to harvest of Sacramento River fall Chinook.
NORTHERN CALIFORNIA COAST - All fall and spring stocks of California streams north of the entrance 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 monitoring program is under consideration by CDFG for stocks originating from the Smith, Eel, Mattole, and Mad Rivers, which might provide a more thorough management 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 primarily from mitigation programs for dams constructed in both Upper Klamath and Trinity Rivers.			
Eel, Mattole, Mad, and Smith Rivers (Fall and Spring) Eel, Mattole, and Mad River stocks - Threatened (1999)	Eel, Mattole, and Mad River stocks listed as threatened under ESA. Data insufficient to define MSY criteria. Indices of spawning abundance limited to one tributary of the Mad River and two tributaries of the Eel River. NMFS ESA consultation standard/recovery plan for Eel, Mattole, and Mad River stocks requires that the projected ocean harvest rates on age-4 Klamath River fall Chinook not exceed 16.0%.	Eel, Mattole, and Mad - No. NMFS ESA consultation standard provides interim rebuilding program. MSY criteria undefined. Smith - Indirectly. Data insufficient to define MSY criteria. CDFG developing an assessment and monitoring program.	Very limited management data available. Believed to occur in ocean fisheries off northern California and southern Oregon. Ocean fishery impacts incidental to fisheries for Sacramento and Klamath Rivers fall Chinook. No preseason or postseason abundance estimates available.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 2 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		- - - CHINOOK - - -	
Klamath River Fall (Klamath and Trinity Rivers)	33% to 34% of potential adult natural spawners, but no fewer than 35,000 naturally spawning adults in any one year. Brood escapement rate must average 33% to 34% over the long-term, but an individual brood may vary from this range to achieve the required tribal/nontribal annual allocation. Objective designed to allow a wide range of spawner escapements from which to develop an MSY objective or proxy while protecting the stock during prolonged periods of reduced productivity. Adopted 1988 based on Hubbell and Boydstun (1985); KRTT (1986); PFMC (1988); minor technical modifications in 1989 and 1996 (Table I-1). Natural spawners to maximize recruitment are estimated at 41,000 to 106,000 adults (Hubbell and Boydstun 1985), and 40,700 (STT 2005).	Yes. A conservation alert or overfishing concern will be based on a failure to meet the 35,000 floor. The response to a conservation alert was modified by Amendment 15 (2007) to allow *de minimis* fishing impacts under certain circumstances.	Above conservation objective and rebuilding plan target natural-area adult escapement in 2009.; below average abundance in 2010. Contributes primarily to ocean fisheries from Humbug Mt., Oregon to Horse Mt., California (the KMZ) and to Klamath River tribal and recreational fisheries. Coastwide impacts are considered in meeting allocation requirements for Indian tribes with federally recognized fishing rights and the inland fishery. Specific management measures for this stock generally are implemented from Pt. Sur, California to Cape Falcon, Oregon. Rebuilding plan raised annual natural area spawning escapement objective to 40,700 adults beginning in 2008 until overfishing concern is ended (two consecutive years ≥40,700 or 3 of 4 consecutive years ≥ 35,000).
Klamath River Spring (Klamath and Trinity Rivers)	Undefined. Productive potential believed to be protected by fishery management objective for Klamath River fall Chinook, which includes an inside allocation to tribal and sport fisheries.	Indirectly. MSY criteria undefined.	Little information available on ocean distribution. Believed to occur in ocean fisheries off northern California and southern Oregon (based on Trinity River Hatchery fish).
OREGON COAST - All fall and spring stocks from Oregon streams south of the Columbia River. No preseason 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 to 90 natural adult spawners per mile in nine standard index streams). This objective is based on optimal escapement estimates for individual coastal rivers at habitat capacity (Thompson 1977). Lower end of the objective range is nearly 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. Far-north migrating, naturally spawning stocks are also subject to the 1999 Chinook agreement of the Pacific Salmon Commission and may be subject to exploitation rate constraints in U.S. fisheries south of the Canada/Washington border.			
Southern Oregon (Aggregate of fall and spring stocks in all streams south of Elk River; Rogue River fall stock is used to indicate relative abundance and ocean contribution rates)	Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982). ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council.	Yes, based on postseason estimates of <60 natural adult spawners per mile. Conservation promoted by the objective for Klamath River fall Chinook, which includes a large inside allocation component that reduces ocean fishery exploitation rate in areas inhabited by these fish, and by ESA consultation standard for California coastal Chinook, which limits projected ocean harvest rates on age-4 Klamath River fall Chinook to ≤ 16.0%.	Medium abundance. Data limited except for Rogue River fall stock. Stocks migrate southerly or remain local, and fall Chinook contribute to ocean fisheries off northern California and Oregon, less so for spring stocks.
Central and Northern Oregon (Aggregate of fall and spring stocks in all streams from the Elk River to just south of the Columbia River)	Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982). ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council.	Yes, based on postseason estimates of <60 natural adult spawners per mile.	Below conservation objective in 2007-2008. Stocks migrate northward and contribute to ocean fisheries off British Columbia and southeast Alaska, and to a lesser degree, off Washington and Oregon. Nehalem, Siletz, and Siuslaw stocks are subject to the PSC ISBM harvest limitations.

TABLE A-1. Conservation objectives and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 3 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
- - - CHINOOK - - -			
COLUMBIA RIVER BASIN - All pertinent fall, summer, and spring stocks of the Columbia River and its tributaries. Stocks within this complex are noted by area of origin: lower river (below Bonneville Dam), mid-river (Bonneville to McNary Dams), and upper river (above McNary Dam). Spawner escapement goals for these stocks are set through procedures of the U.S. District Court in *U.S. v. Oregon* and subsequent court orders. These goals are set forth in the Columbia River Fishery Management Plan and are recognized in the Council's conservation objectives. Annual inside fishery management planning activities are conducted within the Columbia River Compact and other state and tribal management forums. The Columbia River Compact, initially established by Oregon and Washington to jointly administer commercial fisheries within the Columbia River, takes into account the impacts from other state and tribal fisheries (e.g., recreational, ceremonial, subsistence, etc.) authorized under *U.S. v. Oregon*. The majority of ocean Chinook harvest north of Cape Falcon is provided by Columbia River salmon stocks, primarily hatchery production of tule fall Chinook from the Bonneville Pool (Spring Creek) and lower river hatcheries, smaller numbers of upper river bright hatchery and natural fall Chinook, and some lower river hatchery spring Chinook (Cowlitz). Hatchery objectives are based on long-range production programs and/or mitigation requirements associated with displaced natural stocks. Threatened Snake River fall Chinook, which suffer from severe dam passage mortalities and extreme loss of freshwater habitat, are of prime concern in limiting ocean exploitation rates in all ocean fisheries north of Pigeon Pt., California. These limits act to provide considerable protection to other weak natural stocks subject to ocean fishery impacts. Naturally spawning stocks are also subject to the 1999 Chinook agreement of the Pacific Salmon Commission and may be subject to exploitation rate constraints in U.S. fisheries south of the Canada/Washington border.			
North Lewis River Fall Threatened (1999)	NMFS ESA consultation standard/recovery plan (not established at time of printing). McIsaac (1990) stock-recruit analysis supports MSY objective of 5,700 natural adult spawners.	No. Listed stock. NMFS ESA consultation standard provides interim rebuilding program. Base period Council-area ocean fishery impacts around 7%.	Below conservation objective in 2007-2009; below average abundance in 2010. Present in ocean fisheries north of Cape Falcon to SE Alaska. Subject to the PSC ISBM harvest limitations.
Lower River Hatchery Fall	15,400 adults to meet egg-take goal or as determined by management entities. 41.0% total RER in 2008 for ESA listed lower Columbia River natural tule fall Chinook estimated from Cowlitz, Washougal, Kalama and Big Creek hatchery fall Chinook.	No (hatchery exception or listed stock). NMFS ESA consultation standard provides interim rebuilding program.	Average abundance in 2010. Major contributor to ocean fisheries north of Cape Falcon to central British Columbia.
Lower River Hatchery (Spring)	2,700 adults to meet Cowlitz, Kalama, and Lewis Rivers broodstock needs.	No (hatchery exception).	Below average abundance in 2010. Present in ocean fisheries north of Cape Falcon to southeast Alaska.
Upper Willamette (Spring) Threatened (1999)	NMFS ESA consultation standard/recovery plan (ODFW FMEP). Willamette River Management Plan provides an MSY proxy of 30,000 to 45,000 hatchery and natural adults over Willamette River falls, depending on run size.	No. Listed stock. NMFS ESA consultation standard provides interim rebuilding program. Base period Council-area ocean fishery exploitation rate of <5% prevents effective Council fishery management and rebuilding.	Below average abundance in 2010. Present in fisheries north of Cape Falcon to southeast Alaska.
Mid-Columbia Bright Hatchery (Fall)	None for ocean fishery management.	No (hatchery exception).	Average abundance in 2010. Contributor to ocean fisheries off Washington, British Columbia, and southeast Alaska.
Spring Creek Hatchery (Fall)	7,000 adults to meet hatchery egg-take goal.	No (hatchery exception).	Below recent Average abundance in 2010. Major contributor to ocean fisheries north of Cape Falcon to southern British Columbia.

