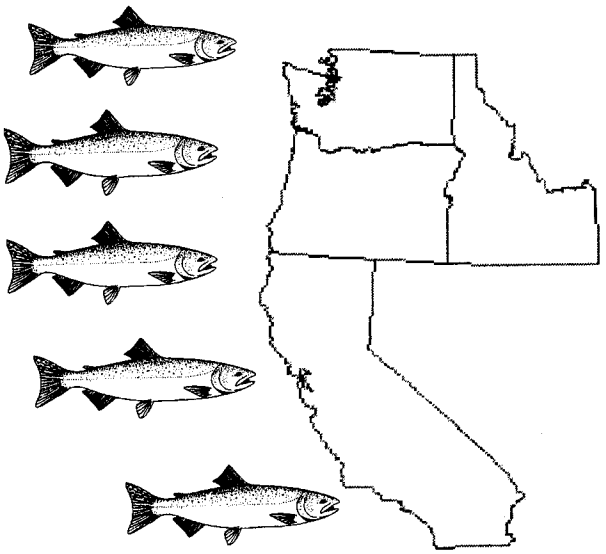
PRESEASON REPORT I

STOCK ABUNDANCE ANALYSIS FOR 2002 OCEAN SALMON FISHERIES



PREPARED BY THE
SALMON TECHNICAL TEAM

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

(503) 326-6352
www.pcouncil.org

February 2002

ACKNOWLEDGEMENTS

SALMON TECHNICAL TEAM

Mr. Dell Simmons, Chair
National Marine Fisheries Service, Lacey, WA

Mr. Allen Grover, Vice Chair
California Department of Fish and Game, Healdsburg, CA

Mr. Mike Burner
Oregon Department of Fish and Wildlife, Portland, OR

Dr. Robert Kope
National Marine Fisheries Service, Seattle, WA

Mr. Doug Milward
Washington Department of Fish and Wildlife, Olympia, WA

Mr. Michael Mohr
National Marine Fisheries Service, Santa Cruz, CA

Dr. Gary Morishima
Indian Tribes, Mercer Island, WA

Mr. Henry Yuen
U.S. Fish and Wildlife Service, Vancouver, WA

The Salmon Technical Team and Council staff express their thanks for the expert assistance provided by Ms. Wendy Beeghley, WDFW; Ms. Melodie Palmer-Zwahlen, CDFG; and numerous other agency and tribal personnel in completing this report.

This document may be cited in the following manner:

Pacific Fishery Management Council. 2002 Preseason Report I Stock Abundance Analysis for 2002 Ocean Salmon Fisheries. (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, Oregon 97220-1384.

COUNCIL STAFF

Mr. Chuck Tracy
Ms. Kerry Aden
Ms. Renee Heyden
Ms. Donde Hayes

This document is published by the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number NA17FC2235.

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LIST OF ACRONYMS AND ABBREVIATIONS

CDFG	California Department of Fish and Game
Council	Pacific Fishery Management Council
CRTAC	Columbia River Technical Advisory Committee
CVI	Central Valley index
CWT	coded-wire tag
DA2	December age-two (coho ocean recruits)
ESA	Endangered Species Act
FMP	fishery management plan
FRAM	Fishery Regulation Assessment Model
GSI	genetic stock identification
HRM	Harvest Rate Model
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
KRTAT	Klamath River Technical Advisory Team
LRB	lower Columbia River brights (bright fall chinook of upriver origin spawning naturally in the mainstem Columbia downstream from Bonneville Dam)
LRH	lower Columbia River hatchery (tule fall chinook returning to hatcheries below Bonneville Dam)
LRW	lower Columbia River wild (native bright fall chinook spawning naturally in tributaries below Bonneville Dam)
MCB	mid-Columbia River brights (bright hatchery fall chinook released in the mid-Columbia River)
MOC	mid-Oregon Coast
MSY	maximum sustainable yield
NA	not available
NMFS	National Marine Fisheries Service
NOC	North Oregon Coast
OCN	Oregon coastal natural (coho)
OCNL	Oregon coastal natural (coho) lake component
OCNR	Oregon coastal natural (coho) river component
ODFW	Oregon Department of Fish and Wildlife
OPI	Oregon production index (coho salmon stock index south of Leadbetter Point)
OPIH	Oregon production index area hatchery (adult coho)
OPITT	Oregon Production Index Technical Team
PRIH	Oregon coastal private hatchery (adult coho)
PSC	Pacific Salmon Commission
SAB	Select Area brights (hatchery fall chinook originally from Rogue River stock that is currently propagated in lower Columbia River hatcheries for release in Youngs Bay)
SCH	Spring Creek Hatchery (tule fall chinook returning to Spring Creek Hatchery)
SRS	Stratified random sampling
SSC	Scientific and Statistical Committee
STEP	Salmon Trout Enhancement Program (Oregon)
STT	Salmon Technical Team
TAC	total allowable catch
URB	upper river brights (naturally spawning bright fall chinook returning to areas upstream from McNary Dam and the Deschutes River, Oregon)
USFWS	U.S. Fish and Wildlife Service
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. They will analyze the impacts of the Council's proposed and final ocean salmon fishery management recommendations for 2002.

This report provides year 2002 salmon stock abundance projections and an analysis of the impacts of 2001 regulations, or regulatory procedures, on the projected 2002 abundance. The report focuses on chinook and coho stocks that have been important in determining Council fisheries in recent years and on stocks listed under the Endangered Species Act (ESA) with established jeopardy standards.

Chapter I provides a summary of stock abundance projections. Chapters II and III provide detailed stock-by-stock analyses of abundance and a description of prediction methodology and accuracy of past abundance predictions for chinook and coho salmon, respectively. Chapter IV summarizes abundance information for pink salmon. Three 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.

The STT notes that differences between preseason and postseason estimates are caused by a number of factors, including: (1) inaccuracies in abundance forecasts for these and other stocks which are exploited in mixed stock fisheries, (2) deviations of actual catches and fishery patterns from preseason expectations, (3) anomalies in stock distribution and migration patterns, and (4) for the Puget Sound coho stocks, differences in assessment methodologies (postseason estimates are based on run reconstruction assumptions which differ substantially from those represented in the Fishery Regulatory Assessment Model [FRAM]).

CHAPTER I
ABUNDANCE PROJECTIONS AND NEW INFORMATION

ABUNDANCE PROJECTIONS

Abundance expectations in 2001 are summarized for key chinook and coho salmon stocks in Tables I-1 and I-2, respectively. Information on pink salmon abundance, which is only significant in odd-numbered years, is contained in Chapter IV. Overall Council salmon management goals, as developed for Amendment 14, are presented in Table 1-3 and Appendix A, Table A-1.

In addition to the key stocks with abundance projections listed in Tables I-1 and I-2, Council management decisions for the 2001 ocean salmon fishing seasons may be constrained by other stocks listed under the ESA which may not have abundance projections made, or do not have abundance projections available in time for inclusion in this report. These include 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.

NEW INFORMATION

On February 14th 2002, the Pacific Salmon Commission adopted a management plan for coho salmon originating in Washington and Southern British Columbia river systems. The plan is directed at the conservation of key management units, four from Southern British Columbia (Interior Fraser, Lower Fraser, Strait of Georgia Mainland, Strait of Georgia Vancouver Island) and nine from Washington (Skagit, Stillaguamish, Snohomish, Hood Canal, Strait of Juan de Fuca, Quillayute, Hoh, Queets, and Grays Harbor). Under the plan, the United States and Canada are required 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 plan. Status levels and exploitation rate targets are anticipated to be established during domestic fishery planning processes and are not yet available. The plan has been transmitted to the governments of the United States and Canada with the expectation that it will be conveyed to domestic managers for implementation.

TABLE I-1. Preliminary preseason **adult chinook** salmon stock forecasts in thousands of fish. (Page 1 of 2)

Production Area, Type of Prediction and/or Stock or Stock Grouping	Preseason Estimates of Adults 2002	2001	2000	1999	1998	1997	1996	Methodology for 2002 Prediction and Source
California Central Valley (Index) Sacramento and San Joaquin Basins, Fall, Late Fall, Spring, and Winter Run	825.4	649.4	790.4	847.7	1,051.0	849.0	533.0	Linear regression analysis of inriver age-2 jacks on CVI of the following year. CDFG.
Klamath River (Ocean Abundance) Fall Run	362.5	435.4	389.8	165.5	225.2	286.3	749.4	Linear regression analysis of age-specific ocean abundance estimates on inriver runs of same cohort. KRTAT.
Oregon Coast								
North and South/Local Migrating	---------- Preseason Estimates Not Made ----------							None.
Columbia River (Ocean Escapement)								
Upriver Spring	333.7	364.6	134.0	24.6	36.2	67.8	37.2	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Willamette Spring	73.8	61.0	59.9	46.0	32.8	27.4	38.7	Age-specific linear regressions of cohort returns in previous run years. ODFW staff.
Sandy Spring	4.3	4.0	3.8	4.3	3.9	3.8	3.3	Recent year average. ODFW staff.
Cowlitz Spring	3.1	1.0	2.0	2.1	1.5	1.4	1.9	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Kalama Spring	1.6	1.0	1.4	0.3	0.5	0.7	0.6	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Lewis Spring	2.0	2.8	2.6	1.5	0.9	2.4	1.9	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Upriver Summer	77.7	24.5	33.3	16.5	17.3	16.7	16.8	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
URB Fall	281.0	127.2	171.1	147.5	150.8	166.4	88.9	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
SCH Fall	144.4	56.6	21.9	65.8	14.2	21.9	27.6	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
LRW Fall	18.7	16.7	3.5	2.6	8.1	7.5	8.8	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
LRH Fall	137.6	32.2	23.7	34.8	19.2	54.2	37.7	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
MCB Fall	96.2	43.5	50.6	38.3	47.8	72.1	40.8	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
Washington Coast (Ocean Escapement)								
Willapa Bay Natural	3.7	4.3	4.2	4.2	-	-	-	
Willapa Bay Hatchery	18.8	17.8	18.9	15.5	64.5	49.0	34.6	Mean return per release by age class.
Other Coastal Stocks	---------- Not Available ----------							WDFW and tribes.

TABLE I-1. Preliminary preseason **adult chinook** salmon stock forecasts in thousands of fish. (Page 2 of 2)

Production Area, Type of Prediction and/or Stock or Stock Grouping		Preseason Estimates of Adults							Methodology for 2002 Prediction and Source
		2002	2001	2000	1999	1998	1997	1996	
Puget Sound[a/]									WDFW and tribes.
Nooksack/Samish	Hatchery	52.8	34.9	19.0	27.0	28.0	34.0	27.0	Brood release times average return-at-age/release.
East Sound Bay	Hatchery	1.6	1.6	5.0	2.3	0.5	1.2	1.7	1991-2000 average return rate of Nooksack/Samish fall chinook multiplied by 1998 Glenwood spring release.
Skagit	Natural	13.8	9.1	7.3	7.6	6.6	6.4	7.1	Age specific average cohort rates.
	Hatchery	0.0	0.0	0.0	0.0	0.0	0.1	1.0	Average return/release of 86-96 broods multiplied by brood year release.
Stillaguamish	Natural	2.0	1.7	2.0	1.5	1.6	1.6	1.3	Estimate based on spawner-recruit information
Snohomish	Natural	6.7	5.8	6.0	5.6	5.6	5.2	4.2	Estimates based on spawner-recruit information.
	Hatchery	6.8	4.1	6.2	7.8	6.5	7.7	6.7	Lbs. released multiplied by average return per lb. released.
Tulalip	Hatchery	5.8	5.5	5.0	4.5	2.5	4.0	2.7	1998 brood release multiplied by average return per release. CWT survival rates multiplied by release numbers for brood years 1996-1999.
South Puget Sound	Natural	16.9	16.2	17.5	19.6	21.8	18.2	19.0	Mean value of 1998 and 1999 escapement for Puyallup. For Nisqually, 1998 escapement multiplied by 1996-2000 average return/spawner.
	Hatchery	90.8	73.7	77.5	59.4	67.8	65.1[b/]	51.9	Average return at age multiplied by cohort release for Green, McAllister, and 10E. Average of two different methods for Carr Inlet: (1) 1998 return/smolt released multiplied by 1998 brood smolts released, and (2) 1998 return/lb released multiplied by 1998 brood lbs released.
Hood Canal	Natural and Hatchery	2.9[c/] 21.1[c/]	2.7 22.6	19.2	14.0	6.7	2.7	9.0	Hatchery lbs. released multiplied by 1998-2001 average return per lb., and 1997-2000 natural run reconstruction contributions.
Strait of Juan de Fuca	Natural	3.6[c/]	3.5	1.1	0.9	0.9	0.8	0.9	For Hoko and Elwha, average 1997-2001 escapement multiplied by average of 4B run size escapement expansion. For 2001 and 2002, estimate is combined hatchery and wild fish.
	Hatchery	0.0	0.0	2.0	1.9	1.7	2.2	2.8	For 2001, the estimate is combined hatchery and natural fish.

a/ Forecast is Puget Sound run size available to U.S. net fisheries. Does not include fish caught in troll and recreational fisheries.

b/ The Muckleshoot Tribe's Green River Hatchery chinook forecast is 10,857 based on the 1990-1995 average hatchery return to Area 10A. This results in a South Sound hatchery estimate of 58,000 fish.

c/ Terminal run forecast.

TABLE I-2. Preliminary, preseason **adult coho** salmon stock ocean abundance forecasts in thousands of fish. (Page 1 of 2)

Production Source and Stock or Stock Group		Preseason Estimates of Adults 2002	2001	2000	1999	1998	1997	Methodology for 2002 Prediction
OPI Area (Total Abundance) (California and Oregon Coasts and Columbia River)		434.1	1,758.7	727.9	620.6	165.8	463.8	Sum of stock component estimates.
OPI Public Hatchery		361.7	1,707.6	671.4	559.2	118.4	376.1	Multiple linear regression of OPI public hatchery jacks to adults adjusted for Columbia River delayed smolt release; 1970-1999 SRS accounting database. Public hatchery prediction is partitioned into Columbia River early and late, and coastal stocks based on the percent of jacks observed and recent year average stock specific maturation rates.
Columbia River Early		161.6	1,036.5	326.3	325.5	63.8	206.9	
Columbia River Late		143.5	491.8	278.0	140.9	24.9	86.5	
Coastal N. of Cape Blanco		36.6	127.3	48.5	59.4	21.6	60.4	
Coastal S. of Cape Blanco		20.0	52.0	18.6	33.4	8.1	22.3	
OCN		71.8	50.1	55.9	60.7	47.2	86.4	For river production, relates ocean recruits (SRS accounting) to upwelling, sea surface temperature; data base 1970-1999. Most recent 3-year average abundance for lake production.
STEP		0.6	1.0	0.6	0.7	0.2	1.3	Smolt production with 1998 smolt to adult survival rates adjusted by changes in OPI public hatchery jacks per smolt between 1999 and 1998 release years.
Washington Coast								
Willapa	Natural	21.6	21.6	9.9	8.3	3.3	-	1998-2000 average terminal run.
	Hatchery	40.4	36.1	19.6	40.5	20.8	72.5	1992-1997 average brood year survival applied to 1998 brood year releases.
Grays Harbor	Natural	55.4	51.3	47.8	57.7	30.1	26.1	1998 brood escapement multiplied by average return per spawner.
	Hatchery	56.8	67.1	75.8	30.4	25.6	104.3	Smolt releases multiplied by average ocean recruits per release.
Quinault	Natural	29.4	8.7	4.4	7.3	6.5	2.0	1992-1996 brood year average ocean recruits per spawner, adjusted for expected survival.
	Hatchery	12.3	10.8	7.4	8.2	3.9	5.1	1992-1996 average marine survival rate to ocean recruit applied to release.
Queets	Natural	12.5	12.0	2.7	4.3	4.2	4.3	Ricker stock recruit model adjusted for sea surface temperature anomalies.
	Hatchery	16.0	10.0	11.8	13.8	4.6	16.9	1992-1996 brood year average survival rate to ocean recruit applied to smolt release. Includes 2000 forecast for supplementation releases, using same method.
Hoh	Natural	8.5	8.5	3.5	3.2	3.4	2.8	Average Queets smolts per square mile multiplied by 299 square miles of Hoh River watershed and recent year marine survivals for Bingham Creek and Queets.
Quillayute Fall Run	Natural	22.3	23.0	8.7	14.5	8.0	8.9	Estimated smolt production multiplied by average predicted survival rate from sea surface temperature, Queets, and Bingham Creek jack models.
	Hatchery	15.0	15.3	13.9	9.4	4.4	9.1	Mean ocean recruits per releasefor BY 80-93, multiplied by releases.

TABLE I-2. Preliminary, preseason **adult coho** salmon stock ocean abundance forecasts in thousands of fish. (Page 2 of 2)

Production Source and Stock or Stock Group		Preseason Estimates of Adults 2002	2001	2000	1999	1998	1997	Methodology for 2002 Prediction
Quillayute Summer Run	Natural	1.2	0.6	1.6	1.2	1.3	1.6	Estimated smolt production multiplied by average predicted survival rate from sea surface temperature and Bingham Creek jack models.
	Hatchery	4.9	5.3	5.4	3.5	1.8	3.6	Average ocean recruits per release by 80 to 93, multiplied by the number of smolts released.
WA Coast Total	Natural	160.8	125.7	78.6	96.5	56.8	45.7	
	Hatchery	145.4	144.6	133.9	105.8	61.1	211.5	
Puget Sound[a/]								A variety of methods were used for 2002, 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.
Strait		21.2	21.4	13.5	14.7	16.8	6.5	
	Natural							
	Hatchery[b/]	14.0	14.4	13.6	37.7	28.3	29.7	
Nooksack-Samish	Natural	22.0	12.4	14.9	13.8	30.8	28.0	
	Hatchery	105.4	44.4	65.5	95.0	119.1	223.3	
Skagit	Natural	98.5	87.2	30.2	75.7	55.0	70.9	
	Hatchery	14.1	10.1	10.3	10.9	12.9	22.1	
Stillaguamish	Natural	19.7	24.4	17.7	35.7	47.8	36.0	
Snohomish	Natural	123.1	129.6	53.0	141.6	165.3	186.6	
	Hatchery	60.3	60.9	62.1	87.8	47.1	184.6	
South Sound	Natural	40.4	29.5	11.7	19.4	57.2	135.0	
	Hatchery	222.5	172.6	121.8	372.1	408.7	674.1	
Hood Canal	Natural	34.9	62.0	61.0	65.1	108.0	78.4	
	Hatchery[c/]	31.3	33.5	38.5	96.8	95.2	66.3	
Puget Sound Total	Natural	359.8	366.5	202.0	366.0	480.9	541.4	
	Hatchery	448.0	335.9	311.8	700.3	711.3	1,200.1	

a/ Run sizes scaled to FRAM base period (1979-1981) catch and escapement.
b/ Strait Hatchery number includes 2,312 Natural coho from Secondary (Hatchery) management zones.
c/ Hood Canal Hatchery number includes 1,157 Natural coho from Secondary (Hatchery) management zones.