TABLE A-1. Conservation objectives and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 4 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		- - - CHINOOK - - -	
COLUMBIA RIVER BASIN (continued)			
Klickitat, Deschutes, John Day, and Yakima Rivers (Spring)	Hold ocean fishery impacts at or below base period (<1%) and recognize CRFMP objective - MSY proxy of 115,000 adults above Bonneville Dam, including upper and mid-Columbia and Snake River stocks (state and tribal management entities considering separate conservation objectives for these stocks).	Limited. Base period Council-area ocean fishery exploitation rate of <1% prevents effective Council fishery management and rebuilding. Major habitat restoration addressing water withdrawals and dam passage and blockages is necessary for rebuilding.	Average abundance in 2010. No significance to ocean fisheries, infrequent occurrence in fisheries north of Cape Falcon to Alaska.
Snake River Fall Threatened (1992)	NMFS ESA consultation/recovery standard. Since 1995, Council has met a standard of limiting its fisheries so that the total exploitation rate on age-3 and age-4 Lyons Ferry Hatchery fall Chinook (representing Snake River fall Chinook) for all ocean fisheries (including Canada) has been ≤70.0% of the 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. NMFS ESA consultation standard provides interim rebuilding program. Recovering historic abundance unlikely, as dams block former primary spawning area.	Depressed. Present in ocean fisheries from central California to southeast Alaska with greatest contribution to Canadian fisheries. Primary impacts in Council fisheries north of Cape Falcon, but also extending to Pigeon Pt., California.
Snake River Spring/Summer Threatened (1992)	Not applicable for ocean fisheries.	No. Listed stock. Base period Council-area ocean fishery impacts rare (unmeasurable). Dam passage mortality must be reduced to allow stock recovery.	Depressed, recent upward trend. Rare occurrence in ocean fisheries from Washington to southeast Alaska.
Upper River Bright (Fall)	40,000 natural bright adults above McNary Dam (MSY proxy) adopted in 1984 based on CRFMP. The management goal was increased to 45,000 by Columbia River managers between 1986 and 1993. Since 1994, inriver fisheries management based on a NMFS ESA consultation standard exploitation rate to protect Snake River wild fall Chinook	Limited. Base period Council-area ocean fishery exploitation rate <4% prevents effective Council fishery management and rebuilding.	Average abundance in 2010. Major contributor to ocean fisheries off Canada, and to a lesser extent, Washington and Oregon. Primary impact area north of Cape Falcon. Subject to the PSC ISBM harvest limitations.
Upper River Summer	Hold ocean fishery impacts at or below base period (<2%); recognize *U.S. v. Oregon* objective - MSY proxy of 29,300 adults to river mouth destined to for areas above Priest Rapids Dam (excludes Snake River stocks).	Limited. Base period Council-area ocean fishery exploitation rate <2% prevents effective Council fishery management and rebuilding. Dam passage mortalities must be reduced to allow rebuilding.	Long-term depressed abundance, significant upward trend in the last few years. Present in ocean fisheries north of Cape Falcon to southeast Alaska. Subject to the PSC ISBM harvest limitations.
Upper Columbia River Spring Endangered (1999)	None applicable to ocean fisheries. Ensure ocean fishery impacts remain rare and recognize CRFMP objective - MSY proxy of 115,000 adults above Bonneville Dam, including upper and mid-Columbia and Snake River stocks (state/tribal management entities considering separate objectives for these stocks).	No. Listed stock. Base period Council-area ocean fishery impacts rare (not measurable), making Council management and rebuilding ineffective. Reduce dam passage mortalities to allow rebuilding.	Long-term depressed abundance, recent upward trend. Captive broodstock programs started in 1997. No significance to ocean fisheries. Rare occurrence in ocean fisheries north of Cape Falcon to Canada.

TABLE A-1. Conservation objectives and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 5 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
	- - - CHINOOK - - -		
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). This stock complex consists of several natural stocks, generally of small to medium sized populations, and some hatchery production (Willapa Bay and the Quinault River). Stocks in this complex tend to range further north than most Columbia River stocks and, while present in fisheries from Cape Falcon to southeast Alaska, are not significantly impacted by Council-area ocean fisheries. These stocks qualify as exceptions to the Council's overfishing criteria, due to very low fishery impacts. Spawning escapement goals for stocks managed within this complex, established in U.S. District Court by WDFW and the treaty tribes, are recognized in the Council's conservation objectives below. 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 the conservation objectives below if agreed to by WDFW and the treaty tribes under the provisions of *Hoh v. Baldrige* and subsequent U.S. District Court orders. After agreement is reached on the annual targets, ocean fishery escapement objectives are established for each river, or region of origin, which include provisions for treaty allocation and inside, non-Indian fishery needs. Naturally spawning stocks are also subject to the 1999 Chinook agreement of the Pacific Salmon Commission and may be subject to exploitation rate constraints in U.S. fisheries south of the Canada/Washington border.			
Willapa Bay Fall (Natural)	No FMP objective. WDFW goal of 4,400 natural spawners.	Limited (exploitation rate exception).	
Willapa Bay Fall (Hatchery)	9,800 adult return to hatchery.	No (hatchery exception).	
Grays Harbor Fall	14,600 natural adult spawners--MSP based on full seeding of spawning and rearing habitat (WDF 1979).	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Grays Harbor Spring	1,400 natural adult spawners.	Limited (exploitation rate exception).	
Quinault Fall	Hatchery production.	No (hatchery exception).	
Queets Fall	Manage terminal fisheries for 40% harvest rate, but no less than 2,500 natural adult spawners, the MSY level estimated by Cooney (1984).	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Queets Spring/Summer	Manage terminal fisheries for 30% harvest rate, but no less than 700 natural adult spawners.	Limited (exploitation rate exception).	
Hoh Fall	Manage terminal fisheries for 40% harvest rate, but no less than 1,200 natural adult spawners, the MSY level estimated by Cooney (1984).	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Hoh Spring/Summer	Manage terminal fisheries for 31% harvest rate, but no less than 900 natural adult spawners.	Limited (exploitation rate exception).	
Quillayute Fall	Manage terminal fisheries for 40% harvest rate, but no less than 3,000 natural adult spawners, the MSY level estimated by Cooney (1984).	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Quillayute Spring/Summer	1,200 natural adult spawners for summer component (MSY).	Limited (exploitation rate exception).	
Hoko Summer/Fall (Western Strait of Juan de Fuca)	850 natural adult spawners, the MSP level estimated by Ames and Phinney (1977). May include adults used for supplementation program.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 6 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
- - - CHINOOK - - -			
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). This stock complex consists of numerous natural Chinook stocks of small to medium sized populations and significant hatchery production. Puget Sound stocks contribute to fisheries off British Columbia and are present into southeast Alaska, but are impacted to a minor degree by Council-area ocean fisheries. Base period, Council-area ocean fishery exploitation rates (adult equivalent) 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 naturally spawning stocks within this complex are listed as threatened under the ESA. Naturally spawning stocks are also subject to the 1999 Chinook agreement of the Pacific Salmon Commission and may be subject to exploitation rate constraints in U.S. fisheries south of the Canada/Washington border. Management objectives for hatchery stocks are based on hatchery escapement needs. Fisheries in Puget Sound conducted under a Resource Management Plan (RMP) are exempted from ESA Section 9 take prohibitions under Limit 6 of the 4(d) rule. This RMP will expire on May 1 of this year. A new RMP is currently under review by NOAA Fisheries but this review will not be completed prior to the March Council meeting.			
Eastern Strait of Juan de Fuca Summer/Fall Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	
Skokomish Summer/Fall (Hood Canal) Threatened (1999)	NMFS ESA consultation standard. Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	
Nooksack Spring (early) Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Skagit Summer/Fall Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Skagit Spring Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Stillaguamish Summer/Fall Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Snohomish Summer/Fall Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Cedar River Summer/Fall (Lake Washington) Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). The preliminary 2004 consultation standard is an RER constraint total mortality in all fisheries not to exceed 31%.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 7 of 12).

Stock	**Conservation Objective** (to be met annually, unless noted otherwise)	**Subject to Council Actions to Prevent Overfishing**	**Other Management Information**
PUGET SOUND (continued)			
White River Spring Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	
Puyallup Summer/Fall Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	
Green River Summer/Fall Threatened (1999)	NMFS ESA consultation standard. Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	Subject to the PSC ISBM harvest limitations.
Nisqually River Summer/Fall (South Puget Sound) Threatened (1999)	NMFS ESA consultation standard. Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	
Mid Hood Canal Fall Threatened (1999)	NMFS ESA consultation standard is expressed in terms of Recovery Exploitation Rate (RER). Guidance will be provided prior to the March Council meeting.	Limited (exploitation rate exception).	
SOUTHERN BRITISH COLUMBIA - Fall and spring stocks of British Columbia coastal streams and the 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 management threshold which allows effective Council management of these stocks, and they qualify as **exceptions** to the Council's overfishing criteria.			
Coastal Stocks	Undefined for Council fisheries. Manage consistent with the Pacific Salmon Treaty.	No. Under Canadian authority and would also be an exploitation rate exception.	Medium abundance. Major contributors to ocean fisheries off British Columbia; significant contributors north into southeast Alaska and present off northern Washington.
Fraser River	Undefined for Council fisheries. Manage consistent with the Pacific Salmon Treaty.	No. Under Canadian authority.	Medium abundance. Major contributors to ocean fisheries off British Columbia; contributors off northern Washington; and present north into southeast Alaska. Harrison River stock subject to the PSC ISBM harvest limitations.

TABLE A-1. Conservation objectives and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 8 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
	- - - COHO - - -		
OREGON PRODUCTION INDEX AREA - All Washington, Oregon, and California natural and hatchery coho stocks from streams south of Leadbetter Pt. Significant production from Columbia River and Oregon coastal hatcheries provide harvest in ocean fisheries throughout the Council management area. Ocean fisheries are usually limited primarily to meet natural escapement objectives. Treaty Indian obligations, non-Indian harvest opportunity, and hatchery requirements must also be factored in for the Columbia River stocks. Natural components have been severely depressed for several yeas due to a combination of previously high fishery impacts, major losses or degradation of freshwater habitat, and long-term marine conditions unfavorable to coho survival.			
Central California Coast Endangered (1996)	NMFS ESA consultation standard/recovery plan. Since 1998, no retention of coho in commercial and recreational fisheries off California in conjunction with total marine fishery impacts of no more than 13% on Rogue/Klamath hatchery coho (surrogate stock). Objective undefined prior to listing.	No. Listed stock, MSY criteria undefined. NMFS ESA consultation standard provides interim protection of productive capacity. Recovery limited by deterioration of significant portions of freshwater habitat, distribution at southern edge of coho range, and ongoing unfavorable marine conditions.	Very minor component of OPI area fisheries, limited potential for significant contribution to ocean and inland fisheries. Current impacts incidental in ocean fisheries off California. Development of monitoring and assessment program considered for Ten Mile River, Noyo River, Gualala River, Lagunitas Creek, and Scott Creek. Rogue/Klamath coho are believed to have a similar, but more northerly distribution.
Northern California Threatened (1997)	NMFS ESA consultation standard/recovery plan. Since 1998, total marine fishery impacts limited to no more than 13.0% on Rogue/Klamath hatchery coho (surrogate stock) and no retention of coho in California ocean fisheries. Objective undefined prior to listing.	No. Listed stock, MSY criteria undefined. NMFS ESA consultation standard provides interim protection of productive capacity. Recovery may last more than 10 years even with no fishery impacts, due to loss or deterioration of significant portions of freshwater habitat and ongoing unfavorable marine conditions.	Depressed and listed. Very minor natural component of OPI area fisheries, potential for minor contribution to ocean fisheries off California and southern Oregon, and inland California fisheries. Current impacts incidental in ocean and inland fisheries (total non-retention south of Cape Falcon since 1994). CDFG considering monitoring to provide data for the Smith, Trinity, Eel, Mattole, and Klamath Rivers.
Oregon Coastal Natural Comprised of Southern, South-Central, North-Central, and Northern Oregon stocks.	An allowable marine and freshwater exploitation rate of no more than 13% to 35%, depending on parent escapement and ocean survival trends, based on Amendment 13 of the Salmon FMP, or no more than 8% to 45% based on the OCN workgroup review of Amendment 13. Standard is ≤15.0% in 2010	No. Listed stock, rebuilding program initiated in 1998. The annual conservation objective should allow component stocks to rebuild when environmental conditions are favorable. Recovery for some components may last more than 10 years even with no fishery impacts, due to loss or deterioration of significant portions of freshwater habitat and ongoing unfavorable marine conditions.	General increase in abundance since 2000 after long term decline . Major natural component of OPI area and freshwater fisheries in Oregon coastal streams. Current impacts are primarily incidental in ocean fisheries under nonretention regulations south of Cape Falcon since 1994 (except 2007 and 2009).

TABLE A-1. Conservation objectives and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 9 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
- - - COHO - - -			
OREGON PRODUCTION INDEX (continued)			
Columbia River Late (Hatchery)	Hatchery rack return goal of 17,200 adults.	No (hatchery exception).	Major component of ocean fisheries north of Cape Falcon. When abundant, significant contributors to ocean fisheries off Oregon north into Canada and Columbia River fisheries.
Columbia River Early (Hatchery)	Hatchery rack return goal of 18,800 adults.	No (hatchery exception).	Major component of OPI area fisheries. When abundant, significant contributors to ocean fisheries off California and north to Leadbetter Pt., Washington and to Columbia River fisheries. Current ocean fishery impacts from very limited retention fisheries north of Cape Falcon and incidental hook-and-release mortality in fisheries south of Cape Falcon.
Columbia River (Natural) Threatened, 2005	NMFS ESA consultation standard. Guidance will be provided at the March Council meeting..	No. Listed stock. NMFS ESA consultation standard provides interim rebuilding program.	Extinct above the Dalles Dam, small populations in Clackamas, and Sandy rivers in Oregon, and Cedar Creek (Lewis River) Washington. Lower river coho are also listed under the Oregon State ESA.
WASHINGTON COASTAL - All pertinent natural and hatchery stocks originating in Washington coastal streams north of the Columbia River and West of the Sekiu River. Management goals for Grays Harbor and Olympic Peninsula coho stocks include achieving natural spawning escapement objectives and treaty allocation requirements, although Grays Harbor also contains a significant amount of hatchery production. The conservation objectives for these stocks are based on MSY spawner escapements 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 WDFW and treaty tribes under the provisions of U.S. v. Washington and subsequent U.S. District Court orders. After agreement to annual targets is reached by the parties in this litigation, ocean fishery escapement 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, Hoh, and Quillayute Rivers were developed as ranges intended to bracket the current best estimates of MSY escapement. The range of each objective reflects the degree of uncertainty inherent by using the high estimate 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 ranges were subsequently adjusted upward for risk aversion and again for habitat considerations by 26% to 184% (Lestelle *et al.* 1984). These stocks are also subject to provisions of the 2002 PSC Coho Management Plan, which requires the United States and Canada to constrain total fishery exploitation rates to levels associated with the categorical status (low, moderate, and abundant) and target exploitation rates of the key management units as determined by domestic managers. Ceilings on exploitation rates by intercepting fisheries are established through formulas specified in the PSC Management Plan. However, the salmon FMP management objectives determine the criteria for triggering a conservation alert or an overfishing concern; annual management objectives established pursuant to U.S. District Court orders and the PSC Coho Management Plan do not.			
Willapa Bay (Hatchery)	Meet WDFW program objectives.	No (hatchery exception).	Contributes to ocean fisheries off northern Oregon north into Canada. Significant contributor to inside non-Indian commercial net and recreational fisheries. WDFW critically reviewing current management to determine if objectives for natural stocks are warranted.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 10 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		- - - COHO - - -	
WASHINGTON COAST (continued)			
Grays Harbor	35,400 natural adult spawners (MSP based on WDF [1979]) or annual target agreed to by WDFW and the Quinault Indian Nation.	Yes. Conservation alert or overfishing concern based on fewer than 35,400 natural spawners.	Below conservation objective in 2006-2007. Ocean distribution from Oregon to northern British Columbia. Harvested by treaty Indian, non-Indian commercial, and recreational fisheries in Grays Harbor and tributary rivers.
Queets	MSY range of 5,800 to 14,500 natural adult spawners (Lestelle *et al.* 1984) or annual target agreed to by WDFW and the Quinault Indian Nation.	Yes. Conservation alert or overfishing concern based on fewer than 5,800 natural spawners.	Below conservation objective in 2006-2008. Ocean distribution from south-central Oregon to northwest Vancouver Island off British Columbia. Harvested by treaty Indian gillnet and non-treaty recreational fisheries inriver. Coho supplementation project conducted since the late 1970s.
Hoh	MSY range of 2,000 to 5,000 natural adult spawners (Lestelle *et al.* 1984) or annual target agreed to by WDFW and Hoh Tribe.	Yes. Conservation alert or overfishing concern based on fewer than 2,000 natural spawners.	Ocean distribution from south-central Oregon to northwest Vancouver Island off British Columbia. Harvested by treaty Indian gillnet and non-treaty recreational fisheries inriver.
Quillayute Fall	MSY range of 6,300 to 15,800 natural adult spawners (Lestelle *et al.* 1984) or annual target agreed to by WDFW and the Quillayute Tribe.	Yes. Conservation alert or overfishing concern based on fewer than 6,300 natural spawners.	Ocean distribution from south-central Oregon to northwest Vancouver Island off British Columbia. Harvested by treaty Indian gillnet and non-treaty recreational fisheries inriver.
Quillayute Summer (Hatchery)	Meet hatchery program objectives.	No (hatchery exception).	Early river entry timing. Contributor to ocean fisheries off Washington north into British Columbia; present south to central Oregon.
Western Strait of Juan de Fuca (Sekiu, Hoko, Clallam, Pysht, East and West, and Lyre Rivers and miscellaneous streams west of the Elwha River)	As a result of Council action in 2009, this stock has been combined with the Eastern Strait of Juan de Fuca stock, and will be managed consistent with the PSC allowable exploitation rates for Puget Sound coho management units.	Yes	Below former FMP conservation objective in 2005-2008. Little information on ocean distribution.