TABLE I-3. Achievement of **conservation objectives** for natural stocks listed in Table 3-1 of Amendment 14. Bolded numbers indicate a failure to meet the conservation objective. Stocks listed under the Endangered Species Act are not included. (Page 1 of 3)

Stock and Conservation Objective (thousands of spawners; spawners per mile; impact or replacement rate)	Observed or Projected Conservation Achievement (postseason estimates of thousands of spawners or spawners per mile; pre- or postseason impact or replacement rate)							Overfishing Criteria		
	1996	1997	1998	1999	2000	2001[a/]	2002[b/]	Alert[c/]	Concern[d/]	Exception[e/]
CHINOOK										
Sacramento River Fall 122.0 - 180.0 hatchery and natural spawners	244.4	323.9	237.5	273.3	413.6	537.1	>180.0	No	No	
Klamath River Fall - no less than 35.0 adult natural spawners	81.3	46.1	42.5	**18.5**	82.7	78.1	>35.0	No	No	
Southern, Central and Northern Oregon Coast Spring and Fall No less than 60 adult spawners/mile.[f/]	133.9	93.9	88.2	105.4	76.8	168.0	>60.0	No	No	
Upper Columbia River Bright Fall 43.5 adults over McNary Dam Council area base period impacts <4%.	73.9	67.1	63.8	78.4	78.7	110.5	>43.5	No	No	✓
Upper Columbia River Summer 80.0 to 90.0 adults over Bonneville Dam. Council area base period impacts <2%. Long history of dam passage and habitat losses.	**12.3**	**19.8**	**15.2**	**22.1**	**25.3**	**55.9**	<80.0	Limited[e/]	Limited[e/]	✓
Grays Harbor Fall - 14.6 adult spawners (MSP)	20.2	18.2	**12.5**	**7.8**	**4.9**	**9.5**	NA[g/]	Limited[e/]	Limited[e/]	✓
Grays Harbor Spring - 1.4 adult spawners	4.5	4.5	2.3	2.9	2.9	2.9	NA[g/]	NA[g/]	No	✓
Queets Fall - no less than 2.5 adult spawners (MSY)	3.4	2.5	4.0	**1.9**	3.6	**2.1**	NA[g/]	NA[g/]	No	✓
Queets Spring/Summer - no less than 0.7 adult spawners	0.78	**0.54**	**0.49**	**0.37**	**0.25**	**0.54**	NA[g/]	Limited[e/]	Limited[e/]	✓
Hoh Fall - no less than 1.2 adult spawners (MSY)	3.0	1.8	4.3	1.9	1.7	1.9	NA[g/]	NA[g/]	No	✓
Hoh Spring/Summer - no less than 0.9 adult spawners	1.4	1.8	1.3	1.0	**0.5**	1.2	NA[g/]	NA[g/]	No	✓
Quillayute Fall - no less than 3.0 adult spawners (MSY)	7.3	5.4	6.7	3.3	3.7	3.8	NA[g/]	NA[g/]	No	✓
Quillayute Spring/Summer - 1.2 adult spawners (MSY)	1.2	**0.9**	1.6	**0.7**	**1.0**	1.2	NA[g/]	NA[g/]	No	✓

TABLE I-3. Achievement of **conservation objectives** for natural stocks listed in Table 3-1 of Amendment 14. Bolded numbers indicate a failure to meet the conservation objective. Stocks listed under the Endangered Species Act are not included. (Page 2 of 3)

Stock and Conservation Objective (thousands of spawners; spawners per mile; impact or replacement rate)	Observed or Projected Conservation Achievement (postseason estimates of thousands of spawners or spawners per mile; pre- or postseason impact or replacement rate)							Overfishing Criteria		
	1996	1997	1998	1999	2000	2001[a/]	2002[b/]	Alert[c/]	Concern[d/]	Exception[e/]
COHO										
Grays Harbor - 35.4 adult spawners (MSP)	63.6	**22.5**	35.6	**29.4**	67.0	NA	>35.4	No	No	
Queets - 5.8 to 14.5 adult spawners (MSY range) Includes supplemental adults.	12.6	**1.9**	**5.5**	**5.3**	8.6	22.4	>5.8	No	No	
Hoh - 2.0 to 5.0 adult spawners (MSY range)	4.9	**1.4**	4.4	4.6	6.8	6.7	>2.0	No	No	
Quillayute Fall - 6.3 to 15.8 adult spawners (MSY range)	11.0	**4.6**	13.9	9.4	13.3	15.0	>6.3	No	No	
Western Strait of Juan de Fuca - 11.9 adult spawners	**3.7**	**4.1**	15.1	**8.0**	16.9	NA	>11.9	No	No	
Eastern Strait of Juan de Fuca - 0.95 adult spawners	1.89	1.30	1.94	1.36	2.11	NA	>0.95	No	No	
Hood Canal - 21.5 adult spawners (MSP)	37.1	96.4	90.4	**14.8**	23.4	NA	>21.5	No	No	
Skagit - 30.0 adult spawners (MSP)	**8.3**	32.6	56.0	**23.5**	58.1	NA	>30.0	No	No	
Stillaguamish - 17.0 adult spawners (MSP)	**10.4**	**10.9**	27.3	**7.0**	28.3	73.6	>17.0	No	No	
Snohomish - 70.0 adult spawners (MSP)	**53.1**	**58.2**	150.1	**61.3**	94.2	261.8	>70.0	No	No	

a/ Preliminary estimates.

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 (beginning in 2001) - 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, which may vary from the MSY or MSP conservation objectives. For all natural stocks which meet the conservation alert criteria, the Council will notify pertinent fishery and habitat managers, advising that the stock may be temporarily depressed or approaching an overfishing concern (depending on its recent conservation status), and request that state and tribal fishery managers identify the probable causes, if known. If the stock in question has not met its conservation objective in the previous two years, the Council will request the pertinent state and tribal managers to do a formal assessment of the primary factors leading to the shortfalls and report their conclusions and recommendations to the Council no later than the March meeting prior to the next salmon season.

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 HSG to provide recommendations for habitat restoration and enhancement measures within a suitable time frame.

e/ **Exception** - strict 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 limited to 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 HSG 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.

TABLE I-3. Achievement of conservation objectives for natural stocks listed in Table 3-1 of Amendment 14. Bolded numbers indicate a failure to meet the conservation objective. Stocks listed under the Endangered Species Act are not included. (Page 3 of 3)

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 9.2 miles for northern stocks).

g/ Preseason forecasts are not made for Washington coastal chinook stocks.

CHAPTER II
CHINOOK SALMON ASSESSMENT

SACRAMENTO RIVER FALL CHINOOK SALMON

Predictor Description

The Council's framework management plan sets the escapement goal for Sacramento River fall chinook as a range from 122,000 to 180,000 adults. This fall stock comprises over 90% of the escapement of all chinook stocks that return to Central Valley streams and hatcheries. The Central Valley index (CVI), which provides an annual index of abundance for the combined Central Valley chinook stocks, is the sum of ocean fishery chinook harvests in the area south of Point Arena plus the Central Valley adult chinook spawning escapement (Table II-1). The CVI harvest index is the ocean harvest landed south of Point Arena, divided by the CVI.

Prior to 1989 the STT based its projection of the CVI on recent CVI levels (with general consideration given for brood year natural escapements), hatchery releases, and the previous year jack returns. Between 1989 and 1991, several predictors of the CVI were evaluated, including weight and number of juveniles in hatchery releases and previous year jack returns. Since 1991, the STT has used a linear regression of the CVI on the previous year's Central Valley age-two return to forecast the CVI (Figure II-1).

Predictor Performance

For the 1985-2001 period, the CVI preseason forecast has ranged from 0.50 to 1.67 times its postseason value (Table II-2). The 2001 CVI postseason estimate of 806,000 fish is 1.24 times its preseason forecast of 649,400 fish (Table II-2). The postseason estimate of 27% for the 2001 CVI harvest index is 0.5 times its preseason forecast of 54% (Table II-1).

2002 Stock Status

A total of 42,200 age-two chinook are estimated to have returned to the Central Valley in 2001, forecasting a 2002 CVI of 825,400 adult chinook (Figure II-1), which is 1.27 times the 2001 forecast.

Evaluation of 2001 Regulations on 2002 Stock Abundance

The CVI harvest index has varied significantly since it was first calculated in 1970. After reaching its lowest level of 51% in 1985, the index rose to 78% in 1988 and ranged between 71% and 78% over the 1989-1995 period (Table II-1). The CVI harvest index fell to approximately 65% in 1996 and 1997 and to approximately 54% in 1998, 1999, and 2000. This decline in the CVI harvest index accompanied the observed reduction in fishing effort south of Point Arena between 1996 and 2000. The 2001 index of 27% is the lowest on record and reflects a very low ocean harvest coupled with a very high river return.

A repeat of 2001 regulations would be expected to result in a CVI harvest index similar to the average of the last five years (51%). Applying the complement of this fraction (1 - 0.51) to the 2002 CVI forecast of 836,900 fish and multiplying that quantity by the typical percentage of Central Valley chinook spawners that are fall run fish (approximately 90%), yields a 2002 adult escapement forecast of 396,100 Sacramento River fall chinook, which is well above the upper end of the escapement goal range (Figure II-2).

KLAMATH RIVER FALL CHINOOK

Predictor Description

For Klamath River fall chinook, linear regressions are used to relate September 1 (preseason) ocean abundance estimates of age-three, age-four, and age-five fish to that year's river run size estimates of age-two, age-three, and age-four fish, respectively (Table II-3). Historical abundance estimates were derived from

TABLE II-1. Indices of annual **abundance and ocean** fishery **impacts** on **California Central Valley chinook** in thousands of fish. (Page 1 of 1)

	Ocean Chinook Landings South of Pt. Arena			Hatchery and Natural Escapements of Central Valley Adults			CVI Abundance (Ocean Landings + Escapement)	CVI Harvest Index (%)[b/]
Year	Troll	Sport	Total	Fall	Other[a/]	Total		
1970	226.8	111.1	337.9	190.5	55.6[c/]	246.1	584.0	58
1971	150.7	166.3	317.0	190.6	62.0	252.6	569.6	56
1972	229.8	187.6	417.4	99.6	46.1	145.7	563.1	74
1973	422.5	180.9	603.4	227.1	27.1	254.2	857.6	70
1974	282.7	141.6	424.3	205.6	35.7	241.3	665.6	64
1975	234.4	92.7	327.1	159.2	47.6	206.8	533.9	61
1976	237.9	68.6	306.5	168.8	43.8	212.6	519.1	59
1977	263.8	76.6	340.4	148.7	42.8	191.5	531.9	64
1978	291.0	65.9	356.9	136.9	17.1	154.0	510.9	70
1979	234.1	108.5	342.6	167.9	11.3	179.2	521.8	66
1980	294.3	77.1	371.4	155.9	31.6	187.5	558.9	66
1981	289.9	73.8	363.7	189.3	18.8	208.1	571.8	64
1982	418.4	122.5	540.9	177.2	38.3	215.5	756.4	72
1983	178.2	53.0	231.2	121.0	12.8	133.8	365.0	63
1984	221.7	78.7	300.4	197.5	17.0	214.5	514.9	58
1985	212.3	121.8	334.1	308.9	18.1	327.0	661.1	51
1986	502.5	114.8	617.3	259.0	33.2	292.2	909.5	68
1987	446.8	152.8	599.6	188.0	25.5	213.5	813.1	74
1988	830.5	130.4	960.9	244.9	28.0	272.9	1233.8	78
1989	363.8	130.9	494.7	149.6	17.9	167.5	662.2	75
1990	336.2	112.7	448.9	108.3	13.6	121.9	570.8	79
1991	254.6	62.1	316.7	112.3	15.3	127.6	444.3	71
1992	163.5	66.7	230.2	85.3	8.2	93.5	323.7	71
1993	259.7	99.3	359.0	131.5	10.4	141.9	500.9	72
1994	290.4	159.9	450.3	148.8	6.8	155.6	605.9	74
1995	670.6	354.6	1025.2	272.0	16.2	288.2	1313.4	78
1996	348.9	129.3	478.2	255.3	8.7	264.0	742.2	64
1997	482.5	208.4	690.9	350.8	17.4	368.2	1059.1	65
1998	221.9	114.4	336.3	253.0	39.1	292.1	628.4	54
1999	285.6	76.4	362.0	289.8	20.5	310.3	672.3	54
2000	418.4	141.1	559.5	454.5	15.8	470.3	1029.8	54
2001[d/]	159.1	59.6	218.7	561.5	25.8[e/]	587.3	806.0	27

a/ Spring run of the current calendar year and late fall and winter runs of the following calendar year.
b/ Ocean harvest landed south of Pt. Arena as a percent of the CVI.
c/ Percent of adults in 1970 spring run assumed the same as 1971 (72%, 5,500 total).
d/ Preliminary.
e/ Late-fall and winter contributions not yet available; recent 5 year average escapements used.

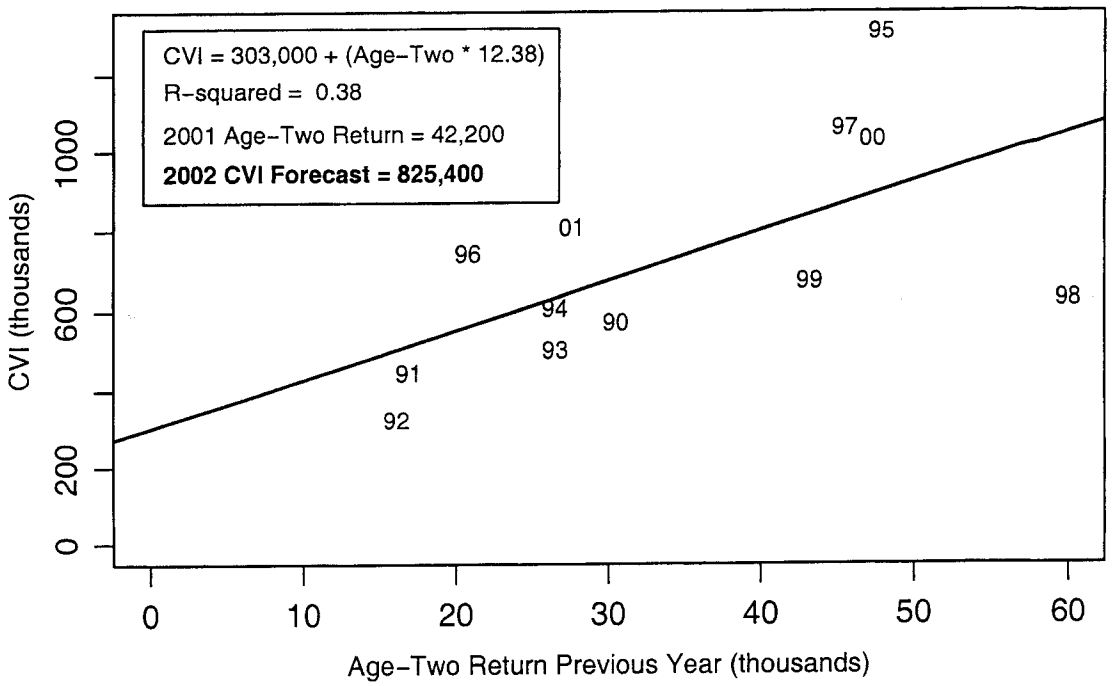

Figure II-1. Regression estimator for CVI based on previous year's river return of age-two Central Valley chinook, 1990-2001. Years shown are CVI year.

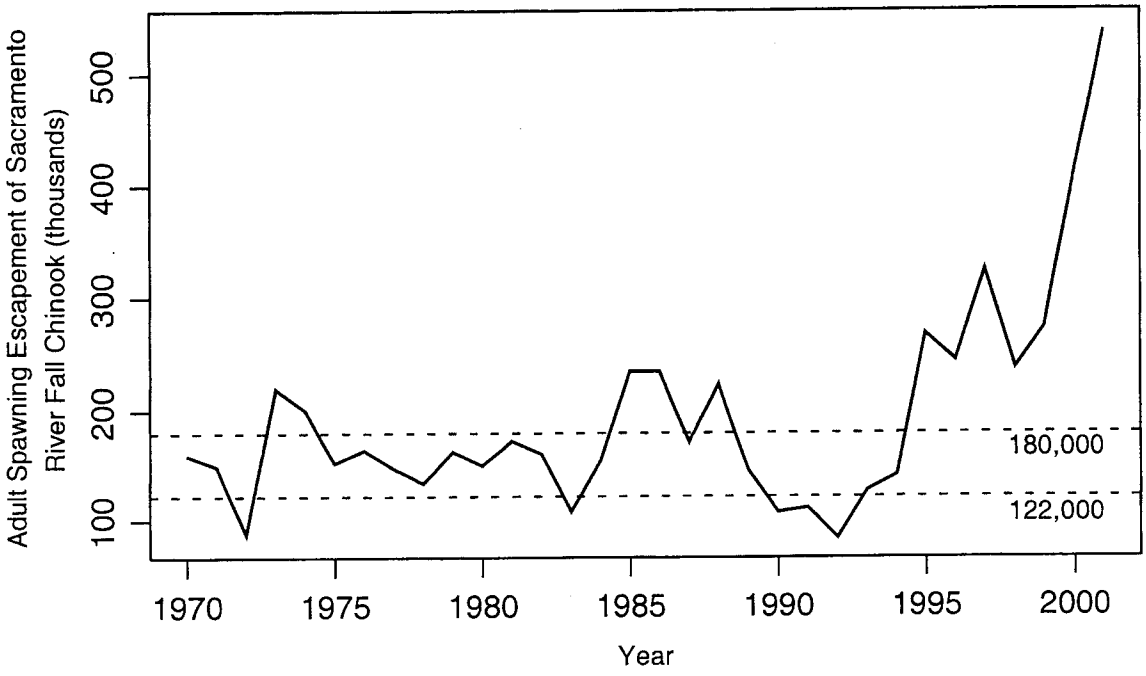

Figure II-2. Spawning escapements of adult Sacramento River fall chinook, 1970-2001, and the goal range for the stock of 122,000 to 180,000 adult fish.