TABLE A-1. Conservation objectives and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 11 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
	- - -COHO- - -		
PUGET SOUND - All pertinent natural and hatchery stocks originating from U.S. tributaries to Puget Sound and the Strait of Juan de Fuca (east of Salt Creek through the Seiku River). Conservation objectives for specific stocks are currently based on MSY exploitation rate matrices for stocks managed for natural production or on hatchery escapement needs for stocks managed for artificial production. The exploitation rate matrices for natural stocks consist of age-3 ocean abundance (stock status) break points and associated annual total allowable exploitation rates. The normal exploitation rate represents the MSY exploitation rate under average survival. The spawning escapement associated with the low/normal ocean abundance breakpoint and the normal exploitation rate represents MSY spawning under low survival conditions (10^{th} percentile). The critical exploitation rate represents *de minimis* fishing levels that will not appreciably reduce spawning escapement if a stock becomes depressed, while allowing some level of access to harvestable stocks. The low exploitation rate is intermediate between the normal and critical exploitation rates. The spawning escapement associated with the critical/low abundance breakpoint and the low exploitation rate represent an escapement level below which production is expected to decrease. Annual management targets for these coho stocks may be developed through procedures established in U.S. District Court. Puget Sound management procedures are outlined in a Memorandum Adopting Salmon Management Plan (U.S. v. Washington, 626 F. Supp. 1405 [1985]). These stocks are also subject to provisions of the 2002 PST Coho Management Plan, which requires the United States and Canada to constrain total fishery exploitation rates to levels associated with the categorical status (low, moderate, and abundant) and target exploitation rates of the key management units as determined by domestic managers. Ceilings on exploitation rates by intercepting fisheries are established through formulas specified in the PSC Management Plan. However, the salmon FMP management objectives determine the criteria for triggering a conservation alert or an overfishing concern; annual management objectives established pursuant to U.S. District Court orders and the PST Coho Management Plan do not.			
Eastern Strait of Juan de Fuca (Streams east of Salt Creek through Chimacum Creek)	As a result of Council action in 2009, this stock has been combined with the Eastern Strait of Juan de Fuca stock, and will be managed consistent with the PSC allowable exploitation rates for Puget Sound coho management units. Formal language for FMP management objectives to be consistent with Council intent is being reviewed by the co-managers. Preliminary 2010: 20% (critical status) total exploitation rate.	Yes. Formal language for FMP overfishing criteria to be consistent with Council intent is being reviewed by the co-managers.	Little information on ocean distribution.
Hood Canal	As a result of Council action in 2009, this stock will be managed consistent with the PSC allowable exploitation rates for Puget Sound coho management units. Formal language for FMP management objectives to be consistent with Council intent is being reviewed by the co-managers. Preliminary 2010: 45% (low status) total exploitation rate.	Yes. Formal language for FMP overfishing criteria to be consistent with Council intent is being reviewed by the co-managers.	Ocean distribution from Cape Falcon, Oregon to British Columbia.
Skagit	As a result of Council action in 2009, this stock will be managed consistent with the PSC allowable exploitation rates for Puget Sound coho management units. Formal language for FMP management objectives to be consistent with Council intent is being reviewed by the co-managers. Preliminary 2010: 60% (normal status) total exploitation rate.	Yes. Formal language for FMP overfishing criteria to be consistent with Council intent is being reviewed by the co-managers.	Ocean distribution from Cape Falcon, Oregon to British Columbia.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries. Abundance information is based on recent year information. (Page 12 of 12).

Stock	Conservation Objective (to be met annually, unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
	- - - COHO - - -		
PUGET SOUND (continued)			
Stillaguamish	As a result of Council action in 2009, this stock will be managed consistent with the PSC allowable exploitation rates for Puget Sound coho management units. Formal language for FMP management objectives to be consistent with Council intent is being reviewed by the co-managers. Preliminary 2010: 50% (normal status) total exploitation rate.	Yes. Formal language for FMP overfishing criteria to be consistent with Council intent is being reviewed by the co-managers.	Below conservation objective in 2007. Ocean distribution from Cape Falcon, Oregon to British Columbia.
Snohomish	As a result of Council action in 2009, this stock will be managed consistent with the PSC allowable exploitation rates for Puget Sound coho management units. Formal language for FMP management objectives to be consistent with Council intent is being reviewed by the co-managers. Preliminary 2010: 40% (low status) total exploitation rate.	Yes. Formal language for FMP overfishing criteria to be consistent with Council intent is being reviewed by the co-managers.	Below conservation objective in 2007-2008. Ocean distribution from Cape Falcon, Oregon to British Columbia.
South Puget Sound (Hatchery)	Hatchery rack return goal of 52,000 adults. Natural production goals under development.	No (hatchery exception).	Ocean distribution from Cape Falcon, Oregon to British Columbia.
SOUTHERN BRITISH COLUMBIA COAST - Stocks of southern British Columbia coastal streams (including Vancouver Island) and the Fraser River.			
Coastal Stocks	Manage Council fisheries that impact Canadian stocks consistent with provisions of the Pacific Salmon Treaty.	No. Not under Council management authority.	Contributes to ocean fisheries off British Columbia, north into southeast Alaska and present off northern Washington.
Fraser River	Manage Council fisheries that impact Canadian stocks consistent with provisions of the Pacific Salmon Treaty. For 2008, southern U.S. fisheries total exploitation rate of ≤10.0%.	No. Not under Council management authority.	Contributes to ocean fisheries off British Columbia and Washington, and to Strait of Juan de Fuca and Puget Sound fisheries.
	- - - PINK (odd-numbered years) - - -		
The Fraser River Panel of the PSC manages fisheries for pink salmon in the Fraser River Panel Area (U.S.) north of 48° 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. 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.			
Puget Sound	900,000 natural spawners or consistent with provisions of the Pacific Salmon Treaty (Fraser River Panel).	No. Minor impacts in Council fisheries and not under Council management authority.	Contributes to ocean fisheries off British Columbia and in Puget Sound. Present south into Oregon. Rare off California.
Fraser River	Manage Council fisheries that impact Canadian stocks consistent with provisions of the Pacific Salmon Treaty (Fraser River Panel).	No. Minor impacts in Council fisheries and not under Council management authority.	Contributes to ocean fisheries off British Columbia; present into southeast Alaska and off Washington and northern Oregon. Rare off California.