TABLE II-2. Comparisons of **preseason forecast and postseason** estimates for the **CVI** in thousands of fish. (Page 1 of 1)

Year	Preseason Forecast	Postseason Estimate	Preseason/Postseason
1985	524.8	661.1	0.79
1986	546.5	909.5	0.60
1987	592.9	813.2	0.73
1988	707.1	1,233.8	0.57
1989	625-885	662.2	0.94-1.34
1990	500-900	570.7	0.88-1.58
1991	466.0	444.3	1.05
1992	452.0	323.7	1.40
1993	501.0	500.9	1.00
1994	503.0	605.9	0.83
1995	654.0	1,313.4	0.50
1996	533.0	742.2	0.72
1997	849.0	1,059.1	0.80
1998	1,051.0	628.4	1.67
1999	847.7	672.3	1.26
2000	790.4	1029.8	0.77
2001	649.4	806.0	0.81

TABLE II-3. **Klamath River fall chinook** ocean abundance, harvest rate, and river run size estimates **by age** and ocean abundance. (Page 1 of 1)

	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	28.1	64.0	14.3	1.8	80.1
1982	557.5	133.4	690.9	0.30	0.52	39.4	30.0	33.9	2.6	66.5
1983	318.0	113.9	432.0	0.19	0.60	3.8	35.8	20.7	0.9	57.5
1984	157.5	84.1	241.6	0.08	0.38	8.3	21.7	24.4	1.1	47.1
1985	375.2	57.0	432.2	0.11	0.25	69.4	32.9	25.6	5.8	64.4
1986	1308.9	141.3	1450.2	0.18	0.46	44.5	162.7	29.8	2.3	194.8
1987	786.5	343.4	1129.9	0.16	0.43	19.0	89.6	112.4	6.8	208.8
1988	750.5	236.2	986.7	0.20	0.39	24.0	101.0	86.4	3.9	191.3
1989	367.0	176.3	543.3	0.15	0.36	9.1	50.3	69.4	4.3	124.0
1990	177.6	103.1	280.7	0.30	0.55	4.4	11.6	22.9	1.3	35.8
1991	69.6	37.3	106.8	0.03	0.18	1.8	10.0	21.5	1.1	32.6
1992	39.4	28.2	67.6	0.02	0.07	13.7	6.9	18.7	1.0	26.7
1993	164.7	15.0	179.7	0.05	0.16	7.6	48.3	8.2	0.7	57.1
1994	116.1	39.6	155.7	0.03	0.09	14.4	36.0	24.6	1.0	61.6
1995	767.7	27.6	795.3	0.04	0.13	22.8	193.8	17.5	2.4	213.7
1996	190.3	225.2	415.5	0.05	0.16	9.5	38.7	136.4	0.3	175.4
1997	140.3	62.8	203.1	0.01	0.06	8.0	35.0	44.1	4.6	83.6
1998	154.3	44.8	199.1	0.00	0.09	4.6	59.2	29.6	1.7	90.6
1999	128.8	30.1	158.9	0.01	0.09	19.2	29.1	20.5	1.3	50.9
2000	631.5[a/]	44.0	675.5	0.06[a/]	0.10	10.2	186.9	30.4	0.5	217.9
2001	485.7[b/]	142.2[a/]	627.9	---- [c/]	0.09[a/]	11.4	100.0	89.2	0.2	189.3

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

a cohort analysis of coded-wire tag (CWT) information (brood years 1979-1997). 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-two fish is not forecast, because no precursor to age-two fish of that brood is available. Ocean fisheries harvest small numbers of age-two and age-five Klamath River fall chinook.

Predictor Performance

Since 1985, the preseason ocean abundance forecasts for age-three fish have ranged from 0.33 to 2.7 times the postseason abundance estimates; for age-four fish from 0.47 to 2.62 times the postseason estimates; and for the adult stock as a whole from 0.4 to 2.03 times the postseason estimates (Table II-4). For years of low stock abundance, particularly 1991-1994, the regression estimators have generally overpredicted abundance. The September 1, 2000 age-three forecast (187,200) was 0.39 times its postseason estimate (485,700); the age-four forecast (247,000) was 1.74 times its postseason estimate (142,200); and the total adults forecast (435,400) was 0.69 times its postseason estimate (628,100) (Table II-4).

Management of Klamath River fall chinook harvest since 1986 has attempted to achieve specific harvest rates on fully-vulnerable age-four and age-five fish in ocean and river fisheries (Table II-5). The Council has used a combination of quotas and time/area restrictions in ocean fisheries in an attempt to meet the harvest rate objective set each year. Since 1992, fisheries have been managed to achieve 50/50 allocation between tribal and non-tribal fisheries. River fisheries have been managed on the basis of adult chinook quotas (tribal net fishing) and partial quotas that trigger area closures (recreational fishing).

The Council's framework management plan for Klamath River fall chinook (Amendment 9) permits a 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. Given the forecast preseason abundance, the regulations adopted in 2001 were expected to result in 47,000 natural spawning adults and an age-four ocean harvest rate of 14%. Based on postseason estimates, there were 78,100 natural spawning adults, and an age-4 ocean harvest rate of 9% (Table II-6).

2002 Stock Status

The forecast September 1, 2001 (preseason) ocean abundance of Klamath River fall chinook salmon is 209,000 age-three fish, 143,800 age-four fish, and 9,700 age-five fish (Figure II-3). Absent ocean and river fisheries in 2002, the projected stock strength would be expected to result in 94,800 fish maturing and returning to the basin in 2002 to spawn as adults in natural areas.

Late-season ocean fisheries in 2001 (September-November) were estimated to have harvested zero age-three, 1,900 age-four, and 400 age-five Klamath River fall chinook. This harvest will be deducted from the ocean fishery's allocation in determining the 2002 allowable ocean harvest.

Evaluation of 2001 Regulations on 2002 Stock Abundance

Assuming: (a) the September 1, 2001 ocean abundance; (b) 2001 ocean fishery seasons and quotas; (c) the 2001 river recreational allocation of 39.5% of the nontribal harvest; and (d) 50% of the total harvest allocated to the river tribes; the Klamath Ocean Harvest Model (KOHM) forecasts a spawning population of approximately 59,900 adults, of which 36,800 would be expected to spawn in natural areas. The total harvest projected by the KOHM under this scenario would be 98,000 adults (tribes 49,000; river recreational 19,300; ocean commercial 23,600, ocean recreational 6,000), with an age-four ocean harvest rate of 12.9%.

OTHER CALIFORNIA COASTAL CHINOOK STOCKS

Other California coastal streams that contribute to ocean fisheries include the Smith, Little, Mad, Eel, and Mattole rivers, and Redwood Creek. All of these streams support fall stocks and are believed to contribute to ocean fisheries off the California and Oregon coasts. Current information is insufficient to forecast the ocean abundance of these stocks.

TABLE II-4. Comparisons of **preseason forecast and postseason** estimates for ocean abundance of adult **Klamath River fall chinook.** (Page 1 of 2)

Year (t)	Preseason Forecast Sept 1 (t-1)	Postseason Estimate Sept 1 (t-1)	Pre/Postseason
	Age-Three		
1985	113,000	276,000	0.41
1986	426,000[a/]	1,308,886	0.33
1987	511,800	786,492	0.65
1988	370,800	750,479	0.49
1989	450,600	367,039	1.23
1990	479,000	177,632	2.70
1991	176,200	69,558	2.53
1992	50,000	39,407	1.27
1993	294,400	164,687	1.79
1994	138,000	116,131	1.19
1995	269,000	767,678	0.35
1996	479,800	190,251	2.52
1997	224,600	140,261	1.60
1998	176,000	154,273	1.14
1999	84,800	128,830	0.66
2000	349,600	631,498	0.55
2001[b/]	187,200	485,710	0.39
	Age-Four		
1985	56,875	57,500	0.99
1986	66,250	141,314	0.47
1987	206,125	343,391	0.60
1988	186,375	236,238	0.79
1989	215,500	176,281	1.22
1990	50,125	103,115	0.49
1991	44,625	37,265	1.20
1992	44,750	28,223	1.59
1993	39,125	14,972	2.61
1994	86,125	39,558	2.18
1995	47,000	27,591	1.70
1996	268,500	225,233	1.19
1997	53,875	62,830	0.86
1998	46,000	44,792	1.03
1999	78,750	30,065	2.62
2000	38,875	44,031	0.88
2001[b/]	247,000	142,157	1.74

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

Year (t)	Preseason Forecast Sept 1 (t-1)	Postseason Estimate Sept 1 (t-1)	Pre/Postseason
	Age-Five		
1985	NA	11,276	NA
1986	NA	5,884	NA
1987	5,250	19,536	0.27
1988	13,250	14,724	0.90
1989	10,125	9,593	1.06
1990	7,625	7,709	0.99
1991	1,500	2,780	0.54
1992	1,250	1,445	0.87
1993	1,125	1,763	0.64
1994	500	1,421	0.35
1995	2,000	3,570	0.56
1996	1,125	786	1.43
1997	7,875	8,865	0.89
1998	3,250	2,383	1.36
1999	2,000	2,094	0.96
2000	1,375	779	1.77
2001[b/]	1,250	258	4.84
	Total Adults		
1985	NA	344,776	NA
1986	NA	1,456,084	NA
1987	723,175	1,149,419	0.63
1988	570,425	1,001,441	0.57
1989	676,225	552,913	1.22
1990	536,750	288,456	1.86
1991	222,325	109,603	2.03
1992	96,000	69,075	1.39
1993	334,650	181,422	1.84
1994	224,625	157,110	1.43
1995	318,000	798,839	0.40
1996	749,425	416,270	1.80
1997	286,350	211,956	1.35
1998	225,250	201,448	1.12
1999	165,550	160,989	1.03
2000	389,850	676,308	0.58
2001[b/]	435,450	628,125	0.69

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

b/ Preliminary.

OREGON COASTAL CHINOOK STOCKS

Oregon coastal chinook stocks are categorized into two major subgroups based on ocean migration patterns. Although their ocean harvest distributions overlap somewhat, they have been labeled as either north or south/local migrating.

North Migrating Chinook

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 north Oregon coast (NOC) river systems from the Nehalem through the Siuslaw Rivers are harvested primarily in Pacific Salmon Commission (PSC) ocean fisheries off British Columbia and southeast Alaska and to a much lesser degree in Council area fisheries off Washington, Oregon, and in terminal area (state waters) fisheries. CWT analysis indicates populations from five major mid-Oregon coast (MOC) systems from the Coos through the Elk Rivers are harvested primarily in ocean fisheries off British Columbia, Washington, and Oregon with minor contributions to California fisheries.

Predictor Description and 2002 Stock Status

Specific techniques are not used to make quantitative abundance predictions for these stocks for use in annual development of Council area fishery regulations. Qualitative expectations of abundance are based on parental year spawner escapements and hatchery indicator stock data for used in the PSC management process.

Natural spawner escapement is assessed yearly from the Nehalem through Coquille rivers. Peak spawning counts of adults are obtained from standard index areas on these rivers and monitored to assess stock trends (*Review of 2001 Ocean Salmon Fisheries*, Chapter II, Table II-4 and Figure II-3). Natural fall chinook stocks from the Nehalem River on the north Oregon coast south to the Elk River near Humbug Mountain 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.

North Oregon Coast

Since 1986, the Salmon River Hatchery production has been coded-wire-tagged and used as an indicator stock for the NOC stock component. Because these fish are mostly 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. Based on this indicator stock and compared with index abundances since 1986, expectations in 2002 are the NOC stock will be above average abundance levels.

Mid-Oregon Coast

Since 1992, the Elk River Hatchery production has been coded-wire-tagged for use as an indicator stock for the MOC stock component. Forecasts of abundance assume river returns of younger age classes of a brood reflect abundance of the remaining, as yet immature, ocean residents of the brood. Age-specific ocean escapements for 2001 are not currently available. The STT has not undertaken a review of the methods used by Oregon Department of Fish and Wildlife (ODFW) staff in preparing these abundance forecasts.

Based on the density index of total spawners, the generalized expectation for Oregon coastal north migrating (NOC and MOC) stocks in 2002 is for above average abundance. The density of adults observed since 1985 has met or exceeded the goal of 60-90 spawners per mile, a primary indicator that these stocks are generally healthy (*Review of 2001 Ocean Salmon Fisheries*, Appendix B, Table B-11).

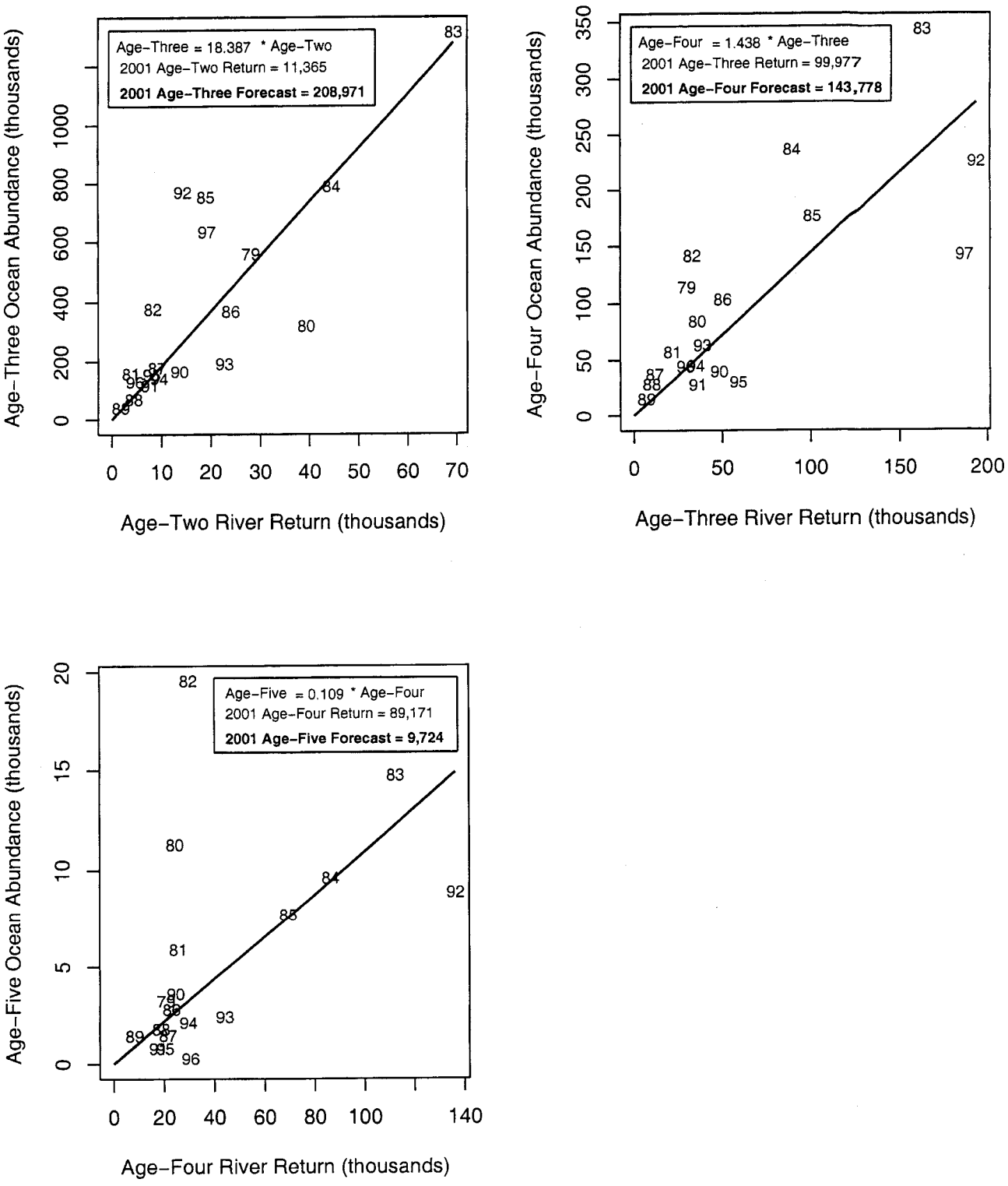

Figure II-3. Regression estimators for Klamath River fall chinook ocean abundance (Sept. 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

South/Local Migrating Chinook

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

Predictor Description and 2002 Stock Status

Quantitative abundance predictions are not made for these stocks, although an abundance index for Rogue River fall chinook has been developed. General trends in stock abundance for southern Oregon coastal chinook stocks are assessed through escapement indices (*Review of 2001 Ocean Salmon Fisheries*, Chapter II, Table II-4 and Figure II-3).

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. Also present in lesser numbers are hatchery fall chinook, primarily from the Chetco River. Substantial releases of hatchery spring chinook occur in both the Rogue and Umpqua Rivers.

Umpqua River and Rogue River Spring Chinook

Umpqua and Rogue rivers spring chinook contribute to ocean fisheries primarily as age-three 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.

Rogue River Fall Chinook

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

Annual predictions of Rogue River fall chinook are used for ocean impact modeling. A Rogue River fall chinook ocean abundance index has been developed based on carcass counts, ocean exploitation rates, and cohort reconstruction methods. Linear regression analysis is used to relate the Rogue River fall chinook ocean abundance index for age-three, age-four, and age-five fish to carcass counts of age-two, age-three and age-four fish, respectively, of the previous year. The inriver age composition estimates are based on scale sampling of carcasses. Ocean exploitation rates are based on Klamath River fall chinook CWT analysis since 1979, because Rogue River fall chinook ocean exploitation rate information is not available. The ocean harvest distribution and age composition of Rogue and Klamath fall chinook are assumed to be similar. The Rogue River fall chinook ocean abundance index for 2002 is 30,400 chinook, the highest since 1988 (Table II-7).

Other Stocks

Information is insufficient to forecast the abundance of fall chinook from other smaller rivers south of the Elk River. These stocks are minor contributors to general season mixed stock ocean fisheries.

Evaluation of 2001 Regulations on 2002 Stock Abundance

Given the 2001 regulations and the projected 2002 Oregon coastal chinook stock abundance, it is expected the aggregate Oregon coastal chinook goal of 150,000 to 200,000 naturally spawning adults will be met.

TABLE II-5. Summary of **management objectives** and predictor performance for **Klamath River fall chinook**. (Page 1 of 1)

	Preseason Ocean Abundance Forecast Sept 1 (t-1)		Postseason Ocean Abundance Estimate Sept 1 (t-1)		Preseason Age-4 Harvest Rate Forecast[a/]		Postseason Age-4 Harvest Rate Estimate[b/]		Preseason Adult Harvest Forecast		Postseason Adult Harvest Estimate	
Year(t)	Age-3	Age-4	Age-3	Age-4	Ocean	River	Ocean	River	Ocean	River	Ocean	River
1986	426,000	66,250	1,308,886	141,314	0.28	0.50	0.46	0.67	72,000	37,700	305,547	46,154
1987	511,800	206,125	786,492	343,391	0.28	0.53	0.43	0.44	121,200	78,200	279,890	73,265
1988	370,800	186,375	750,479	236,238	0.31	0.53	0.39	0.52	114,100	65,400	252,962	73,854
1989	450,600	215,500	367,039	176,281	0.30	0.49	0.36	0.70	128,100	67,600	123,985	54,340
1990	479,000	50,125	177,632	103,115	0.30	0.49	0.55	0.36	85,100	31,200	115,003	11,459
1991	176,200	44,625	69,558	37,265	0.13	0.28	0.18	0.45	16,700	12,800	9,969	13,581
1992	50,000	44,750	39,407	28,223	0.06	0.15	0.07	0.27	4,200	4,200	3,160	6,787
1993	294,400	39,125	164,687	14,972	0.12	0.43	0.16	0.49	20,100	22,500	11,264	12,808
1994	138,000	86,125	116,131	39,558	0.07	0.20	0.09	0.30	10,400	14,300	8,525	13,524
1995	269,000	47,000	767,678	27,591	0.07	0.32	0.13	0.20	13,500	18,500	31,302	21,638
1996	479,800	268,500	190,251	225,233	0.17	0.66	0.16	0.39	88,400	129,100	44,921	69,242
1997	224,600	53,875	140,261	62,830	0.10	0.43	0.06	0.26	17,600	26,500	8,620	17,763
1998	176,000	46,000	154,273	44,792	0.07	0.29	0.09	0.30	10,200	14,800	4,916	17,897
1999	84,800	78,750	128,830	30,065	0.10	0.28	0.09	0.45	12,300	18,100	5,085	16,942
2000	349,600	38,875	631,498	44,031	0.11	0.53	0.10	0.25	24,000	32,400	42,293	35,065
2001[c/]	187,200	247,000	485,710	142,157	0.14	0.61	0.09	0.30	45,600	105,300	21,671	52,569

a/ 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.

b/ 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 river fisheries.

c/ Preliminary.