TABLE A-2. **Allowable** fishery **impact** rate criteria for **OCN coho** stock components under the Salmon Fishery Management Plan **Amendment 13**.

	MARINE SURVIVAL INDEX (based on return of jacks per hatchery smolt)		
	Low (<0.0009)	**Medium** (0.0009 to 0.0034)	**High** (>0.0034)
PARENT SPAWNER STATUS	**Allowable Total Fishery Impact Rate**		
High: Parent spawners achieved Level #2 rebuilding criteria; grandparent spawners achieved Level #1	≤15%	≤30% [a/]	≤35% [a/]
Medium: Parent spawners achieved Level #1 or greater rebuilding criteria	≤15%	≤20% [a/]	≤25% [a/]
Low: Parent spawners less than Level #1 rebuilding criteria	≤15%	≤15%	≤15%
	≤10-13% [b/]		

	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:	Nehalem	Tillamook	Nestucca	Ocean Tribs.	
(Necanicum River to Neskowin Creek)	17,500	2,000	1,800	400	
North-Central:	Siletz	Yaquina	Alsea	Siuslaw	Ocean Tribs.
(Salmon River to Siuslaw River)	4,300	7,100	15,100	22,800	5,700
South-Central:	Umpqua	Coos	Coquille	Coastal Lakes	
(Siltcoos River to Sixes River)	29,400	7,200	5,400	8,000	
Southern:	Rogue				
(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.

TABLE A-3. Fishery **impact** rate criteria for **OCN coho** stock components based on the harvest matrix resulting from the **OCN work group** 2000 review of Amendment 13.

Parent Spawner Status a/	Marine Survival Index (based on return of jacks per hatchery smolt)			
	Extremely Low (<0.0008)	**Low** (0.0008 to 0.0014)	**Medium** (>0.0014 to 0.0040)	**High** (>0.0040)
High Parent Spawners > 75% of full seeding	**E** ≤ 8%	**J** ≤ 15%	**O** ≤ 30%	**T** ≤ 45%
Medium Parent Spawners > 50% & ≤ 75% of full seeding	**D** ≤ 8%	**I** ≤ 15%	**N** ≤ 20%	**S** ≤ 38%
Low Parent Spawners > 19% & ≤ 50% of full seeding	**C** ≤ 8%	**H** ≤ 15%	**M** ≤ 15%	**R** ≤ 25%
Very Low Parent Spawners > 4 fish per mile & ≤ 19% of full seeding	**B** ≤ 8%	**G** ≤ 11%	**L** ≤ 11%	**Q** ≤ 11%
Critical b/ Parental Spawners ≤ 4 fish per mile	**A** 0 - 8%	**F** 0 - 8%	**K** 0 - 8%	**P** 0 - 8%

Sub-aggregate and Basin Specific Spawner Criteria Data

Sub-aggregate	Miles of Available Spawning Habitat	100% of Full Seeding	"Critical"		Very Low, Low, Medium & High		
			4 Fish per Mile	12% of Full Seeding	19% of Full Seeding	50% of Full Seeding	75% of full Seeding
Northern	899	21,700	3,596	NA	4,123	10,850	16,275
North - Central	1,163	55,000	4,652	NA	10,450	27,500	41,250
South - Central	1,685	50,000	6,740	NA	9,500	25,000	37,500
Southern	450	5,400	NA	648	1,026	2,700	4,050
Coastwide Total	4,197	132,100	15,636		25,099	66,050	99,075

a/ Parental spawner abundance status for the OCN aggergate assumes the status of the weakest sub-aggregate.

b/ "Critical" parental spawner status is defined as 4 fish per mile for the Northern, North-Central, and South-Central subaggergates. Because the ratio of high quality spawning habitat to total spawning habitat in the Rogue River Basin differs significantly from the rest of the basins on the coast, the spawner density of 4 fish per mile does not represent "Critical" status for that basin. Instead. "Critical" status for the Rogue Basin (Southern Sub-aggergate) is estimated as 12% of full seeding of high quality

TABLE A-4. Council adopted management objectives for Puget Sound natural coho management units, expressed as exploitation rate ceilings for critical, low and normal abundance based status categories, with runsize breakpoints (abundances expressed as ocean-age 3).

Status	Management Unit				
	Strait of Juan de Fuca	Hood Canal	Skagit	Stillaguamish	Snohomish
Critical/Low runsize breakpoint	11,679	19,545	22,857	9,385	51,667
Critical exploitation rate	0.20	0.20	0.20	0.20	0.20
Low/normal runsize breakpoint	27,445	41,000	62,500	20,000	125,000
Low exploitation rate	0.40	0.45	0.35	0.35	0.40
Normal exploitation rate	0.60	0.65	0.60	0.50	0.60

APPENDIX B
OREGON PRODUCTION INDEX DATA

LIST OF TABLES

TABLE B-1. Millions of coho smolts[a/] released annually into the OPI area by geographic area and rearing agency.

	Columbia River						Oregon Coast				
		Washington						Private			
Year or Average	Oregon	Early	Late	Combined	Federal	Total	ODFW[b/]	Yearlings	Total	California	Total OPI
1960-1965	5.6	-	-	6.1	4.5	16.2	2.0	-	2.0	0.4	18.6
1966-1970	6.0	10.2	4.9	15.1	6.5	27.6	2.9	0.0	2.9	1.3	31.8
1971-1975	6.8	10.7	6.8	17.5	4.5	28.8	3.9	0.0	3.9	1.2	33.9
1976-1980	8.0	7.3	10.1	17.4	4.7	30.1	3.8	1.4	5.2	0.7	36.0
1981-1985	7.1	4.3	14.4	18.7	3.2	29.0	3.9	3.3	7.2	0.7	36.9
1986-1990	7.3	3.1	15.6	18.7	4.1	30.1	5.2	1.9	7.1	1.4	38.6
1991	10.4	3.7	15.3	19.0	5.9	35.2	5.3	-	5.3	1.5	42.0
1992	11.5	4.3	14.3	18.6	2.7	32.8	6.2	-	6.2	0.7	39.7
1993	11.1	4.3	14.8	19.1	4.1	34.3	4.3	-	4.3	0.8	39.4
1994	9.1	2.5	12.0	14.5	3.0	26.6	5.2	-	5.2	0.6	32.4
1995	7.1	3.4	12.9	16.3	1.7	25.1	3.7	-	3.7	0.7	29.5
1996	8.4	3.4	12.9	16.3	3.4	28.1	3.3	-	3.3	0.3	31.7
1997	6.1	3.2	7.8	11.0	3.9	21.0	2.9	-	2.9	0.7	24.6
1998	6.1	5.8	11.4	17.2	3.6	26.8	1.7	-	1.7	0.6	29.1
1999	7.6	4.0	11.5	15.5	4.8	27.9	1.0	-	1.0	0.7	29.6
2000	7.8	6.2	10.8	17.0	5.9	30.7	0.9	-	0.9	0.6	32.2
2001	7.6	4.2	9.7	13.9	3.7	25.2	0.9	-	0.9	0.6	26.7
2002	7.5	3.3	8.6	11.9	4.3	23.7	1.0	-	1.0	0.6	25.3
2003	8.2	3.3	8.7	12.0	3.1	23.3	0.8	-	0.8	0.5	24.6
2004	6.7	3.0	8.8	11.8	3.6	22.1	0.8	-	0.8	0.6	23.5
2005	6.1	2.5	9.1	11.6	2.8	20.6	0.8	-	0.8	0.6	22.0
2006	6.1	2.8	9.0	11.7	2.6	20.4	0.8	-	0.8	0.6	21.8
2007	6.2	3.1	9.0	12.1	3.1	21.4	0.7	-	0.7	0.6	22.6
2008	6.9	2.8	9.2	12.0	2.9	21.9	0.4	-	0.4	0.5	22.8
2009[c/]	6.9	2.6	8.2	10.8	3.2	20.9	0.4	-	0.4	0.6	21.8

a/ Defined here as 30 fish per pound or larger and released in February or later.

b/ Beginning in 1989, does not include minor releases from STEP projects.

c/ Preliminary.

TABLE B-2. Data set used in predicting Oregon production index hatchery (OPIH) adult coho. Adults and jacks shown in thousands of fish and smolts in millions of fish.

	Adults (t)		Jacks (t-1)			Columbia River Smolts (t-1)		
			Total OPI[c/]	Columbia	OR Coast/		Normal	Adjustment
Year (t)	OPIH[a/]	MSM[b/]		River[d/]	CA[e/]	Delayed[f/]	Timed[g/]	Proportion[h/]
1970	2,765.1	.						
1971	3,365.0	.	179.4	172.8	6.6	0.0	24.0	0.0000
1972	1,924.8	.	103.7	100.8	2.9	0.0	28.3	0.0000
1973	1,817.0	.	91.4	85.7	5.7	1.8	29.9	5.1592
1974	3,071.1	.	144.1	132.0	12.1	2.9	28.5	13.4316
1975	1,652.8	.	76.2	75.1	1.1	1.8	27.8	4.8626
1976	3,885.3	.	171.5	146.2	25.3	2.0	29.0	10.0828
1977	987.5	.	53.8	46.3	7.5	0.2	28.9	0.3204
1978	1,824.1	.	103.2	99.2	4.0	0.0	31.4	0.0000
1979	1,476.7	.	72.5	64.1	8.4	5.0	32.6	9.8313
1980	1,224.0	.	57.6	51.6	6.0	6.7	28.9	11.9626
1981	1,064.5	.	48.7	40.6	8.1	5.6	28.1	8.0911
1982	1,266.8	.	61.3	55.0	6.3	6.8	32.4	11.5432
1983i[/]	599.2	.	68.2	61.0	7.2	5.0	27.7	11.0108
1984	691.3	.	31.6	28.0	3.6	5.1	27.0	5.2889
1985	717.5	.	26.0	18.2	7.8	9.1	29.2	5.6719
1986	2,435.8	2,412.0	77.5	64.6	12.9	12.2	28.8	27.3653
1987	887.2	779.4	32.9	24.2	8.7	9.0	32.9	6.6201
1988	1,669.3	1,467.8	85.2	72.3	12.9	7.7	28.8	19.3302
1989	1,720.2	1,922.0	60.8	55.0	5.8	7.2	29.5	13.4237
1990	718.4	713.6	46.7	37.1	9.6	8.5	29.6	10.6537
1991	1,874.8	1,816.5	68.6	60.7	7.9	7.1	30.3	14.2234
1992	543.6	512.6	25.6	19.9	5.7	6.0	35.3	3.3824
1993	261.7	223.3	27.1	19.6	7.5	5.5	32.8	3.2866
1994	202.3	214.1	5.2	3.9	1.3	6.0	34.4	0.6802
1995	147.2	139.4	11.8	9.1	2.7	3.1	26.6	1.0605
1996	185.2	176.5	17.3	14.1	3.2	4.2	25.2	2.3500
1997	200.7	195.6	20.4	15.8	4.6	3.4	28.0	1.9186
1998	207.5	228.3	9.7	6.7	3.0	2.5	21.0	0.7976
1999	334.5	372.5	29.5	23.6	5.9	3.0	26.8	0.6418
2000	673.2	673.1	34.8	31.3	3.5	4.1	27.9	0.5996
2001	1,417.1	1,478.7	87.4	71.7	15.7	2.0	30.6	0.6863
2002	649.8	689.5	25.2	18.9	6.3	1.4	23.5	1.1260
2003	936.6	1,009.9	49.9	41.7	8.2	0.3	23.7	0.5278
2004	622.1	693.6	35.4	29.4	6.0	2.0	23.2	2.5345
2005	443.2	435.7	25.9	21.2	4.7	0.8	22.0	0.7709
2006	440.6	502.4	26.3	20.9	5.4	0.4	20.6	0.4058
2007	476.6	502.7	36.7	34.2	2.5	0.1	20.4	0.1676
2008	565.3	552.8	15.4	14.0	1.4	0.6	21.4	0.3925
2009	-	1,066.1	61.0	58.4	2.6	1.1	21.9	2.9333
2010	-	408.0[j/]	25.3	23.8	1.5	0.2	21.3	0.2235

a/ Adult OPIH = Harvest impacts plus escapement for public hatchery stocks originating in the Columbia River, Oregon coastal rivers, and the Klamath River, California.
b/ Adult MSM = Harvest impacts plus escapement for public hatchery stocks originating in the Columbia River, Oregon coastal rivers, and the Klamath River. Estimates derived from the MSM and used for prediction beginning in 2008.
c/ Jack OPI = Total Jack CR and Jack OC.
d/ Jack CR = Columbia River jack returns corrected for small adults.
e/ Jack OC = Oregon coastal and California hatchery jack returns corrected for small adults.
f/ Sm D = Columbia River delayed smolt releases from the previous year expected to return as adults in the year listed.
g/ Sm CR = Columbia River smolt release from the previous year expected to return as adults in the year listed.
h/ Correction term for delayed smolts released from Columbia River hatcheries (proportion).
i/ Data not used in subsequent predictions due to El Niño impacts.
j/ Preseason predicted adults.

TABLE B-3. Estimated coho salmon natural spawner abundance in Oregon coastal basins for each OCN coho management component.

Component and Basin[a/]	Miles	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	1995-2009 Avg.
NORTHERN																	
Nehalem	386	1,463	1,057	1,173	1,190	3,713	14,285	22,310	20,903	33,059	21,479	10,451	11,614	14,033	15,690	14,676	12,473
Tillamook	249	289	661	388	271	2,175	1,983	1,883	15,715	14,584	2,290	1,995	8,774	2,295	4,897	14,298	4,833
Nestucca	167	1,811	519	271	169	2,201	1,171	3,940	13,003	8,929	6,152	686	1,876	394	5,444	4,996	3,437
Ind. Tribs.	97	319	1,043	314	946	775	474	5,247	2,912	3,068	3,142	3,334	1,871	807	1,645	1,645	1,836
TOTAL	899	3,882	3,280	2,146	2,576	8,864	17,913	33,451	52,533	59,640	33,063	16,466	24,135	17,529	27,676	39,595	22,850
NORTH CENTRAL																	
Siletz	118	607	763	336	394	706	3,553	1,437	2,252	9,736	6,399	14,567	5,205	2,197	14,519	22,066	5,649
Yaquina	109	5,668	5,127	384	365	2,588	647	3,039	23,981	13,254	4,989	3,441	4,247	3,158	8,710	10,787	6,026
Alsea	221	681	1,637	680	213	2,050	2,465	3,339	6,170	8,957	6,005	13,907	1,972	2,146	11,431	13,931	5,039
Siuslaw	514	6,089	7,625	668	1,089	2,724	6,767	11,024	57,129	29,257	8,443	16,907	5,869	3,552	17,042	21,679	13,058
Ind. Tribs.	201	560	2,975	774	1,222	3,691	829	6,400	14,434	7,664	14,558	2,585	3,931	1,217	6,170	6,110	4,875
TOTAL	1,163	13,605	18,127	2,842	3,283	11,759	14,261	25,239	103,966	68,868	40,394	51,407	21,224	12,270	57,872	74,573	34,646
SOUTH CENTRAL																	
Umpqua	1,083	12,809	10,824	2,960	9,153	7,685	12,233	35,702	37,591	29,607	31,346	42,676	18,154	11,783	32,306	52,678	23,167
Coos	208	10,351	12,128	1,127	3,167	4,945	5,386	43,301	35,688	29,559	24,116	17,048	11,266	1,329	13,312	25,014	15,849
Coquille	331	2,116	16,169	5,720	2,466	3,001	6,130	13,310	8,610	23,909	22,276	11,806	28,577	13,968	9,874	21,235	12,611
Coastal Lakes	-	11,216	13,493	8,603	11,107	13,442	12,747	19,669	22,162	16,688	18,687	14,724	24,378	8,955	23,608	17,356	15,789
TOTAL	1,622	36,492	52,614	18,410	25,893	29,073	36,496	111,982	104,051	99,763	96,425	86,254	82,375	36,035	79,100	116,283	67,416
SOUTH																	
Rogue[b/]	-	3,359	5,241	8,213	2,257	1,389	10,987	12,579	8,403	6,754	24,486	9,957	3,937	5,242	414	2,566	7,052
COASTWIDE	-	57,338	79,262	31,611	34,009	51,085	79,648	183,251	268,953	235,025	194,368	164,084	131,671	71,076	165,062	233,017	131,964

a/ The sum of the individual basins may not equal the aggregate totals, due to the use of independent estimates at different geographic scales.

b/ Mark recapture estimate based on seining at Huntley Park in the lower Rogue River.