TABLE II-6. **Harvest** levels and rates of age-three and age-four **Klamath River fall chinook**. (Page 1 of 2)

	Ocean Fisheries (Sept 1 (t-1) - Aug 31 (t))							River Fisheries (t)		
	KMZ			North of	South of		Ocean			
Year (t)	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
					HARVEST (numbers of fish)					
Age-Three										
1986	35,821	4,894	40,715	74,248	123,456	197,704	238,419	8,100	18,100	26,200
1987	17,590	5,167	22,757	43,535	57,462	100,997	123,754	11,400	11,400	22,800
1988	15,707	5,071	20,778	23,762	106,770	130,532	151,310	12,500	15,600	28,100
1989	6,312	11,77	18,088	15,278	23,463	38,741	56,829	2,700	900	3,600
1990	81	4,442	4,523	37,070	11,163	48,233	52,756	1,300	1,400	2,700
1991	0	1,032	1,032	350	824	1,174	2,206	2,123	1,277	3,400
1992	0	0	0	970	0	970	970	970	251	1,221
1993	0	812	812	819	6,360	7,179	7,991	5,426	2,917	8,343
1994	41	573	614	0	3,267	3,267	3,881	4,543	971	5,514
1995	0	984	984	11,856	14,476	26,332	27,316	11,840	5,536	17,376
1996	0	0	0	0	9,137	9,137	9,137	12,363	3,661	16,024
1997	0	232	232	611	1,211	1,822	2,054	2,166	2,736	4,902
1998	0	6	6	296	467	763	769	2,231	5,781	8,012
1999	61	174	235	1,251	435	1,686	1,921	4,981	1,748	6,729
2000[a/]	409	3,286	3,695	8,846	25,200	34,046	37,741	22,458	4,893	27,351
2001[a/]	116	107	223	2,794	5,962	8,756	8,979	18,716	7,289	26,005
Age-Four										
1986	7,786	1,121	8,907	23,478	32,100	55,578	64,485	17,000	2,900	19,900
1987	21,803	4,442	26,245	71,367	49,019	120,386	146,631	41,000	8,500	49,500
1988	11,926	3,635	15,561	27,139	50,584	77,723	93,284	38,600	6,200	44,800
1989	5,935	9,625	15,560	31,975	16,298	48,273	63,833	41,000	7,700	48,700
1990	3,959	2,865	6,824	39,395	10,505	49,900	56,724	6,000	2,200	8,200
1991	0	1,007	1,007	1,530	4,174	5,704	6,711	7,593	2,016	9,609
1992	172	55	227	1,799	12	1,811	2,038	4,360	723	5,083
1993	0	0	0	850	1,606	2,456	2,456	3,786	243	4,029
1994	0	1,072	1,072	1,116	1,419	2,535	3,607	6,666	812	7,478
1995	0	224	224	1,758	1,703	3,461	3,685	2,957	481	3,438
1996	768	3,450	4,218	10,277	20,763	31,040	35,258	43,959	9,080	53,039
1997	3	170	173	460	2,972	3,432	3,605	8,734	2,586	11,320
1998	0	101	101	3,972	0	3,972	4,073	7,164	1,822	8,986
1999	15	379	394	1,655	694	2,349	2,743	8,789	494	9,283
2000	116	895	1,011	2,362	1,055	3,417	4,428	6,733	756	7,489
2001[a/]	1,317	1,608	2,925	5,864	3,864	9,728	12,653	21,724	4,817	26,541

TABLE II-6. **Harvest** levels and rates of age-three and age-four **Klamath River fall chinook**. (Page 2 of 2)

	Ocean Fisheries (Sept 1 (t-1) - Aug 31 (t))							River Fisheries (t)		
	KMZ			North of	South of		Ocean			
Year (t)	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
					HARVEST RATE					
Age-Three										
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	0.03	0.03	0.21	0.06	0.27	0.30	0.11	0.12	0.23
1991	0.00	0.01	0.01	0.01	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	0.00	0.01	0.00	0.03	0.03	0.03	0.13	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	0.01	0.17	0.06	0.23
2000[a/]	0.00	0.01	0.01	0.01	0.04	0.05	0.06	0.12	0.03	0.15
2001[a/]	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.19	0.07	0.26
Age-Four										
1986	0.06	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	0.27	0.03	0.30
1995	0.00	0.01	0.01	0.06	0.06	0.13	0.13	0.17	0.03	0.20
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	0.05	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	0.06	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[a/]	0.01	0.01	0.02	0.04	0.03	0.07	0.09	0.24	0.05	0.30

a/ Preliminary data (incomplete cohort).

TABLE II-7. **Rogue River fall chinook** inriver run and ocean **population indices**. (Page 1 of 1)

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	37.7	5.2	0.2	43.1
1979	0.2	1.0	6.5	0.0	7.7	0.23	0.55	7.5	18.2	0.1	25.8
1980	0.4	0.2	0.9	0.6	2.1	0.23	0.55	4.9	3.8	1.4	10.1
1981	1.1	3.3	1.0	0.3	5.7	0.21	0.53	8.8	2.8	0.6	12.2
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	9.8	4.7	0.2	14.7
1985	2.5	1.3	3.5	0.6	7.9	0.11	0.25	9.5	6.2	0.9	16.6
1986	3.1	12.5	2.3	0.5	18.4	0.18	0.46	72.0	5.8	0.9	78.7
1987	2.6	7.8	18.1	0.4	28.9	0.16	0.43	80.5	37.2	0.6	118.3
1988	1.4	4.8	25.2	1.5	32.9	0.20	0.39	17.2	47.9	2.5	67.6
1989	0.5	1.3	4.0	2.0	7.8	0.15	0.36	8.4	7.1	3.2	18.7
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	4.3	2.4	0.6	7.4
1993	0.3	3.5	1.5	0.5	5.8	0.05	0.16	16.0	3.2	0.6	19.8
1994	0.5	0.8	5.8	0.9	8.0	0.03	0.09	3.0	9.4	0.9	13.3
1995	0.2	0.6	1.4	2.0	4.2	0.04	0.13	4.1	1.7	2.3	8.1
1996	0.1	0.4	1.8	0.1	2.4	0.05	0.16	2.4	2.7	0.1	5.2
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	1.4	2.7	0.6	4.8
2000	0.2	2.0	0.8	0.6	3.6	0.06	0.10	12.9	0.9	0.6	14.5
2001	1.0	3.5	6.2	0.0	10.7	0.03[e/]	0.09	20.2[f/]	8.1[f/]	0.0	28.4
2002	-	-	-	-	-	-	-	17.5	11.9	0.9	30.4

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, 1977-80 based on 1981-83 average.

c/ Based on cohort reconstruction methods. Index values for 2002 predicted from regression equations; postseason estimates are not available.

d/ Excludes age-six fish.

e/ 1996-2000 average age-3 harvest rate/age-4 harvest rate.

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

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 tule stocks generally mature at an earlier age than the natural fall stocks and do not migrate as far north. Minor stocks include lower river bright (LRB), a naturally produced stock, and Select Area brights (SAB), a hatchery stock originally from Rogue River stock; both occur downstream from Bonneville Dam.

Preseason estimates of Columbia River fall chinook stock abundance, used by the STT to assess the Council's adopted fishery regulations, are based on age and stock-specific forecasts of annual ocean escapement (return to the Columbia River). These forecasts are developed by the technical staffs of the Columbia River management agencies. Columbia River return forecast methodologies used for Council management are generally 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 2002 return of each fall chinook stock group is estimated using relationships between successive age groups within a brood year. 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 (1977-1998) 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 such factors as CWT recovery 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 2001 Ocean Salmon Fisheries* (Appendix B, Tables B-15 through B-19). The 2001 returns for the five fall chinook stocks listed in this report may differ somewhat from those provided in the *Review of 2001 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 and postseason estimates (Table II-8). The 1992-2001 average March preliminary preseason estimates as a percentage of the postseason estimates for the URB, LRW, LRH, SCH, and MCB stock estimates are 0.85, 0.88, 0.87, 0.93, and 0.94 respectively. The only March preliminary preseason estimate to show a consistent bias was LRH, which has been underpredicted the past eight years. The other four have been both over and under predicted.

Ocean escapement estimates developed for the March Council meeting do not take into account marine harvests, which has varied during the last 20 years. The STT combines the initial inriver run size (ocean escapements) with expected Council area fishery harvest levels and stock distribution patterns to produce adjusted ocean escapement estimates based on the proposed ocean fishing regulations (Table II-8). These revised estimates are available at the end of the Council preseason planning process in April and should provide a more accurate prediction of ocean escapement.

2002 Stock Status

The preliminary forecast for 2002 URB fall chinook ocean escapement is 281,000 adults; if realized, would represent the largest return since 1988, the fourth largest since 1964, and 64% greater than the recent 5-year

TABLE II-8. **Predicted and postseason** returns of **Columbia River** adult **fall chinook** in thousands of fish. (Page 1 of 2)

Stock	Year	March Preseason Forecast[a/]	April STT Modeled Forecast[b/]	Postseason Return	March Pre/Postseason	April Pre/Postseason
URB	1984	90.1	93.0	131.4	0.69	0.71
	1985	159.1	159.1	196.4	0.81	0.81
	1986	285.9	286.1	281.6	1.02	1.02
	1987	436.4	436.4	420.7	1.04	1.04
	1988	450.7	446.5	339.9	1.33	1.31
	1989	234.0	231.8	261.3	0.90	0.89
	1990	127.2	126.9	153.6	0.83	0.83
	1991	88.8	88.9	103.3	0.86	0.86
	1992	68.4	66.3	81.0	0.84	0.82
	1993	84.5	82.7	102.9	0.82	0.80
	1994	85.4	94.7	132.8	0.64	0.71
	1995	103.7	125.0	106.5	0.97	1.17
	1996	88.9	94.2	143.2	0.62	0.66
	1997	166.4	158.0	161.7	1.03	0.98
	1998	150.8	141.8	142.3	1.06	1.00
	1999	147.5	102.1	166.1	0.89	0.61
	2000	171.1	208.2	155.7	1.10	1.34
	2001	127.2	132.7	232.6	0.55	0.57
LRW	1984	16.7	NA	13.3	1.26	NA
	1985	12.9	NA	13.3	0.97	NA
	1986	15.7	NA	24.5	0.64	NA
	1987	29.2	NA	37.9	0.77	NA
	1988	43.3	42.1	41.7	1.04	1.01
	1989	27.3	26.9	38.6	0.71	0.70
	1990	23.7	23.4	20.3	1.17	1.15
	1991	12.7	12.7	19.8	0.64	0.64
	1992	17.4	16.7	12.5	1.39	1.34
	1993	12.5	11.9	13.3	0.94	0.89
	1994	14.7	13.2	12.2	1.20	1.08
	1995	12.4	11.5	16.0	0.78	0.72
	1996	8.8	8.1	14.6	0.60	0.55
	1997	7.5	7.2	12.3	0.61	0.59
	1998	8.1	7.0	7.3	1.11	0.96
	1999	2.6	2.5	3.3	0.79	0.76
	2000	3.5	2.7	10.2	0.34	0.26
	2001	16.7	18.5	15.7	1.06	1.18
LRH	1984	70.4	89.0	102.4	0.69	0.87
	1985	81.5	86.7	111.0	0.73	0.78
	1986	171.6	173.9	154.8	1.11	1.12
	1987	294.9	298.7	344.1	0.86	0.87
	1988	267.7	246.5	309.9	0.86	0.80
	1989	104.9	97.5	130.9	0.80	0.74
	1990	68.5	65.5	60.0	1.14	1.09
	1991	71.4	73.1	62.7	1.14	1.17
	1992	113.2	121.5	62.6	1.81	1.94
	1993	79.3	77.7	52.3	1.52	1.49
	1994	36.1	46.5	53.6	0.67	0.87
	1995	35.8	42.4	46.4	0.77	0.91
	1996	37.7	48.3	75.5	0.50	0.64
	1997	54.2	68.7	57.4	0.94	1.20
	1998	19.2	22.5	45.3	0.42	0.50
	1999	34.8	38.2	40.0	0.87	0.96
	2000	23.7	26.4	27.0	0.88	0.98
	2001	32.2	30.5	94.3	0.34	0.32

TABLE II-8. **Predicted and postseason** returns of **Columbia River** adult **fall chinook** in thousands of fish. (Page 2 of 2)

Stock	Year	March Preseason Forecast[a/]	April STT Modeled Forecast[b/]	Postseason Return	March Pre/Postseason	April Pre/Postseason
SCH	1984	21.3	27.0	47.5	0.45	0.57
	1985	34.9	37.1	33.2	1.05	1.12
	1986	16.0	16.2	16.6	0.96	0.98
	1987	9.1	9.2	9.1	1.00	1.01
	1988	6.5	5.9	12.0	0.54	0.49
	1989	29.5	23.0	26.8	1.10	0.86
	1990	27.3	23.7	18.9	1.44	1.25
	1991	56.3	61.4	52.4	1.07	1.17
	1992	40.9	41.3	29.5	1.39	1.40
	1993	19.9	18.2	16.8	1.18	1.08
	1994	20.2	28.9	18.5	1.09	1.56
	1995	17.5	22.5	33.8	0.52	0.67
	1996	27.6	35.4	33.1	0.83	1.07
	1997	21.9	25.7	27.4	0.80	0.94
	1998	14.2	14.2	20.2	0.70	0.70
	1999	65.8	61.0	50.2	1.31	1.22
	2000	21.9	26.9	20.5	1.07	1.31
	2001	56.6	61.9	125.0	0.45	0.50
MCB	1990	69.5	69.3	58.9	1.18	1.18
	1991	48.4	48.5	35.4	1.37	1.37
	1992	42.5	40.7	31.1	1.37	1.31
	1993	33.0	32.3	27.5	1.20	1.17
	1994	23.9	26.7	33.7	0.71	0.79
	1995	25.0	30.0	34.2	0.73	0.88
	1996	40.8	43.2	59.7	0.68	0.72
	1997	72.1	61.9	59.0	1.22	1.05
	1998	47.8	44.9	36.8	1.30	1.22
	1999	38.3	27.7	50.7	0.76	0.55
	2000	50.6	61.6	36.8	1.38	1.67
	2001	43.5	45.3	76.4	0.57	0.59

a/ March preseason forecasts are ocean escapements based on terminal run size and stock-specific cohort relationships affected by the historical "normal" ocean fisheries during the brood year data base time period (generally 1978-1998).

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.

average returns. No preseason estimate of Snake River wild fall chinook ocean escapement for 2002 is currently available. However, the Columbia River technical staffs are expected to develop a run size estimate for this critical ESA listed stock prior to the April Council meeting process.

Ocean escapement of LRW fall chinook in 2002 is forecast at 18,700 adults, suggesting the largest return since 1991 and greater than the 10 year average of 11,300. The forecast run is expected to exceed the spawning escapement goal of 5,700 into the North Lewis River, Washington.

The preliminary forecast for 2002 ocean escapement of LRH fall chinook is for a return of 137,600 adults, which would be the largest return since 1988 and greater than the recent 10 year average of 55,400.

Ocean escapement of SCH fall chinook in 2002 is projected to be 144,400 adults, the fifth largest return since 1964 and largest since the 1976 return of 182,200.

The preliminary forecast for the 2002 ocean escapement of MCB fall chinook is 96,200 adults, which would be the largest on record and 25% more than the 2001 observed return of 76,400 adults. The MCB chinook are primarily returns from hatchery releases of bright fall chinook stock in the area downstream from McNary Dam, although some natural spawning in tributaries between Bonneville and McNary dams also occurs.

Evaluation of 2001 Regulations on 2002 Stock Abundance

Applying 2001 regulations to the projected 2002 abundance of Columbia River fall chinook results in ocean escapements of all five major stock units being greater than spawning escapement goals. Compared to 2001, ocean escapement is substantially greater for URB, MCB, SCH, and LRH stocks, but slightly lower for LRW.

Washington Coastal Chinook

Predictor Description and Past Performance

Preseason abundance estimates for most Washington coastal chinook stocks are not available for consideration in Council preseason fishery management planning. Since Council fisheries have only a minor impact on the ocean escapement of Washington coastal stocks, they have not been included in the preseason fishery impact assessment reports prepared by the STT.

2002 Stock Status

Preseason forecasts for most Washington coastal chinook stocks are not available at this time. The Willapa Bay hatchery fall chinook ocean escapement abundance forecast is 18,768 adults, up approximately 5% from the 2001 preseason forecast. The natural fall chinook ocean escapement abundance forecast is 3,701 adults, down approximately 13% from the 2001 preseason forecast.

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-9. 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-four adults. Puget Sound chinook were listed as threatened under the ESA in March 1999.

2002 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 continuing concern.