TABLE B-4. Data set used in predicting 2010 Oregon coastal natural river (OCNR) coho ocean recruits with random survey sampling and Mixed Stock Model (MSM) accounting. Recruits shown in thousands of fish.

	Recruits to Ocean						
Year (t)	SRS	MSM	Ln SRS	Ln MSM	JanAnom[a/]	UpAnom (t-1)[b/]	Regime Index[c/]
1969	391.5	.	5.96999	.	-0.793	56.08	0
1970	183.1	.	5.21003	.	0.307	-16.92	0
1971	416.3	.	6.03141	.	-1.293	30.08	0
1972	185.5	.	5.22305	.	-1.393	10.08	0
1973	235.0	.	5.45959	.	-0.493	23.08	0
1974	196.4	.	5.28015	.	-0.693	47.08	0
1975	208.4	.	5.33946	.	-0.493	48.08	0
1976	451.7	.	6.11302	.	-0.893	65.08	0
1977	161.2	.	5.08265	.	-0.193	32.08	0
1978	111.6	.	4.71492	.	1.207	17.08	0
1979	188.8	.	5.24069	.	-1.193	-2.92	0
1980	108.3	.	4.68491	.	0.507	17.08	0
1981	174.5	.	5.16192	.	1.607	-1.92	0
1982	185.7	.	5.22413	.	-0.093	-8.92	0
1983	96.0	.	4.56435	.	1.007	14.08	0
1984	94.7	.	4.55071	.	0.607	-24.92	0
1985	124.9	.	4.82751	.	0.007	-24.92	0
1986	97.9	114.6	4.58395	4.74145	0.107	-24.92	0
1987	70.1	78.1	4.24992	4.35799	0.507	-39.92	0
1988	124.4	154.3	4.82350	5.03890	-0.093	-21.92	0
1989	103.8	115.1	4.64247	4.74580	-0.493	-43.92	0
1990	60.4	63.0	4.10099	4.14313	0.007	-21.92	1
1991	68.8	84.0	4.23120	4.43082	-0.893	-37.92	1
1992	86.9	107.5	4.46476	4.67749	0.107	43.08	1
1993	81.1	75.0	4.39568	4.31749	-0.593	7.08	1
1994	40.6	41.6	3.70377	3.7281	1.107	-50.92	1
1995	47.6	48.7	3.86283	3.88568	0.707	-3.92	1
1996	65.5	65.4	4.18205	4.18052	1.807	-1.92	1
1997	16.3	18.7	2.79117	2.92852	0.907	9.08	1
1998	21.7	23.2	3.07731	3.14415	2.407	-24.92	1
1999	37.8	39.2	3.63231	3.66866	-0.393	18.08	1
2000	58.9	60.2	4.07584	4.09767	0.107	84.08	1
2001	161.4	157.6	5.08389	5.06006	0.707	9.08	0
2002	266.5	246.8	5.58537	5.50858	0.207	65.08	0
2003	249.4	227.8	5.51906	5.42847	1.107	54.08	0
2004	175.2	165.9	5.16593	5.11139	0.407	53.08	0
2005	134.4	130.5	4.90082	4.87137	0.317	3.08	0
2006	116.4	101.1	4.75703	4.61611	1.537	-34.92	0
2007	49.6	62.8	3.90399	4.13996	-0.103	16.08	0
2008	-	144.7		4.97466	-0.983	24.08	0
2009	-	237.8		5.47143	-0.513	33.08	0
2010	-	131.4[d/]		.	0.887	-1.92	0

a/ JanAnom = The annual deviation from mean (1969-1996) January sea surface temperature (degrees Centigrade) at Charleston, Oregon.

b/ UpAnom = Annual deviation from mean (1946-1996) April-June Bakun upwelling index at 42° N latitude.

c/ Regime Index flags the cold ocean regimes (1986-1989, 2001 - 2010) with a 0 and warm regimes (1990 – 2000) with a 1.

d/ Preseason adult prediction.

APPENDIX C
SALMON HARVEST ALLOCATION SCHEDULES

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HARVEST ALLOCATION -- SECTION 5.3 OF THE PACIFIC COAST SALMON PLAN

5.3 ALLOCATION

> *"Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges."*
>
> *Magnuson-Stevens Act, National Standard 4*

Harvest allocation is required when the number of fish is not adequate to satisfy the perceived needs of the various fishing industry groups and communities, to divide the catch between (non-Indian) ocean and inside fisheries and among ocean fisheries, and to provide 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 historic 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 jeopardy 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 quotas 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 the 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 in the coho and Chinook distribution sections below. 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. The Council may also deviate from subarea quotas to (1) meet recreational season objectives based on agreement of representatives of the affected ports and (2) in accordance with Section 6.5.3.2 with regard to certain selective fisheries.

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.

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

Example distributions of the recreational coho TAC north of Leadbetter Point would be as follows:

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 NMFS Regional Director to assure that the primary objective of the Chinook harvest guidelines for each of the three 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, 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.)

TABLE 5-3. Allocation of allowable ocean harvest of coho salmon (thousands of fish) south of Cape Falcon.[a/]

Total Allowable Ocean Harvest	Recreational Allocation		Commercial Allocation	
	Number	Percentage	Number	Percentage
≤100	≤100[b/c/]	100[b/]	b/	b/
200	167[b/c/]	84[b/]	33[b/]	17[b/]
300	200	67	100	33
350	217	62	133	38
400	224	56	176	44
500	238	48	262	52
600	252	42	348	58
700	266	38	434	62
800	280	35	520	65
900	290	32	610	68
1,000	300	30	700	70
1,100	310	28	790	72
1,200	320	27	880	73
1,300	330	25	970	75
1,400	340	24	1,060	76
1,500	350	23	1,150	77
1,600	360	23	1,240	78
1,700	370	22	1,330	78
1,800	380	21	1,420	79
1,900	390	21	1,510	79
2,000	400	20	1,600	80
2,500	450	18	2,050	82
3,000	500	17	2,500	83

a/ The allocation schedule is based on the following formula: first 150,000 coho to the recreational base (this amount may be reduced as provided in footnote b); over 150,000 to 350,000 fish, share at 2:1, 0.667 to troll and 0.333 to recreational; over 350,000 to 800,000 the recreational share is 217,000 plus 14% of the available fish over 350,000; above 800,000 the recreational share is 280,000 plus 10% of the available fish over 800,000.

Note: The allocation schedule provides guidance only when coho abundance permits a directed coho harvest, not when the allowable impacts are insufficient to allow general coho retention south of Cape Falcon. At such low levels, allocation of the allowable impacts will be determined in the Council's preseason process. Deviations from the allocation may also be allowed to meet consultation standards for ESA listed stocks (e.g., the 1998 biological opinion for California coastal coho requires no retention of coho in fisheries off California).

b/ If the commercial allocation is insufficient to meet the projected hook-and-release mortality associated with the commercial all-salmon-except-coho season, the recreational allocation will be reduced by the number needed to eliminate the deficit.

c/ When the recreational allocation is 167,000 coho or less, special allocation provisions apply to the recreational harvest distribution by geographic area (unless superseded by requirements to meet a consultation standard for ESA listed stocks); see text of FMP as modified by Amendment 11 allocation provisions.