TABLE II-9. Comparison of **preseason and postseason** forecasts **of Puget Sound** run size for **summer/fall chinook.**[a/] (Page 1 of 1)

Year	Preseason Forecast	Postseason Return	Pre/Postseason
	Nooksack-Samish - Hatchery and Natural		
1993	50.4	32.9	1.53
1994	46.6	28.1	1.66
1995	38.5	22.2	1.73
1996	27.0	29.4	0.92
1997	34.0	34.2	0.99
1998	28.5	29.5	0.97
1999	29.3	40.9	0.72
2000	19.0	33.5[b/]	0.57
	Stillaguamish - Natural		
1993	NA	1.3	NA
1994	NA	1.3	NA
1995	1.8	1.4	1.29
1996	1.3	2.3	0.57
1997	1.6	1.2	1.33
1998	1.6	1.5	1.07
1999	1.5	1.1	1.36
2000	1.5	1.7[b/]	0.88
	South Puget Sound - Hatchery		
1993	61.8	36.8	1.68
1994	52.7	46.2	1.14
1995	49.6	74.5	0.67
1996	51.9	57.6	0.90
1997	65.1	46.5	1.40
1998	67.8	54.2	1.25
1999	59.4	74.7	0.80
2000	77.5	48.0[b/]	1.61
	Strait of Juan de Fuca - Hatchery		
1993	0.7	0.2	3.50
1994	3.9	1.6	2.44
1995	3.0	0.1	30.00
1996	2.8	0.2	14.00
1997	2.2	0.3	7.33
1998	1.7	1.7	1.00
1999	1.9	0.7	2.71
2000	2.2	1.2[b/]	1.83

Year	Preseason Forecast	Postseason Return	Pre/Postseason
	East Sound Bay - Hatchery		
1993	3.2	3.8	0.84
1994	3.2	0.8	4.00
1995	3.5	0.2	17.50
1996	1.7	0.7	2.43
1997	1.2	1.2	1.00
1998	0.5	0.3	1.67
1999	2.3	0.3	7.67
2000	5.0	0.1[b/]	5.00
	Snohomish - Hatchery		
1993	1.6	2.7	0.59
1994	1.8	5.4	0.33
1995	2.2	6.0	0.37
1996	6.7	9.2	0.73
1997	7.7	2.7	2.85
1998	6.5	1.1	5.91
1999	7.8	1.6	4.88
2000	6.2	1.5[b/]	4.10
	South Puget Sound - Natural		
1993	26.5	19.8	1.34
1994	18.0	29.9	0.60
1995	21.7	34.5	0.63
1996	19.0	35.8	0.53
1997	18.2	20.6	0.88
1998	21.8	27.3	0.80
1999	19.6	27.1	0.72
2000	17.5	13.6[b/]	1.29
	Strait of Juan de Fuca - Natural		
1993	3.1	2.4	1.29
1994	1.0	0.5	2.00
1995	0.9	2.7	0.33
1996	0.9	3.1	0.29
1997	0.8	3.5	0.23
1998	0.9	1.9	0.47
1999	0.9	2.7	0.33
2000	1.4	1.7[b/]	0.82

Year	Preseason Forecast	Postseason Return	Pre/Postseason
	Skagit - Hatchery		
1993	1.0	1.4	0.71
1994	1.3	4.3	0.30
1995	1.6	3.3	0.48
1996	1.0	1.2	0.83
1997	0.1	0.0	-
1998	0.0	0.1	-
1999	0.0	0.0	-
2000	0.0	0.2[b/]	-
	Snohomish - Natural		
1993	4.9	5.7	0.86
1994	4.5	5.0	0.90
1995	4.3	5.9	0.73
1996	4.2	8.0	0.53
1997	5.2	4.4	1.18
1998	5.6	6.4	0.88
1999	5.6	4.8	1.17
2000	6.0	6.1[b/]	0.98
	Hood Canal - Hatchery and Natural		
1993	11.7	4.8	2.44
1994	11.5	3.8	3.03
1995	3.9	9.4	0.41
1996	9.0	8.2	1.10
1997	2.7	7.9	0.34
1998	6.7	16.3	0.41
1999	14.0	29.6	0.47
2000	19.2	24.2[b/]	0.79

Year	Preseason Forecast	Postseason Return	Pre/Postseason
	Skagit - Natural		
1993	14.0	7.0	2.00
1994	8.4	6.6	1.27
1995	5.0	9.6	0.52
1996	7.1	12.2	0.58
1997	6.4	6.2	1.03
1998	6.4	14.9	0.43
1999	7.6	5.2	1.46
2000	10.4	17.2[b/]	0.60
	Tulalip - Hatchery		
1993	2.8	1.4	2.00
1994	2.8	1.9	1.47
1995	2.3	4.1	0.56
1996	2.7	4.0	0.68
1997	4.0	8.6	0.47
1998	2.5	7.2	0.35
1999	4.5	15.2	0.30
2000	5.0	8.4[b/]	0.60

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/ Preliminary.

Summer/Fall Chinook

Preliminary information for Puget Sound summer/fall stocks indicates the total 2002 return is expected to be similar to the 2001 preseason forecast. Changes in the abundance of individual stocks from various production areas are detailed in Table I-1.

The total return from Puget Sound hatchery production is forecast to be about 25% above the 2001 predicted level.

The total return of natural Puget Sound summer/fall stocks is expected to be about the same as in 2001. Returns to the Skagit River are forecast to be 13,800, which is 52% greater than the 2001 forecast. Returns to the Strait of Juan de Fuca, south Puget Sound, Stillaguamish, and Snohomish rivers are expected to be similar to the 2001 preseason forecasts. Natural stocks from Puget Sound have experienced poor survival in recent years, resulting in depressed production and escapements. Only four natural Puget Sound summer/fall chinook stocks have met escapement goals at least once in the last five years (Hoko, Snohomish, Green, and Nisqually). However, two of these stocks (Green and Nisqually) have significant numbers of hatchery chinook that stray into natural spawning areas and are counted as natural fish.

Evaluation of 2001 Regulations on 2002 Stock Abundance

Council fisheries north of Cape Falcon have a very minor impact on most stocks that originate in Washington coastal and Puget Sound Rivers since these stocks have northerly marine distribution patterns and are affected primarily by Canadian and Alaska fisheries. A evaluation of 2001 Council area regulations on projected 2002 abundance would not provide a useful comparison of ocean escapement.

CHAPTER III
COHO SALMON ASSESSMENTS

COLUMBIA RIVER AND OREGON/CALIFORNIA COASTAL COHO (OREGON PRODUCTION INDEX AREA)

The majority of coho harvested in the Oregon production index (OPI) area originate from stocks produced in rivers located within the OPI area (Leadbetter Point, Washington, to the U.S.-Mexico border). These stocks include hatchery and natural production from the Columbia River, Oregon coast, and northern California.

The Council adopted revised abundance estimation predictors in 1987 for use starting in 1988, which were expected to predict more accurately the abundance of individual stock components originating in the OPI area. These stock components are: (1) public hatchery (OPIH), (2) Oregon coastal natural river (OCNR), (3) Oregon coastal natural lake (OCNL), (4) private hatchery (PRIH), and (5) hatchery smolt production from the Oregon coastal Salmon Trout Enhancement Program (STEP).

A stratified random sampling (SRS) study implemented in 1990 indicated an overestimation of annual OCN spawner escapement, which had previously been based on index surveys. Because OPI area ocean impacts are proportioned to the ocean escapements of various OPI components, a reduction in OCN spawner escapement indicated traditional OCN abundances were overestimated, while traditional abundance estimates for other OPI area stocks were 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 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 1999, with the availability of a long term data set in SRS values, all five OPI area stock abundances were projected in SRS accounting. Direct comparisons of 2001 abundance forecasts with recent year SRS abundance projections, both preseason and postseason, are reported in Table III-1. All fishery impacts and escapements from the coho FRAM are converted to and reported in SRS values.

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 lesser amounts of coho. OPI area smolt releases since 1960 are reported by geographic area in Appendix B, Table B-1.

Predictor Description

Since 1988, the OPIH stock predictor was a multiple linear regression with the following variables: Columbia River jacks (Jack CR), Oregon coastal and Klamath River Basin jacks (Jack OC), and a correction term for delayed smolts released from Columbia River hatcheries (Jack CR * [SmD/SmCR]) to predict public hatchery stock abundance.

The OPIH stock predictor is partitioned into Columbia River early and late stocks and coastal stocks north and south of Cape Blanco, Oregon based on the proportion of the 2001 jack returns to each area adjusted for stock specific maturation rates. 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.

TABLE III-1. Preliminary 1992-2001 **preseason and postseason coho** stock **SRS abundance** estimates for OPI area stocks in thousands of fish. (Page 1 of 1)

Stock	Year	Preseason	Postseason	Preseason/Postseason
OPIH 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
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
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
Oregon Coastal N. 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
Coastal S. 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
OCN	1996	63.2	86.1	0.73
	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
STEP	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

For the 2002 abundance prediction, the data base includes 1970-2001 recruits, excluding 1983 when *El Niño* impacted adult returns. It also includes 1969-2000 jack returns, excluding 1982, also due to *El Niño* influence. The model is:

OPIH(t) = a+b*Jack CR(t-1)+c*Jack OC(t-1)+d*Jack CR(t-1)*[SmD(t-1)/SmCR(t-1)]

Where:

a	=	-138.617843
b	=	19.696647
c	=	14.412818
d	=	33.767680
adjusted r^2	=	0.96

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 predictions, partitioned by production area and as a total, are compared with postseason estimates in Table III-1. The 2001 preseason abundance prediction of 1,707,600 OPIH coho was 122% of the preliminary postseason estimate of 1,395,500 coho.

Since 1983, the OPIH predictor has often performed poorly, due principally to high interannual variability in the jack to adult ratios.

2002 Stock Status

Using the appropriate values from Appendix B, Table B-2, the OPIH abundance prediction for 2002 is 361,700 coho, 21% of the 2001 prediction and 26% of the preliminary 2001 postseason estimate. The decrease in predicted OPIH coho from 2001 to 2002 is primarily due to substantially reduced hatchery jack returns in 2001 relative to 2000.

Oregon Coastal Natural Coho

The OCN stock is composed of natural production north of Cape Blanco, Oregon from OCNR and OCNL systems, which are predicted independently.

Predictor Description

Oregon Coastal Natural Rivers

From 1988-1993, the abundance of OCNR index coho was predicted 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 overpredict abundances, the data base in the predictor was shortened from 1970-1991 to 1980-1991 starting with 1992 predictions.

Because of concern the adopted OCNR model does 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 are 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. The 2002 OCNR abundance prediction database includes 1970-2001 recruits, 1969-2001 upwelling, and 1969-2002 sea surface temperatures. The model is:

ln(Recruits(t)) = a+b*UpAnom(t-1)+c*JanAnom(t)+d*Year(t)

Where:

a	=	107.339939
b	=	0.003418
c	=	-0.174598
d	=	-0.051720
adjusted r^2	=	0.65

The OCNR stock data set, and a definition of the above terms, are presented in Appendix B, Table B-5.

Oregon Coastal Natural Lakes

Since 1988, 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 (Ten Mile, Siltcoos, and Tahkenitch lake systems). Production from these systems has declined substantially from the levels observed during 1950-1980, but has been relatively stable in recent years.

Predictor Performance

Recent-year OCN stock preseason SRS abundance predictions are compared to postseason estimates in Table III-1. The 2001 preseason abundance prediction of 50,100 OCN coho was 31% of the preliminary postseason estimate of 163,200 coho.

2002 Stock Status

The 2002 preseason prediction for OCN (river and lake systems combined) is 71,800 coho, 143% of the 2001 preseason prediction and 44% of the 2001 postseason estimate (Table III-1). The 2002 preseason SRS prediction for OCNR and OCNL components are 57,200 and 14,600 coho, respectively.

Private Hatchery Coho

There have been no Oregon coastal Oregon coastal private hatchery (PRIH) coho smolt releases since 1990. Thus, there is no PRIH recruitment in 2002.

Salmon Trout Enhancement Hatchery Coho Smolt Program

Predictor Description

Since 1988, preseason abundance predictions for Oregon coastal STEP index coho smolt production facilities have been based on the Council-approved procedure. This procedure involves calculating the smolt to adult survival rate for the 2001 return and multiplying it by the ratio of 2001 OPI jack survival to 2000 OPI jack survival. The 2002 prediction is the product of this adjusted smolt to adult survival rate and the number of 1999 brood smolts released in 2001.

Predictor Performance

Recent-year STEP preseason abundance predictions are compared to postseason estimates in Table III-1. The 2001 preseason abundance prediction of 1,000 coho was 71% of the preliminary postseason estimate of 1,400 coho.

2002 Stock Status

The 2002 preseason STEP index abundance prediction is 600 coho (Table III-1). The 2002 prediction is below the 2001 preseason prediction of 1,000 coho due to low OPI smolt to jack survival.

Oregon Production Index Area Summary of 2002 Stock Status

The 2002 combined OPI area stock abundance is predicted to be 434,100 coho, which is 25% of the 2001 preseason prediction of 1,758,700 coho and 28% of the 2001 postseason estimate of 1,560,100 coho. The 2002 OPI area predictions can be compared to historical abundances in Table III-2.

WASHINGTON COASTAL 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).

A comparison of expected preseason and postseason abundance estimates for Washington coastal and Puget Sound stocks in recent years is presented in Tables III-3 and III-4. Postseason estimates of 2001 stock abundances for some of these stocks are not available at this time. The comparison of preseason and postseason estimates of returns to terminal areas 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 quite different than those that actually occur. Postseason reconstructions of total fishery impacts and abundance estimates have not been completed for the 2001 season.

2002 Stock Status

Willapa Bay

This is the third year hatchery and wild coho forecasts were estimated independently. The 2002 Willapa Bay hatchery total ocean coho abundance forecast is 40,400 adults, a 12% increase over the 2001 preseason forecast of 36,100. The prediction is based on a recent six year mean return per release without adjustment for jack abundance. The natural coho ocean abundance forecast is 21,600. This prediction is the average terminal run size estimate for the recent three years (1999-2001). Terminal forecasts for both hatchery and natural stocks were expanded to ocean abundances using an ocean survival rate derived from Bingham Creek wild coded-wire tag recovery data.

Grays Harbor

Preseason forecasts of abundance are made for natural fish throughout the system and for hatchery fish returning to three freshwater rearing complexes and three saltwater net-pen sites. The forecasts include returns expected from numerous volunteer production projects. The forecast of Grays Harbor natural stock abundance for 2002 is 55,400 ocean recruits. The forecast of hatchery stock ocean abundance is 56,800 adults.

The natural forecast was generated by estimating a terminal run size using a recent six year average return per spawner, which was then expanded to ocean abundance using Bingham Creek wild coded-wire tag recovery data. The hatchery forecast was generated by multiplying smolt releases by an average ocean recruit per release survival rate.

Quinault River

The 2002 forecast for Quinault natural coho is 29,400 ocean recruits, an 238% increase from the 2001 projected level of 8,700. This estimate represents the 1999 brood year escapement (12,666) multiplied by

TABLE III-2. Oregon production index **(OPI) coho harvest , spawning, abundance, and exploitation rate** estimates by SRS accounting in thousands of fish.[a/] (Page 1 of 1)

	Ocean Fisheries[b/]		Oregon and California Coastal Returns						
Year	Troll	Sport	Hatcheries and Freshwater Harvest[c/]	OCN Spawners	Private Hatcheries	Columbia River Returns	Abundance	Ocean Exploitation Rate Based on OPI Abundance[d/]	OCN Exploitation Rate Based on Postseason FRAM[e/]
1970	1,463.7	499.0	80.3	71.7	-	895.3	3,010.0	0.65	-
1971	2,543.5	715.8	53.8	94.8	-	544.5	3,952.4	0.83	-
1972	1,275.6	560.3	29.9	34.1	-	277.8	2,177.7	0.84	-
1973	1,320.3	443.2	42.2	55.4	-	291.3	2,152.4	0.82	-
1974	2,095.1	668.6	49.5	34.5	-	460.8	3,308.5	0.84	-
1975	1,079.2	463.7	19.2	40.4	-	292.5	1,895.0	0.81	-
1976	2,936.1	977.7	62.6	40.7	-	337.0	4,354.1	0.90	-
1977	664.4	412.1	21.4	19.5	4.2	93.8	1,215.4	0.89	-
1978	1,104.2	524.6	12.6	19.8	12.3	307.5	1,981.0	0.83	-
1979	1,056.6	334.4	27.4	45.0	49.2	276.5	1,789.1	0.79	-
1980	506.9	526.4	32.1	30.3	38.7	301.6	1,436.0	0.73	-
1981	830.9	339.9	34.1	32.6	117.8	170.2	1,525.5	0.81	-
1982	740.9	300.4	37.1	76.2	184.7	453.1	1,792.4	0.62	-
1983	429.6	275.0	18.2	22.8	133.9	111.2	990.7	0.79	-
1984	95.8	174.2	51.2	74.5	115.4	425.9	937.0	0.32	-
1985	166.4	280.4	45.4	73.9	332.0	367.2	1,265.3	0.43	-
1986	643.5	320.6	81.8	70.0	453.7	1,549.1	3,118.7	0.34	-
1987	469.1	296.2	45.3	30.1	119.3	316.6	1,276.6	0.60	-
1988	844.7	297.2	62.4	56.8	116.1	670.8	2,048.0	0.56	-
1989	646.9	425.5	62.3	46.4	46.9	712.8	1,940.8	0.55	-
1990	277.6	357.1	30.6	20.9	35.6	196.7	918.5	0.69	-
1991	450.6	469.9	84.0	36.4	35.1	954.3	2,030.3	0.45	-
1992	67.5	256.5	53.8	40.6	-	217.7	636.1	0.51	-
1993	13.2	140.8	41.5	54.5	-	114.2	364.2	0.42	-
1994	2.7	3.0	30.8	43.3	-	169.1	248.9	0.02	0.07
1995	5.4	43.5	40.0	52.5	-	75.2	216.6	0.23	0.12
1996	7.0	31.8	48.9	73.0	-	104.6	265.3	0.15	0.08
1997	5.5	22.4	27.9	22.7	-	145.3	223.8	0.13	0.12
1998	3.5	12.6	30.5	30.9	-	164.5	242.0	0.07	0.08
1999	3.6	41.8	24.4	47.7	-	272.6	390.1	0.12	0.09
2000	25.9	74.2	40.0	71.3	-	550.7	762.1	0.13	0.07
2001[f/]	38.1	216.8	77.3	151.9	-	1,076.0	1,560.1	0.16	0.07

a/ The OPI includes ocean and inside harvest impacts and escapement to streams and lakes south of Leadbetter Point, Washington.
b/ Includes estimated nonretention mortality: troll fishery--hook-and-release mortality for 1982-2001 and drop-off mortality for all years; sport fishery--hook and release mortality for 1994-2001 and drop-off mortality for all years.
c/ Includes returns from STEP smolt releases.
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/ 2001 based on preseason FRAM estimate.
f/ Preliminary.

TABLE III-3. **Preseason and postseason** estimates of ocean **escapements** for selected **Washington coastal** adult **natural coho** stocks in thousands of fish. (Page 1 of 1)

Year	Quillayute River Fall			Hoh River Fall			Queets River Fall			Grays Harbor[a/]		
	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
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	3.25
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	82.4	1.00
1997	5.1	5.0	1.02	1.6	1.4	1.14	2.4	2.0	1.20	14.8	18.9	0.78
1998	7.4	17.0	0.44	3.2	5.2	0.62	4.5	4.6	0.98	27.1	41.2	0.66
1999	12.8	19.5	0.66	2.8	6.3	0.44	3.7	5.0	0.74	50.3	38.9	1.29
2000	8.2	17.7	0.46	3.3	8.8	0.38	2.5	8.3	0.30	44.2	40.8	1.08
2001	20.6	30.8[b/]	0.67	7.6	10.3[b/]	0.74	10.6	24.0[b/]	0.44	46.6	NA	NA

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

TABLE III-4. **Preseason and postseason** estimates of ocean **escapements** for selected **Puget Sound** adult **natural coho** stocks in thousands of fish. (Page 1 of 1)

Year	Skagit River			Stillaguamish River			Hood Canal		
	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
1984	29.6	37.2	0.80	NA	26.9	NA	NA	57.5	NA
1985	26.1	31.3	0.83	NA	34.4	NA	NA	38.5	NA
1986	43.5	73.4	0.59	37.0	49.9	0.74	NA	82.2	NA
1987	33.0	41.2	0.80	29.7	46.3	0.64	NA	71.7	NA
1988	29.6	29.9	0.99	24.5	35.4	0.69	18.2	15.5	1.17
1989	31.2	27.6	1.13	24.5	13.5	1.81	36.8	25.5	1.44
1990	37.6	26.3	1.43	30.8	34.1	0.90	43.9	14.2	3.09
1991	40.8	11.8	3.46	32.9	11.3	2.91	17.6	15.3	1.15
1992	35.7	9.5	3.76	18.7	18.0	1.04	10.1	19.9	0.51
1993	28.1	14.5	1.94	24.5	10.6	2.31	39.5	16.7	2.37
1994	17.9	30.5	0.59	10.2	30.3	0.34	13.5	57.1	0.24
1995	30.0	16.2	1.85	32.7	20.4	1.60	19.3	41.1	0.47
1996	26.7	28.1	0.95	29.8	12.2	2.44	15.4	40.9	0.38
1997	34.2	39.0	0.88	15.7	13.8	1.14	38.1	91.9	0.41
1998	41.1	63.9	0.64	37.7	30.7	1.23	87.3	111.7	0.78
1999	53.4	31.0	1.72	27.3	7.5	3.64	45.2	16.8	2.69
2000	24.7	71.4	0.35	15.0	46.7	0.32	50.4	37.1	1.36
2001	46.9	NA	NA	18.1	NA	NA	40.6	NA	NA

the 1992-1996 brood year average ocean recruits per spawner (3.31), multiplied by a bias adjustment based on the predictor performance over the last five years (0.701).

The Quinault hatchery coho forecast is 11,750 ocean recruits, an increase of 13% compared to the 2001 forecast level of 10,800. The forecast is derived from the mean 1992-1996 brood year observed marine survival rates (0.0178) and 1999 brood year smolt release (659,400). Approximately 197,100 (30%) of the fish released were marked with an adipose fin clip and CWT.

Queets River

The Queets natural coho forecast is 12,500 ocean recruits, a slight increase compared to the 2001 forecast level. This forecast represents the estimated adult production from natural spawning, based on a Ricker stock-recruit model adjusted for sea surface temperature anomalies.

The forecast for supplemental production is 2,000 ocean recruits, based on releases (138,600) multiplied by the average recruits/release (0.0142). All supplemental releases were adipose fin clipped. There was no forecast for supplemental production in 2001, because the Salmon River fish culture facility (where juveniles used for the supplementation program are reared prior to release), experienced severe flooding in December 1999. The Queets supplementation program is designed to outplant progeny in the vicinity where brood stock are collected. When the flood completely inundated the ponds, all production from the 1998 brood was mixed. Consequently, it was not possible to maintain the identity of each group of progeny. All fish originally intended for the supplementation program from the 1998 brood were released along with hatchery fish from the Salmon River facility.

The Queets hatchery (Salmon River) coho forecast is 14,000 ocean recruits, an increase of 40% compared to the 2001 forecast level. This forecast is based on the smolt release of 894,100 multiplied by the 1992-1995 brood year average observed marine survival rate (0.0157). Approximately 8.4% of the fish released from the Salmon River facility were marked with an adipose fin clip. CWTs were inserted into 16% of the fish released.

Hoh River

The Hoh River natural coho forecast is 8,500 ocean recruits, the same as the 2001 forecast. This forecast is based on estimated smolt production per square mile of watershed (based on Clearwater tributary to the Queets) multiplied by the size of the Hoh watershed for a total of 170,700 smolts. The total smolt production is then multiplied by the average recent year ocean survival rate (0.05) from the Bingham Creek jack return model and Queets coho survival estimates.

No hatchery production is projected for the Hoh system for 2002.

Quillayute River

The Quillayute River summer natural and hatchery coho forecasts for 2002 are 1,200 and 4,900 ocean recruits, respectively. The natural component run size is based on estimated smolt production (22,400) and a projected ocean survival rate of 0.055 (average of the 0.061 survival suggested by a sea surface temperature model and the 0.045-0.051 estimated by extrapolating Bingham Creek jack return data to Queets survivals). The hatchery component run forecast is based on 1980-1993 brood year average ocean recruits per release (0.0253) multiplied by the number of smolts released (607,500). The 2002 forecast abundance of natural summer coho is 100% above the 2001 forecast while the hatchery forecast is 8% below the 2001 forecast level.

The Quillayute River fall natural and hatchery coho forecasts are 22,300 and 15,000 ocean recruits, respectively. The forecast of the natural component run size is based on the estimated smolt production (406,000), multiplied by the projected ocean survival rate (0.055, as described above for summer coho). The hatchery production forecast is based on average ocean recruits per release (0.0247) multiplied by the number of smolts released (607,500). The 2002 forecast abundance of natural and hatchery components of Quillayute fall coho are 3% and 2% below their respective 2001 forecast levels.

Puget Sound

The 2002 total hatchery and wild coho ocean recruit forecast for Puget Sound is 807,800, 15% above the year 2001 forecast. The hatchery forecast of 448,000 is 33% over the 2001 forecast. The wild forecast of 359,800 is 2% below the 2001 forecast.

Puget Sound hatchery forecasts are generally the product of 1999 brood year smolt releases from each facility and the predicted ocean survival rate. Natural forecasts for Puget Sound coho were generally derived by measured or estimated smolt production from each major watershed or region within Puget Sound, multiplied by a marine survival rate prediction.

Strait of Juan de Fuca

The 2002 forecasts for Strait of Juan de Fuca natural and hatchery coho ocean recruits are 21,200 and 14,000, respectively. The ocean survival rate for Strait of Juan de Fuca natural coho forecast (5.6%) was derived from the average of the Hood Canal predicted 2002 natural coho survival rate and the North Coastal overall average predicted 2002 survival rate. Strait of Juan de Fuca coho survival rates were assumed to be intermediate between coastal and Puget Sound coho stocks.

Nooksack-Samish

The 2002 forecasts for Nooksack-Samish natural and hatchery coho ocean recruits are 22,000 and 105,400, respectively. The forecast is the product of projected smolt production from these basins and an adjusted Skagit smolt survival rate.

Skagit

The 2002 forecasts for Skagit natural and hatchery coho ocean recruits are 98,500 and 14,100, respectively. The ocean recruit survival rate prediction of 12.96% was based on the mean of the most recent four odd brood year ocean recruit survival rates observed for the Baker wild coho indicator stock. Odd brood years were used because Skagit wild coho exhibit different smolt production and marine survival rates during even and odd brood years. The Skagit survival rate was also applied to the Nooksack, Samish, and Strait of Georgia tributaries smolt production estimates after a slight subjective reduction.

Stillaguamish

The 2002 forecast for Stillaguamish natural coho ocean recruits is 19,700. No hatchery production is anticipated. The Stillaguamish wild coho ocean survival rate (9%) was developed from the 1997 and 1998 brood year Wallace River Hatchery coho marine survival rates.

Snohomish

The 2002 forecasts for Snohomish natural and hatchery coho ocean recruits are 123,100 and 60,300, respectively. The Snohomish wild coho ocean survival rate (9%) was developed from the 1997 and 1998 brood year Wallace River Hatchery coho marine survival rates. The Snohomish Hatchery coho ocean survival rate (6.4%) was developed from the 1996 to 1998 brood year Wallace River Hatchery coho marine survival rates.

South Sound

The 2002 forecasts for South Puget Sound natural and hatchery coho ocean recruits are 40,400 and 222,500, respectively. The South Sound ocean survival rate prediction of 5% was based on recent year survival rates at the Washington Department of Fish and Wildlife (WDFW) Deschutes River research station.

Hood Canal

The 2002 forecasts for Hood Canal natural and hatchery coho ocean recruits are 34,900 and 33,300, respectively. The 2001 Hood Canal natural coho forecast is based on an average of four different regressions of Big Beef Creek jacks versus Hood Canal December age-two run sizes.

SELECTIVE FISHERY CONSIDERATIONS

As the region has moved forward with mass marking of hatchery coho salmon stocks, selective fishing options are an important consideration for fishery managers. Table III-5 summarizes estimates of mass mark rates for coho stocks from Southern British Columbia to the Oregon coast, based on preseason abundance forecasts. Agencies have released coho mass marked with adipose clips from the 1999 brood, making these fish available to 2002 fisheries.

EVALUATION OF 2000 REGULATIONS ON 2002 STOCK ABUNDANCE

For 2002, the STT is unable to present an evaluation of the previous season's regulations on the current stock abundance forecasts, because there are insufficient marked hatchery coho salmon to allow catches of the magnitude provided for in the 2001 regulations. Consequently, the **projected impacts of 2000 regulations on 2002 stock forecasts for selected coho salmon stocks are presented.** The projections for 2000 catch levels, season structure, and regulations for all Council area ocean fisheries, U.S. inside water fisheries (e.g., Puget Sound), and Canadian fisheries (e.g., West Coast Vancouver Island [WCVI] troll) were identical to those used for the final 2000 preseason analysis. Escapements and fishery impacts were estimated using the FRAM, with the new base period data, updated with 2002 abundance forecasts.

Oregon Production Index Area

Ocean fisheries were modeled with **2000** regulations, an expected WCVI fishery mortality of 1,200 coho and 2002 preseason abundance predictions. Under this scenario, expected exploitation rates are 10.8% on OCN coho and 6.4% on Rogue/Klamath hatchery coho. Expected spawner escapements are 63,800 for OCN coho and 14,200 for Rogue/Klamath hatchery coho (Tables III-6 and III-7).

Based on parent escapement levels and observed OPI smolt-to-jack survival for 1999 brood OPI smolts, the total allowable OCN coho exploitation rate for 2002 fisheries is no greater than 15% under Amendment 13 and the matrix developed by the OCN work group. (Table III-8; Appendix A, Tables A-2 and A-3). The total allowable Rogue/Klamath hatchery coho marine exploitation rate is 13%.

Ocean escapements into the Columbia River in 2002 would be sufficient to provide some inside harvest and meet hatchery egg take goals.

North of the Oregon Production Index Area

Ocean escapement expectations in relation to management goals for selected naturally-spawning coho stocks, given 2002 preseason abundance forecasts and **2000** preseason projections for fishing patterns, are presented in Table III-6. More detailed fishery management goals for Council area coho stocks are listed in Appendix A, Table A-1.

Under **2000** regulations, ocean escapements for natural coho stocks north of the OPI index area are expected to be at levels that would permit attainment of FMP escapement goals for all stocks except Stillaguamish. Impacts of inside fisheries would ultimately determine levels of anticipated spawning escapements.

TABLE III-5. **Mass marking** of 1999 brood **coho** available to 2002 Council fisheries. All stocks were marked with an adipose fin clip. (Page 1 of 1)

Region	Ocean Recruits		Percent Mass Marked
	Wild	Hatchery	
PUGET SOUND STOCKS:			
Nooksack-Samish and 7/7A Independent	22.0	105.4	74.4%
Skagit	98.5	14.1	10.5%
Stillaguamish	19.7	0.0	0.0%
Snohomish	123.1	60.7	12.7%
South Puget Sound Normal	40.4	135.3	72.3%
South Puget Sound Delayed		87.5	95.7%
Hood Canal	36.0	32.4	41.9%
Strait of Juan de Fuca and Area 9	23.5	11.7	27.5%
Puget Sound Total	363.2	446.7	46.9%
WASHINGTON COASTAL STOCKS:			
North Coast Independent Tributaries	6.4	6.6	40.0%
Quillayute Summer	1.2	4.9	80.3%
Quillayute Fall	22.3	15.0	36.0%
Hoh	8.5	0.0	0.0%
Queets	12.5	16.0	11.6%
Quinault	29.4	12.3	8.8%
Grays Harbor	55.4	56.8	48.8%
Willapa Bay	21.6	40.4	62.2%
Washington Coastal Total	157.3	152.0	40.0%
COLUMBIA RIVER STOCKS:			
Columbia River Early		161.6	81.0%
Columbia River Late		143.5	93.0%
Columbia River Total	0	305.1	86.7%
OREGON COASTAL	71.8	56.6	27.3%
SOUTHERN BRITISH COLUMBIA STOCKS:[a/]			
West Coast Vancouver Island	183.8	17.4	7.2%
Southeast Vancouver Island	13.5	23.8	12.0%
Quinsam	158.0	28.0	8.8%
Puntledge	23.6	9.7	22.3%
Big Qualicum	29.9	29.2	47.1%
Capilano	2.7	15.8	85.4%
Fraser	67.7	117.8	54.4%
Southern British Columbia Total	479.2	241.7	26.0%

a/ For this assessment, the same numbers were used as in 2001.

TABLE III-6. Estimated **ocean escapements** for critical natural and Columbia River hatchery **coho** stocks based on preliminary 2002 preseason abundance forecasts and **2000** Council regulations.[a/] (Page 1 of 1)

Stock	Ocean Escapement Estimates Under **2000** Regulations[b/] 2002 Preseason Abundance	2002 Spawning Escapement Goal[c/d/]
	COHO (thousands)	
Natural Coho Stocks		
Skagit	88.4	Exploitation Rate (30.0)
Stillaguamish	15.7	Exploitation Rate (17.0)
Snohomish	98.0	Exploitation Rate (70.0)
Hood Canal	29.5	Exploitation Rate (21.5)
Strait of Juan de Fuca	19.7	Exploitation Rate (12.8)
Quillayute Fall	20.8	6.3-15.8
Hoh	7.5	2.0 - 5.0
Queets[e/]	12.4	5.8 - 14.5
Grays Harbor	51.5	35.4
OCN	63.8 (10.8%)[f/]	Exploitation Rate ≤15%
Hatchery Stocks		
Columbia Early	78.4	18.6
Columbia Late	49.6	11.9

a/ Quota levels include harvest and hooking mortality estimates used in planning the Council's 2000 ocean fisheries and a coho catch for the Canadian troll fishery off the West Coast of Vancouver Island (WCVI).

'b/ 2000 regulations include the following coho quota fisheries: Treaty Indian troll - 20,000 non-selective; non-Indian troll - 25,000 selective; recreational north of Cape Falcon - 75,000 selective; recreational Cape Falcon to Humbug Mt. - 20,000 selective. 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 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 stocks, ocean escapement represents the number of coho after the Buoy 10 fishery.

c/ Spawning escapement goals are not directly comparable to ocean escapement, because inside fishery harvest is not considered.

d/ Number in parentheses are presented for convenient reference to numerical escapement goals identified in Amendment 14 of the Salmon Framework Management Plan.

e/ Ocean escapement of 12,400 is 10,800 wild and 1,600 supplemental.

f/ Numbers in parentheses represent estimated total exploitation rates.

TABLE III-7. Comparison of Oregon coastal natural **(OCN)** and Rogue/Klamath **(RK) coho harvest** mortality and exploitation rates by fishery under Council-adopted **2000** regulations and preliminary 2002 preseason abundance estimates. (Page 1 of 1)

	Harvest Mortality and Exploitation Rate			
	OCN		RK	
Fishery	Number	Percent	Number	Percent
SOUTHEAST ALASKA	0	0.0	0	0.0
BRITISH COLUMBIA	32	0.0	0	0.0
PUGET SOUND/STRAITS	70	0.1	0	0.0
NORTH OF CAPE FALCON				
Treaty Indian Troll	104	0.1	0	0.0
Recreational	556	0.8	2	0.0
Non-Indian Troll	273	0.4	0	0.0
SOUTH OF CAPE FALCON				
Recreational:				
Cape Falcon to Humbug Mt.	1,035	1.4	10	0.0
Humbug Mt. to Horse Mt. (KMZ)	853	1.1	321	2.1
Fort Bragg	414	0.6	177	1.2
South of Pt. Arena	616	0.9	203	1.4
Troll:				
Cape Falcon to Humbug Mt.	1,599	2.2	31	0.2
Humbug Mt. to Horse Mt. (KMZ)	85	0.1	68	0.4
Fort Bragg	15	0.0	4	0.0
South of Pt. Arena	560	0.8	135	0.9
BUOY 10	761	1.1	0	0.0
ESTUARY/FRESHWATER	710	1.0	-	-
TOTAL	7,683	10.8	952	6.3

TABLE III-8. 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. (Page 1 of 1)

	Estimated OCN Coho Spawners by Stock Component						Amendment 13 Matrix			OCN Work Group Matrix[a/]		
Fishery Year (t)	Parent Spawner Year (t-3)	Northern	North-Central	South-Central	Southern	Hatchery 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	3,800	13,600	35,000	3,800	0.04%	Low	Very Low	≤10-13%	Extremely Low	Very Low	≤8%
1999	1996	3,300	18,100	51,500	4,600	0.10%	Med	Very Low	≤15%	Low	Critical	0-8%
2000	1997	2,100	2,800	17,700	8,300	0.12%	Med	Very Low	≤15%	Low	Critical	0-8%
2001	1998	2,600	3,300	25,200	2,300	0.27%	Med	Very Low	≤15%	Medium	Critical	0-8%
2002	1999	8,800	11,800	27,100	1,400	0.09%	Med	Low	≤15%	Low	Low	≤15%
2003	2000	19,300	14,000	38,000	11,000	-	-	Low	-	-	Low	-
2004	2001	33,900	22,800	95,200	12,200	-	-	Low	-	-	Low	-

a/ Developed by the OCN workgroup as a result of the 2000 Review of Amendment 13.

CHAPTER IV
FRASER RIVER AND PUGET SOUND PINK SALMON ASSESSMENTS

Two major stocks comprise the pink salmon population available to Council ocean fisheries during odd-numbered years. Table IV-1 provides a summary of recent run sizes.

The more abundant of the two runs originates from the Fraser River in British Columbia. The 2001 run size of Fraser pinks is estimated at 21.19 million, compared to the forecast of 5.47 million. The 2001 estimated run size for Puget Sound pinks is not yet available; the forecast run size was 2.92 million.

Fraser River and Puget Sound pink runs occur in significant numbers only in odd-numbered years. The only self-sustaining even-year pink run known in Washington is from the Snohomish River. This run has been steadily increasing over the 20 years it has been monitored. The 2002 return for Snohomish River pink salmon is projected to be 20,600.

TABLE IV-1. Actual **run sizes** (odd numbered years 1977-2001) for Fraser River and Puget Sound **pink salmon** in millions of salmon.