The allocation schedule is designed to give sufficient coho to the recreational fishery to increase the probability of attaining no less than a Memorial Day to Labor Day season as stock sizes increase. This increased allocation means that, in many years, actual catch in the recreational fishery may fall short of its allowance. In such situations, managers will make an inseason reallocation of unneeded recreational coho to the south of Cape Falcon troll fishery. The reallocation should be structured and timed to allow the commercial fishery sufficient opportunity to harvest any available reallocation prior to September 1, while still assuring completion of the scheduled recreational season (usually near mid-September) and, in any event, the continuation of a recreational fishery through Labor Day. This reallocation process will occur no later than August 15 and will involve projecting the recreational fishery needs for the remainder of the summer season. The remaining projected recreational catch needed to extend the season to its scheduled closing date will be a harvest guideline rather than a quota. If the guideline is met prior to Labor Day, the season may be allowed to continue if further fishing is not expected to result in any 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.

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.

SELECTIVE FISHERY GUIDELINES – SECTION 6.5 OF THE PACIFIC COAST SALMON PLAN

6.5 SEASONS AND QUOTAS

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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:

Harvestable fish of the target species are available.

Harvest impacts on incidental species will not exceed allowable levels determined in the management plan.

Proven, documented, selective gear exists (if not, only an experimental fishery should be considered).

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.

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.

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:

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.

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.
Other allocation objectives (i.e., treaty Indian, or ocean and inside allocations) are satisfied during negotiations in the North of Cape Falcon Forum.

The selective fishery is assessed against the guidelines in Section 6.5.3.1.

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:

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.

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.

APPENDIX D: INCLUSION OF THE 2005 DATA POINT FOR THE SACRAMENTO INDEX FORECAST

Since 2008, the 2005 data point has been excluded when forecasting the Central Valley Index (CVI) and Sacramento Index (SI). In 2008, the justification for excluding the 2005 data point was that it had "considerable influence" on the linear predictor, and in particular, 2005 had a high degree of influence on the forecast when jack escapement was low (PFMC 2008). At the time, the linear predictor included a y-intercept parameter and there was concern that the model structure in conjunction with inclusion of the 2005 data point would lead to an unacceptably high CVI forecast at the very low 2008 jack escapement level. Later in the 2008 preseason management process, the SI was developed and a zero-intercept linear model was used to forecast the SI. The 2005 data point was excluded when performing the SI forecast in 2008, and for consistency, it was also excluded in 2009.

A closer examination of the SI forecast model suggests that, given the model structure, there is little reason to exclude the 2005 data point. The data point has little influence on the zero intercept, linear predictor ($\beta_{\text{with 05}}$= 26.6, $\beta_{\text{omit 05}}$= 28.6), and SI forecasts would be very similar, particularly at low jack escapement levels (Figure D-1). Based on the changes made in the predictor model structure since 2008, and the similarity between the current predictor with and without the 2005 data point, the STT has decided to use all data since 1990 for predicting the SI in 2010.

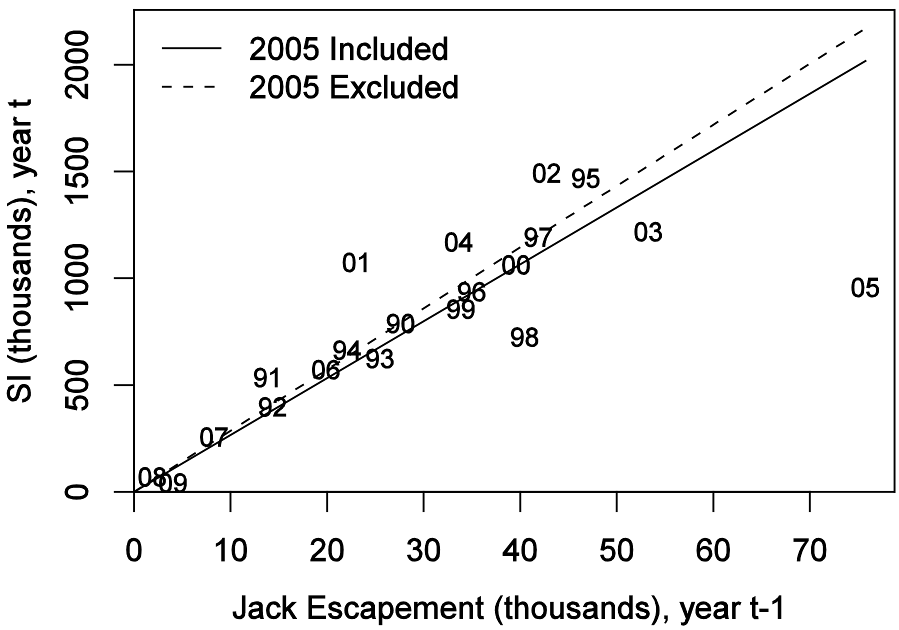
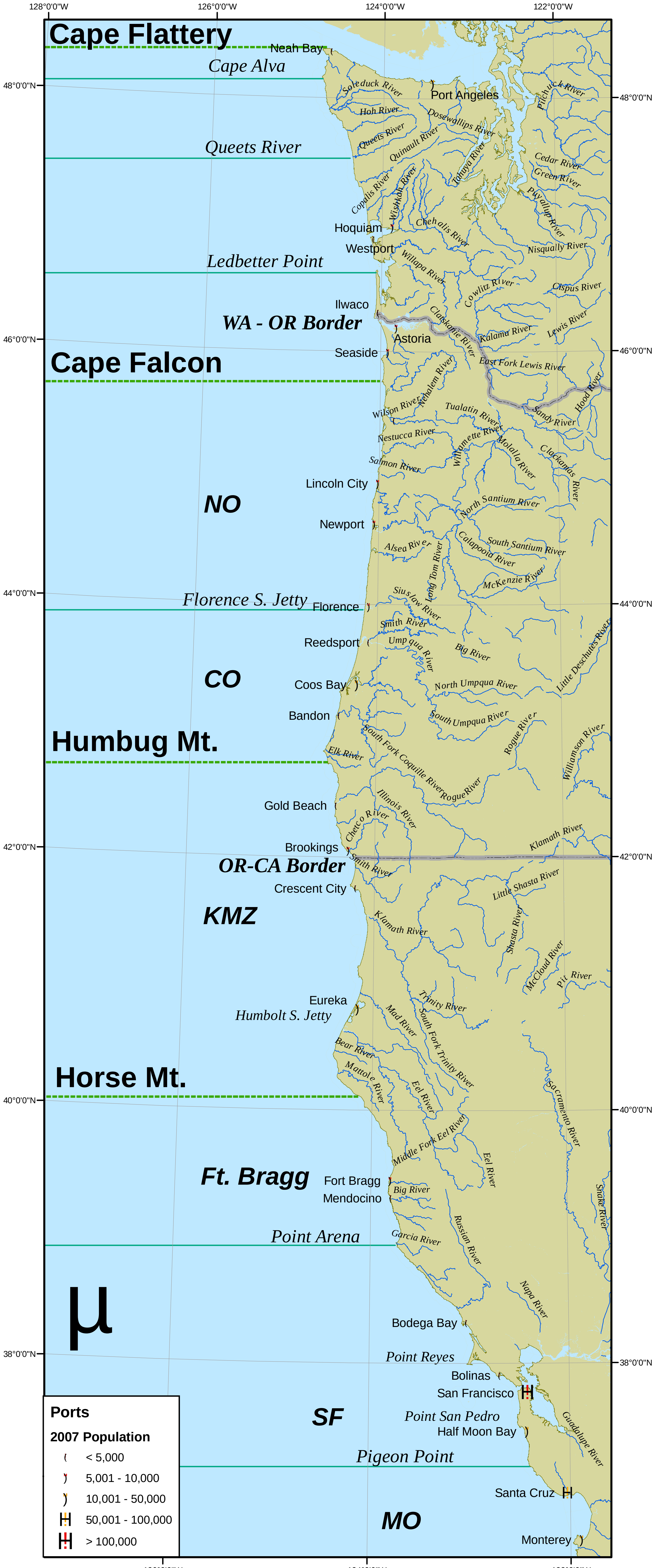


Figure D-1. The SI predictor with (solid line) and without (dashed line) the 2005 data point.

Reference

Pacific Fishery Management Council. 2008. *Preseason Report I: Stock Abundance Analysis for 2008 Ocean Salmon Fisheries.* (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.

Marine Fisheries Management Zones



0 25 50 100 km

Projection: UTM Zone 10, NAD83

Washington Department of FISH and WILDLIFE

Andrew Weiss
Fish Program
Biological Data Systems
Feb. 2009