Year	Puget Sound[a/]	Fraser River[b/]
1977	0.88	8.21
1979	1.32	14.40
1981	0.50	18.69
1983	1.01	15.35
1985	1.76	19.10
1987	1.57	7.17
1989	1.93	16.63
1991	1.09	22.33
1993	1.06	17.01
1995[c/]	2.11	12.88
1997[c/]	0.44	8.20
1999[c/]	0.95	3.59
2001[c/]	NA	21.19

a/ Total Puget Sound run size.
b/ Total run size.
c/ Preliminary estimate. Likely to be adjusted when genetic stock identification (GSI) bias correction methodologies are finalized.

APPENDIX A
SUMMARY OF COUNCIL STOCK MANAGEMENT GOALS

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TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 1 of 15)

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.	High abundance, large hatchery component. Single largest contributor to ocean fisheries off California, a significant contributor off southern and central Oregon, and present north into British Columbia. Primary impact south of Pt. Arena; considerable overlap with coastal and Klamath River fall chinook between Pt. Arena and Horse Mt.
Sacramento River Spring Threatened	NMFS jeopardy standard/recovery plan (not established at time of printing). No defined objective for ocean management prior to listing.	Indirectly. MSY criteria undefined. Assessment of ocean distribution and fishery impacts needed for ESA determination and to aid management. Present level of ocean fishery impacts limited by measures constraining harvest on Sacramento River winter and Klamath River fall chinook.	Severely depressed. Minor contributor to ocean fisheries off California, 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. MSY undefined but substantially reduced from historic levels by man-caused loss and deterioration of freshwater habitat.
Sacramento River Winter Endangered (1994)	NMFS jeopardy standard/recovery plan. Since 1996, an annual preseason objective of a 31% increase in the adult spawner replacement rate (equivalent to a 1.77 replacement rate) relative to the observed 1989-1993 mean rate of 1.35. Objective undefined prior to listing.	No. Listed stock, MSY criteria undefined. ESA jeopardy standard provides interim rebuilding program.	Depressed and listed, recent increase. Minor contributor to ocean fisheries south of Pt. Arena. Ocean fishery impacts incidental to harvest of Sacramento River fall chinook. Primary impact south of Pt. Arena.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 2 of 15)

Stock	Conservation Objective (to be met annually unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		- - - 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. 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)	Undefined. Indices of spawning abundance limited to one tributary of the Mad River and two tributaries of the Eel River. NMFS jeopardy standard/recovery plan for Eel, Mattole, and Mad River stocks not established at time of printing.	Indirectly. Data insufficient to define MSY criteria. CDFG developing an assessment and monitoring program. Conservation achieved by objective for Klamath River fall chinook which includes an inside allocation to tribal and sport fisheries which lowers ocean fishery impacts.	Depressed. Limited management data. 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.
Klamath River Fall (Klamath and Trinity Rivers)	33-34% of potential adult natural spawners, but no fewer than 35,000 naturally spawning adults in any one year. Brood escapement rate must average 33-34% 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).	Yes. A conservation alert or overfishing concern will be based on a failure to meet the 35,000 floor.	Abundance variable from high to depressed. Major contributor to ocean fisheries from Humbug Mt., OR to Horse Mt., CA (the KMZ) and to Klamath River tribal and recreational fisheries. Significant contributor to ocean fisheries from central Oregon to central California. 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 Pigeon Pt., California to Florence, Oregon.
Klamath River Spring (Klamath and Trinity Rivers)	Undefined.	Indirectly. MSY criteria undefined. Productive potential protected by the objective for Klamath River fall chinook which includes an inside allocation to tribal and sport fisheries which lowers ocean fishery impacts.	Depressed. Believed to occur in ocean fisheries off northern California and southern Oregon (based on Trinity River Hatchery fish). Impacts incidental to ocean fisheries for Sacramento and Klamath Rivers fall chinook.

TABLE A-1. **Conservation objectives** and management information[a/] for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998. (Page 3 of 15)

Stock	Conservation Objective (to be met annually unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		- - - CHINOOK - - -	
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 60-90 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.			
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 also ensured 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.	Medium to low 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.	Variable between high and medium abundance. Stocks migrate northward and contribute to ocean fisheries off British Columbia and SE Alaska and to a lesser degree off Washington and Oregon.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 4 of 15)

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 the Columbia River Fish Management Plan. 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.			
North Lewis River Fall Threatened (1999)	NMFS jeopardy 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. ESA jeopardy standard provides interim rebuilding program. Base period Council-area ocean fishery impacts around 7%.	Medium to low abundance. Present in ocean fisheries north of Cape Falcon to SE Alaska.
Lower River Hatchery Fall	15,400 adults to meet egg-take goal or as determined by management entities.	No (hatchery exception).	Medium to low abundance. 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).	Medium to low abundance. Present in ocean fisheries north of Cape Falcon to SE Alaska.
Upper Willamette (Spring) Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). 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. ESA jeopardy standard provides interim rebuilding program. Base period Council-area ocean fishery exploitation rate of <1% prevents effective Council fishery management and rebuilding.	Low abundance. Present in fisheries north of Cape Falcon to SE Alaska.
Mid-River Bright Hatchery (Fall)	None for ocean fishery management.	No (hatchery exception).	Medium to high abundance. Contributor to ocean fisheries off Washington, British Columbia, and southeast Alaska. Primarily produced at Bonneville Hatchery.
Spring Creek Hatchery (Fall)	7,000 adults to meet hatchery egg-take goal.	No (hatchery exception).	Low abundance. Significant 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 as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 5 of 15)

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, Warm Springs, 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.	Long-term depressed abundance. No significance to ocean fisheries, infrequent occurrence in fisheries north of Cape Falcon to Alaska.
Snake River Fall Threatened (1992)	NMFS jeopardy/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% 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. ESA jeopardy standard provides interim rebuilding program. Recovering historic abundance unlikely as dams block former primary spawning area.	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., CA.
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 trend downward. Rare occurrence in ocean fisheries from Washington to SE Alaska.
Upper River Bright (Fall)	40,000 natural bright adults above McNary Dam (MSY proxy adopted in 1984 based on CRFMP. The management goal has been increased to 45,000 by Columbia River managers in recent years.	Limited. Base period Council-area ocean fishery exploitation rate <4% prevents effective Council fishery management and rebuilding.	High to medium abundance. Significant contributor to ocean fisheries off Canada and to a lesser extent Washington and Oregon. Primary impact area north of Cape Falcon.
Upper River Summer	Hold ocean fishery impacts at or below base period (<2%); recognize CRFMP objective - MSY proxy of 80,000 to 90,000 adults above Bonneville Dam, including both Columbia and Snake River stocks (state and tribal management entities considering separate objectives for these stocks).	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. Present in ocean fisheries north of Cape Falcon to southeast Alaska.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 6 of 15)

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)			
Upper 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. Captive broodstock programs started in 1997. No significance to ocean fisheries. Rare occurrence in ocean fisheries north of Cape Falcon to Canada.
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 SE Alaska, are not significantly impacted by Council-area ocean fisheries. Preseason abundance estimates are generally not available for Council management. These stocks qualify as exceptions to the Council's overfishing criteria due to very 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.			
Willapa Bay Fall (natural)	Undetermined.	Limited (exploitation rate exception).	
Willapa Bay Fall (hatchery)	8,200 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).	
Grays Harbor Spring	1,400 natural adult spawners.	"	
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).	
Queets Spring/Summer	Manage terminal fisheries for 30% harvest rate, but no less than 700 natural adult spawners.	"	

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 7 of 15)

Stock	Conservation Objective (to be met annually unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		--- CHINOOK ---	
WASHINGTON COAST (continued)			
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).	"	
Hoh Spring/Summer	Manage terminal fisheries for 31% harvest rate, but no less than 900 natural adult spawners.	"	
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).	"	
Quillayute Spring/Summer	1,200 natural adult spawners for summer component (MSY).	"	
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.	"	

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 SE 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 stocks within this complex and their respective conservation objectives, established in U.S. District Court by WDFW and the Treaty tribes, are recognized below. The conservation objectives for stocks managed primarily for natural production were developed by a State/Tribal Management Plan Development Team following the Boldt Decision and were based on "the adult spawning population that will, on the average, maximize biomass of juvenile outmigrants subsequent to incubation and freshwater rearing under average environmental conditions." The objectives were estimated for the average spawning escapements during periods that were thought to represent spawner abundances that provided maximum production (Ames and Phinney 1977). The objectives for stocks managed for artificial production are based on hatchery escapement needs. Annual management targets (expected hatchery plus natural escapement) for specific rivers or regions of origin may vary from the conservation objectives by following fixed procedures established in U.S. District Court as outlined in "Memorandum Adopting Salmon Management Plan" (U.S. v. Washington, 626 F. Supp. 1405 [1985]).

Eastern Strait of Juan de Fuca Summer/Fall Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 3,825 natural and hatchery adult spawners--2,900 for the Elwha River (Ames and Phinney 1977) and 925 for the Dungeness River (Smith and Sele 1994).	Limited (exploitation rate exception).	

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 8 of 15)

Stock	Conservation Objective (to be met annually unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		--- CHINOOK ---	
PUGET SOUND (continued)			
Skokomish Summer/Fall (Hood Canal) Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 1,650 natural adult spawners (Ames and Phinney 1977).	"	
Nooksack Spring (early) Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 2,000 natural adult spawners.	"	
Skagit Summer/Fall Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 14,850 natural adult spawners (Ames and Phinney 1977).	"	
Skagit Spring Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 3,000 natural adult spawners based on mean escapement 1959-1968.	"	
Stillaguamish Summer/Fall Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 2,000 natural adult spawners (Ames and Phinney 1977).	"	
Snohomish Summer/Fall Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 5,250 natural adult spawners (Ames and Phinney 1977).	"	
Cedar River Summer/Fall (Lake Washington) Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 1,200 natural adult spawners (Hage *et al.* 1994).	"	
White River Spring Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 1,000 natural adult spawners.	"	
Green River Summer/Fall Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 5,750 natural adult spawners (Ames and Phinney 1977).	"	
Nisqually River Summer/Fall (South Puget Sound) Threatened (1999)	NMFS jeopardy standard/recovery plan (not established at time of printing). MSP objective of 900 natural adult spawners.	"	

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 9 of 15)

Stock	Conservation Objective (to be met annually unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		- - - CHINOOK - - -	
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 SE 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 SE Alaska.
		- - - 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 Threatened (1996)	NMFS jeopardy 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. ESA jeopardy 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.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 10 of 15)

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)			
Northern California Threatened (1997)	NMFS jeopardy standard/recovery plan. Since 1998, total marine fishery impacts limited to no more than 13% 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. ESA jeopardy 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. Threatened (1997 and 1998)	NMFS jeopardy standard/recovery plan consistent with Council's objective under Amendment 13 and the Oregon Plan: For each of the 4 component stocks, a rebuilding and data collection program with an allowable marine and freshwater exploitation rate of no more than 13% to 35%, depending on parent escapement and ocean survival trends (adopted 1997). For a detailed description of the objective, see Section 3.3.2. Prior PFMC objectives contained in PFMC (1984 and 1993).	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.	Depressed and listed. Major natural component of OPI area which, when abundant, contributes to ocean fisheries off California, Oregon, and Washington south of Leadbetter Pt., and freshwater fisheries in Oregon coastal streams. Current impacts primarily incidental in ocean fisheries under a total nonretention regulation south of Cape Falcon since 1994.
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., WA 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.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 11 of 15)

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 (Natural)	Undefined. Management is in a transitional phase pending completion of a critical review that may establish an explicit objective.	Not presently. See management information.	Extinct above the Dalles Dam, very rare below. Lower river coho are a candidate species under the ESA with an ongoing effort to determine if a reproducing population can be found and rebuilt.
WASHINGTON COASTAL - All pertinent natural and hatchery stocks originating in Washington coastal streams north of the Columbia River through the western Strait of Juan de Fuca (West of the Elwha 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 Washington Department of Fish and Wildlife 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).			
Willapa Bay (Hatchery)	Meet WDFW program objectives.	No (hatchery exception).	Minor component of ocean fisheries off northern Oregon north into Canada. Significant contributor to inside commercial net and recreational fisheries. WDFW critically reviewing current management to determine if objectives for natural stocks are warranted.
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.	Medium to high abundance. Minor contributor to ocean fisheries off Oregon and north into Canada. Significant contributor to Washington inside tribal fishery, minor contributor to inside recreational fishery.
Quinault (Hatchery)	Meet hatchery program objectives and provide escapement to utilize production potential for naturally spawning fish.	No (hatchery exception).	Contributor to ocean fisheries off Washington and north into British Columbia; present south to central Oregon; significance to Puget Sound and tribal fisheries.

TABLE A-1. **Conservation objectives** and management information[a/] for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998. (Page 12 of 15)

Stock	Conservation Objective (to be met annually unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
		--- COHO ---	
WASHINGTON COAST (continued)			
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.	Small population. Low to depressed abundance. Contributor to ocean fisheries off Washington north into British Columbia; present south to central Oregon; significance to Puget Sound and tribal fisheries.
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.	Small population. Medium to low abundance. Contributor to ocean fisheries off Washington north into British Columbia; present south to central Oregon.
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.	Small population. Depressed abundance. Contributor to ocean fisheries off Washington north into British Columbia; present south to central Oregon.
Quillayute Summer (Hatchery)	Meet hatchery program objectives.	No (hatchery exception).	Low to depressed abundance. 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)	MSP objective of 9,720 natural adult spawners (Clark 1983 modified by habitat apportionment of WDFW/Tribal Technical Committee in 1998) or annual target agreed to through fixed procedures established in U.S. District Court.	Yes. Conservation alert or overfishing concern based on fewer than 9,720 natural spawners.	Small population. Low to depressed abundance. Little information on ocean distribution. A new annual objective of stepped exploitation rates is under consideration by WDFW and the tribes.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 13 of 15)

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 eastern Strait of Juan de Fuca (east of Salt Creek). The Puget Sound Salmon Management Plan defines management objectives and long term goals for these stocks as developed by representatives from federal, state and tribal agencies. Conservation objectives for specific stocks are currently based on either MSP principles for stocks managed primarily for natural production or upon hatchery escapement needs for stocks managed for artificial production. However, a transition to exploitation rate management is currently under consideration by the involved managers. Annual escapement targets for these coho stocks are developed 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]). The original conservation objectives were developed by a State/Tribal Management Plan Development Team following the Boldt Decision with the goal for natural spawning stocks defined as "the adult spawning population that will, on the average, maximize biomass of juvenile outmigrants subsequent to incubation and freshwater rearing under average environmental conditions." The methodology used to develop the objectives was based on assessment of the quantity and quality of rearing habitat and the number of adult spawners required to fully seed the habitat (Zillges 1977). Some objectives have subsequently been modified in 1983 by the U.S. District Court Fisheries Advisory Board (Clark 1983 and PSSSRG 1997) and later determinations of the WDFW/Tribal Technical Committee.			
Eastern Strait of Juan de Fuca (Streams east of Salt Creek through Chimacum Creek))	MSP objective of 3,130 natural adult spawners (Clark 1983 modified by habitat apportionment of WDFW/Tribal Technical Committee in 1998) or annual target agreed to in fixed procedures set by U.S. District Court. The Elwha and Dungeness Rivers are not included in this objective, but are managed on a harvest rate basis.	Yes. Conservation alert or overfishing concern based on fewer than 3,130 natural spawners.	Small population. Low to depressed abundance. Little information on ocean distribution. A new annual objective of stepped exploitation rates is under consideration by WDFW and the tribes.
Hood Canal	MSP objective of 21,500 natural adult spawners (Clark 1983 modified since 1994 by WDFW/Tribal Technical Committee) or annual target agreed to in fixed procedures set by U.S. District Court.	Yes. Conservation alert or overfishing concern based on fewer than 21,500 natural spawners.	Low to medium abundance. Contributor to U.S. ocean fisheries north of Cape Falcon; significant contributor to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries. A new objective utilizing stepped exploitation rates is under consideration by WDFW and the tribes which may utilize harvest rate management rather than a fixed spawner goal.
Skagit	MSP objective of 30,000 natural adult spawners (Zillges 1977 and Clark 1983) or annual target agreed to in fixed procedures set by U.S. District Court. (The spawner assessment methodology is currently being revised and may result in an objective significantly different from 30,000.)	Yes. Conservation alert or overfishing concern based on fewer than 30,000 natural spawners.	Low to depressed abundance. Contributor to U.S. ocean fisheries north of Cape Falcon; significant contributor to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries. A new objective is under consideration by WDFW and the tribes which may utilize harvest rate management rather than a fixed spawner goal.

TABLE A-1. **Conservation objectives** and management information[a/] for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998. (Page 14 of 15)

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	MSP objective of 17,000 natural adult spawners (Zillges 1977) or annual target agreed to in fixed procedures set by U.S. District Court.	Yes. Conservation alert or overfishing concern based on fewer than 17,000 natural spawners.	Medium to low abundance. Contributor to U.S. ocean fisheries north of Cape Falcon; significant contributor to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries. A new objective is under consideration by WDFW and the tribes which may utilize harvest rate management rather than a fixed spawner goal..
Snohomish	MSP objective of 70,000 natural adult spawners (Zillges 1977 as modified by WDFW/Tribal Technical Committee) or annual target agreed to in fixed procedures set by U.S. District Court.	Yes. Conservation alert or overfishing concern based on fewer than 70,000 natural spawners.	High to medium abundance. Contributor to U.S. ocean fisheries north of Cape Falcon; significant contributor to ocean fisheries off British Columbia, in Puget Sound, and inside tribal fisheries. A new annual objective is under consideration by WDFW and the tribes which may utilize harvest rate management rather than a fixed spawner goal..
South Puget Sound (Hatchery)	Hatchery rack return goal of 52,000 adults. Natural production goals under development.	No (hatchery exception).	High abundance. Contributor to U.S. ocean fisheries north of Cape Falcon; significant contributor off British Columbia, in Puget Sound, and inside tribal fisheries.
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.	Medium to low abundance. Major contributors to ocean fisheries off British Columbia; significant contributors north into SE Alaska and present off northern Washington.
Fraser River	Manage Council fisheries that impact Canadian stocks consistent with provisions of the Pacific Salmon Treaty.	No. Not under Council management authority.	Medium to low abundance. Major contributors to ocean fisheries off British Columbia.

TABLE A-1. **Conservation objectives** and management information for salmon stocks of significance to ocean salmon fisheries as provided in Amendment 14. Abundance information is generally based on the period 1994-1998.[a/] (Page 15 of 15)

Stock	Conservation Objective (to be met annually unless noted otherwise)	Subject to Council Actions to Prevent Overfishing	Other Management Information
	- - - PINK (odd-numbered years) - - -		
The Fraser River Panel of the Pacific Salmon Commission (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.	High abundance. Contributors 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.	High to medium abundance. Major contributors to ocean fisheries off British Columbia; present into SE Alaska and off Washington and northern Oregon. Rare off California.

a/ This table may be updated periodically by formal amendments to the FMP or comprehensive technical reviews which result in modified conservation objectives or the development of rebuilding programs in response to overfishing concerns. In addition, any stock listed under the ESA and its jeopardy standard or recovery plan will immediately be incorporated in the table.

TABLE A-2. **Allowable** fishery **impact** rate criteria for **OCN coho** stock components under **Amendment 13.** (Page 1 of 1)

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

Rebuilding Criteria	OCN Coho Spawners by Stock Component: Northern	North-Central	South-Central	Southern	Total
Full Seeding at Low Marine Survival:	21,700	55,000	50,000	5,400	132,100
Level #2 (75% of full seeding):	16,400	41,300	37,500	4,100	99,300
Level #1 (50% of full seeding):	10,900	27,500	25,000	2,700	66,100
38% of Level #1 (19% of full seeding):	4,100	10,500	9,500	1,000	25,100

Stock Component (Boundaries)	Full Seeding of Major Basins at Low Marine Survival (Number of Adult Spawners)				
Northern: (Necanicum River to Neskowin Creek)	Nehalem	Tillamook	Nestucca	Ocean Tribs.	
	17,500	2,000	1,800	400	
North-Central: (Salmon River to Siuslaw River)	Siletz	Yaquina	Alsea	Siuslaw	Ocean Tribs.
	4,300	7,100	15,100	22,800	5,700
South-Central: (Siltcoos River to Sixes River)	Umpqua	Coos	Coquille	Coastal Lakes	
	29,400	7,200	5,400	8,000	
Southern: (Elk River to Winchuck River)	Rogue				
	5,400				

a/ When a stock component achieves a medium or high parent spawner status under a medium or high marine survival index, but a major basin within the stock component is less than 10% of full seeding: (1) the parent spawner status will be downgraded one level to establish the allowable fishery impact rate for that component and (2) no coho-directed harvest impacts will be allowed within that particular basin.

b/ This exploitation rate criteria applies when (1) parent spawners are less than 38% of the Level #1 rebuilding criteria, or (2) marine survival conditions are projected to be at an extreme low as in 1994-1996 (<0.0006 jack per hatchery smolt). If parent spawners decline to lower levels than observed through 1998, rates of less than 10% would be considered, recognizing that there is a limit to further bycatch reduction opportunities.

TABLE A-3. Fishery **impact** rate criteria for **OCN coho** stock components based on the harvest matrix resulting from the **OCN work group** 2000 review of Amendment 13. (Page 1 of 1).

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%		
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

APPENDIX B
OREGON PRODUCTION INDEX DATA

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

	Columbia River						Oregon Coast				
		Washington						Private			Total
Year	Oregon	Early	Late	Combined	Federal	Total	ODFW[b/]	Yearlings	Total	California	OPI
1960	2.2	-	-	2.5	1.7	6.4	1.0	-	1.0	0.0	7.4
1961	4.6	-	-	6.3	4.2	15.1	1.4	-	1.4	0.1	16.6
1962	6.7	-	-	5.5	2.3	14.5	2.5	-	2.5	0.4	17.4
1963	6.5	-	-	8.0	7.9	22.4	2.7	-	2.7	0.5	25.6
1964	6.9	-	-	6.5	4.6	18.0	2.3	-	2.3	0.5	20.8
1965	6.4	-	-	7.8	6.4	20.6	2.1	-	2.1	1.1	23.8
1966	6.0	-	-	12.1	6.5	24.6	2.1	-	2.1	0.7	27.4
1967	7.0	-	-	8.5	8.6	24.1	2.4	-	2.4	1.3	27.8
1968	5.5	-	-	6.6	7.2	19.3	3.2	-	3.2	1.8	24.3
1969	6.3	10.5	5.2	15.7	5.6	27.6	3.4	-	3.4	1.4	32.4
1970	5.2	9.8	4.6	14.4	4.4	24.0	3.4	-	3.4	1.4	28.8
1971	7.2	13.5	3.1	16.6	4.5	28.2	4.1	-	4.1	1.0	33.3
1972	6.9	13.6	5.2	18.8	4.2	29.9	3.8	-	3.8	1.6	35.3
1973	6.3	11.1	5.9	17.0	5.2	28.5	3.9	-	3.9	1.2	33.6
1974	6.9	9.5	7.2	16.7	4.3	27.9	4.1	-	4.1	0.6	32.6
1975	6.6	5.9	12.4	18.3	4.1	29.0	3.4	-	3.4	1.6	34.0
1976	8.2	5.6	10.9	16.5	4.2	28.9	4.0	0.7	4.7	0.6	34.2
1977	8.4	6.4	10.6	17.0	6.0	31.4	3.2	1.1	4.3	0.9	36.6
1978	9.1	10.2	8.0	18.2	5.3	32.6	4.0	0.3	4.3	0.5	37.4
1979	8.8	8.2	9.1	17.3	2.8	28.9	4.5	0.9	5.4	0.8	35.1
1980	5.5	5.9[c/]	11.7	17.6	5.0	28.1	3.4	4.1	7.5	0.8	36.4
1981	5.9	8.7[c/]	14.2	22.8	3.7	32.5	3.9	6.6	10.5	0.9	43.9
1982	5.6	4.0	14.9	18.9	3.3	27.8	4.3	3.2	7.5	0.6	35.9
1983	6.2	2.4	15.0	17.4	3.4	27.0	3.0	1.3	4.3	0.9	32.2
1984	8.9	2.5	14.2	16.7	3.6	29.3	4.5	1.4	5.9	0.7	35.9
1985	9.1	3.9	13.8	17.7	2.0	28.8	3.8	4.2	8.0	0.2	37.0
1986	9.1	3.8	15.3	19.1	4.7	32.9	4.8	3.1	7.9	1.8	42.6
1987	6.8	3.3	15.4	18.7	3.3	28.8	4.9	0.5	5.4	1.3	35.5
1988	6.2	2.8	16.1	18.9	4.5	29.5	5.3	1.1	6.4	1.2	37.1
1989	6.6	2.5	17.0	19.5	3.5	29.6	5.2	2.0	7.2	1.3	38.1
1990	8.0	3.3	14.3	17.6	4.7	30.3	5.7	2.8	8.5	1.2	40.0
1991	10.4	3.7	15.3	19.0	5.9	35.3	5.3	-	5.3	1.5	42.1
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	34.4	4.3	-	4.3	0.8	39.5
1994	9.1	2.5	12.0	14.5	3.0	26.6	5.2	-	5.0	0.6	32.3
1995	7.1	3.4	12.9	16.3	1.7	25.2	3.7	-	3.7	0.7	29.5
1996	8.4	3.4	12.9	16.3	3.4	28.0	3.3	-	3.3	0.3	31.6
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	29.7
2000[d/]	7.8	6.2	10.8	17.0	5.9	30.6	0.9	-	0.9	0.6	32.1
2001[d/]	7.6	4.2	9.7	13.9	3.7	25.3	0.9	-	0.9	0.6	26.8

a/ A coho smolt is here defined 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/ Excludes 3.5 million assumed lost at Toutle Hatchery on May 18, 1980, during the eruption of Mt. Saint Helens.

d/ Preliminary.

TABLE B-2. **Data** set used in **predicting 2002** Oregon production index hatchery (**OPIH**) adult coho with SRS accounting. Adults and jacks shown in thousands of fish and smolts in millions of fish.[a/] (Page 1 of 1)

Year (t)	Adult OPIH (t)	Jack CR (t-1)	Jack OC (t-1)	Sm CR (t-1)	Sm D (t-1)
1970	2,765.1	148.6	13.6	27.6	0.0
1971	3,365.0	172.8	6.6	24.0	0.0
1972	1,924.8	100.8	2.9	28.3	0.0
1973	1,817.0	85.7	5.7	29.9	1.8
1974	3,071.1	132.1	12.1	28.5	2.9
1975	1,652.8	75.1	1.1	27.8	1.8
1976	3,885.3	146.2	25.3	29.0	2.0
1977	987.5	46.2	7.5	28.9	0.2
1978	1,824.1	99.2	4.0	31.4	0.0
1979	1,476.7	64.1	8.4	32.6	5.0
1980	1,224.0	51.6	6.0	28.9	6.7
1981	1,064.5	40.6	8.1	28.1	5.6
1982	1,266.8	55.0	6.3	32.4	6.8
1983[b/]	599.2	61.0	7.2	27.7	5.0
1984	691.3	28.1	3.6	27.0	5.1
1985	717.5	18.2	7.8	29.2	9.1
1986	2,435.8	64.6	12.9	28.8	12.2
1987	887.2	24.2	8.7	32.9	9.0
1988	1,669.3	72.3	12.9	28.8	7.7
1989	1,720.2	55.0	5.8	29.5	7.2
1990	718.4	37.1	9.6	29.6	8.5
1991	1,874.8	60.8	7.9	30.3	7.1
1992	543.6	19.9	5.7	35.3	6.0
1993	261.7	19.6	7.5	32.8	5.5
1994	202.3	3.9	1.3	34.4	6.0
1995	147.6	9.1	2.7	26.6	3.1
1996	177.8	14.1	3.2	25.2	4.2
1997	197.6	15.8	4.6	28.0	3.4
1998	205.2	6.8	3.0	21.0	2.5
1999	335.1	22.9	5.9	26.8	3.0
2000	679.4	31.2	3.5	27.9	4.1
2001	1,395.6	71.1	15.7	30.6	2.0
2002	361.7[c/]	18.8	6.4	23.5	1.4

a/ Adult OPIH = Harvest impacts plus escapement for public hatchery stocks originating in the Columbia River, Oregon coastal rivers and the Klamath River, California.
Jack CR = Columbia River jack returns corrected for small adults.
Jack OC = Oregon coastal and California hatchery jack returns corrected for small adults.
Sm CR = Columbia River smolt release.
Sm D = Columbia River delayed smolt releases.

b/ Data not used in the analysis due to *El Niño* impacts.

c/ Preseason predicted adults.

TABLE B-3. Estimated **coho** salmon natural **spawner abundance** (SRS accounting) in Oregon coastal basins for each **OCN coho** management component. Estimates adjusted for visual observation bias by multiplying observed count by 1.33 . (Page 1 of 1)

Component and Basin	Miles	Adjusted SRS Natural Coho Spawner Estimates												
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2,000	2001	1990-2001 Mean
NORTHERN														
Nehalem	386	1,552	3,975	1,268	2,265	2,007	1,463	1,057	1,173	1,190	3,713	15,519	22,868	4,838
Tillamook	249	265	3,000	261	860	652	289	661	388	271	2,175	2,253	2,070	1,095
Nestucca	167	189	728	684	401	313	1,811	519	271	169	2,201	1,070	3,671	1,002
Direct Ocean Tributaries	97	191	1,579	209	983	485	319	1,043	314	946	775	410	5,321	1,048
TOTAL	899	2,197	9,282	2,422	4,509	3,457	3,882	3,280	2,146	2,576	8,864	19,252	33,930	7,983
NORTH CENTRAL														
Siletz	118	441	984	2,447	400	1,200	607	763	336	394	706	2,765	1,904	1,079
Yaquina	109	381	380	633	549	2,448	5,668	5,127	384	365	2,588	788	1,320	1,719
Alsea	221	1,189	1,561	7,029	1,071	1,279	681	1,637	680	213	2,050	2,571	3,271	1,936
Siuslaw	514	2,685	3,740	3,440	4,428	3,205	6,089	7,625	668	1,089	2,724	6,910	10,202	4,400
Direct Ocean Tributaries	201	895	67	1,821	1,331	1,683	560	2,975	774	1,222	3,691	1,002	6,065	1,841
TOTAL	1,163	5,591	6,732	15,370	7,779	9,815	13,605	18,127	2,842	3,283	11,759	14,036	22,762	10,975
SOUTH CENTRAL														
Umpqua	1,083	3,737	3,600	2,152	9,311	4,485	11,349	9,749	2,233	8,426	6,466	12,990	33,561	9,005
Coos	208	2,273	3,813	16,545	15,284	14,685	10,351	12,128	1,127	3,167	4,945	4,600	35,009	10,327
Coquille	331	2,712	5,651	2,115	7,384	5,035	2,116	16,169	5,720	2,466	3,001	7,669	11,592	5,969
Coastal Lakes	-	4,393	7,251	1,986	10,145	5,841	11,216	13,493	8,603	11,107	12,710	12,747	15,062	9,546
TOTAL	1,622	13,115	20,315	22,798	42,124	30,046	35,032	51,539	17,683	25,166	27,122	38,006	95,224	34,848
SOUTH														
Rogue[a/]	-	3,051	1,027	2,208	361	5,439	3,761	4,622	8,282	2,316	1,438	10,966	12,213	4,640
COASTWIDE	-	23,954	37,356	42,798	54,773	48,757	56,280	77,568	30,953	33,341	49,183	82,260	164,129	58,446

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

TABLE B-4. **Data** set used in **predicting 2002** Oregon coastal natural river (**OCNR**) coho recruits with SRS accounting. Recruits shown in thousands of fish. (Page 1 of 1)

Year	Recruits to Ocean SRS	Ln SRS (Recruits)	JanAnom[a/]	UpAnom (t-1)[a/]
1970	174.9	5.16421	0.307	-16.92
1971	406.4	6.00734	-1.293	30.08
1972	178.8	5.18627	-1.393	10.08
1973	228.8	5.43285	-0.493	23.08
1974	193.4	5.26476	-0.693	47.08
1975	208.6	5.34042	-0.493	48.08
1976	451.5	6.11258	-0.893	65.08
1977	151.2	5.01860	-0.193	32.08
1978	112.1	4.71939	1.207	17.08
1979	188.5	5.23910	-1.193	-2.92
1980	107.2	4.67470	0.507	17.08
1981	176.7	5.17445	1.607	-1.92
1982	185.9	5.22521	-0.093	-8.92
1983	96.9	4.57368	1.007	14.08
1984	95.1	4.55493	0.607	-24.92
1985	124.6	4.82511	0.007	-24.92
1986	96.8	4.57265	0.107	-24.92
1987	69.5	4.24133	0.507	-39.92
1988	124.5	4.82431	-0.093	-21.92
1989	104.0	4.64439	-0.493	-43.92
1990	59.7	4.08933	-0.007	-21.92
1991	67.3	4.20916	-0.893	-37.92
1992	86.8	4.46361	0.107	43.08
1993	80.6	4.38950	-0.593	7.08
1994	38.8	3.65842	1.107	-50.92
1995	53.9	3.98713	0.707	-3.92
1996	70.4	4.25419	1.807	-1.92
1997	16.3	2.79117	0.907	9.08
1998	21.3	3.05871	2.407	-24.92
1999	37.8	3.63231	-0.393	18.08
2000	55.6	4.01818	0.107	84.08
2001	163.2	5.09498	0.707	9.08
2002	57.2[b/]	4.04655	0.407	65.08

a/ JanAnom = The annual deviation from mean (1969-1996) January sea surface temperature (degrees Centigrade) at Charleston, Oregon.
UpAnom = Annual deviation from mean (1946-1996) April-June Bakun upwelling index at 42° N latitude.

b/ Preseason adult prediction.

APPENDIX C
SALMON HARVEST ALLOCATION SCHEDULES

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HARVEST ALLOCATION -- SECTION 5.3 OF AMENDMENT 14[1/]

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

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1/ Amendment 14 is expected to be implemented during the 2000 salmon fishing season.

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	25,400
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 (Old Section 8.1.2)

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 jeopardy 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 jeopardy 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 AMENDMENT 14

6.5 SEASONS AND QUOTAS

* * * * * * *

6.5.3 Species-Specific and Other Selective Fisheries

6.5.3.1 Guidelines

In addition to the all-species and single or limited species seasons established for the commercial and recreational fisheries, other species-limited fisheries, such as "ratio" fisheries and fisheries selective for marked or hatchery fish, may be adopted by the Council during the preseason regulatory process. In adopting such a fishery, the Council will consider the following guidelines:

1. Harvestable fish of the target species are available.

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

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

4. Significant wastage of incidental species will not occur or a written economic analysis demonstrates the landed value of the target species exceeds the potential landed value of the wasted species.

5. The species specific or ratio fishery will occur in an acceptable time and area where wastage can be minimized and target stocks are maximally available.

6. Implementation of selective fisheries for marked or hatchery fish must be in accordance with U.S. v. Washington stipulation and order concerning co-management and mass marking (Case No. 9213, Subproceeding No. 96-3) and any subsequent stipulations or orders of the U.S. District Court, and consistent with international objectives under the Pacific Salmon Treaty (e.g., to ensure the integrity of the coded-wire tag program).

6.5.3.2 Selective Fisheries Which May Change Allocation Percentages North of Cape Falcon

As a tool to increase management flexibility to respond to changing harvest opportunities, the Council may implement deviations from the specified port area allocations and/or gear allocations to increase harvest opportunity through fisheries that are selective for marked salmon stocks (e.g., marked hatchery salmon). The benefits of any selective fishery will vary from year to year and fishery to fishery depending on stock abundance, the mix of marked and unmarked fish, projected hook-and-release mortality rates, and public acceptance. These factors should be considered on an annual and case-by-case basis when utilizing selective fisheries. The deviations for selective fisheries are subordinate to the allocation priorities in Section 5.3.1.1 and may be allowed under the following management constraints:

1. Selective fisheries will first be considered during the months of August and/or September. However, the Council may consider selective fisheries at other times, depending on year to year circumstances identified in the preceding paragraph.

2. The total impacts within each port area or gear group on the critical natural stocks of management concern are not greater than those under the original allocation without the selective fisheries.
3. Other allocation objectives (i.e., treaty Indian, or ocean and inside allocations) are satisfied during negotiations in the North of Cape Falcon Forum.

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

5. Selective fishery proposals need to be made in a timely manner in order to allow sufficient time for analysis and public comment on the proposal before the Council finalizes its fishery recommendations.

If the Council chooses to deviate from the specified port and/or gear allocations, the process for establishing a selective fishery would be as follows:

1. Allocate the TAC among the gear groups and port areas according to the basic FMP allocation process described in Section 5.3.1 without the selective fishery.

2. Each gear group or port area may utilize the critical natural stock impacts allocated to its portion of the TAC to access additional harvestable, marked fish, over and above the harvest share established in step one, within the limits of the management constraints listed in the preceding paragraph.

Cape Flattery
Carroll Island
Cape Alava
Destruction Island
Queets River
Copalis Head
Washington
Westport
Leadbetter Point
Willapa Bay
North Head Lighthouse
Tillamook Head
Astoria
Cape Falcon
Garibaldi
Columbia River
Cascade Head
Newport
Oregon
Heceta Head
Heceta Banks
Florence
Coos Bay
Cape Arago
Cape Blanco
Humbug Mt.
Port Orford
Gold Beach
Brookings
Crescent City
Klamath River
Humboldt South Jetty
Eureka
Horse Mt.
Fort Bragg
Sacramento River
Point Arena
Fort Ross
Bodega Head
Bodega Bay
Point Reyes
Point San Pedro
San Francisco
Pigeon Point
San Joaquin River
Santa Cruz
Monterey
Point Sur
Point Lopez
California
Morro Bay
Point Conception
Santa Barbara
Point Mugu
Los Angeles
San Diego