
CHAPTER I

ABUNDANCE PROJECTIONS

ABUNDANCE PROJECTIONS

Abundance expectations in 2004 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. Council Salmon Fishery Management Plan (FMP) management goals 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 2004 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.

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

Production Source and Stock or Stock Group	Preseason Estimates of Adults								Methodology for 2004 Prediction and Source
	1997	1998	1999	2000	2001	2002	2003	2004	
California Central Valley (Index)	849.0	1,051.0	847.7	790.4	649.4	825.4	1,108.1	831.8	Linear regression analysis of river age-2 jacks on CVI of the following year. CDFG.
Sacramento and San Joaquin Basins, Fall, Late Fall, Spring, and Winter Run									
Klamath River (Ocean Abundance) Fall Run	286.3	225.2	165.5	389.8	435.4	362.5	310.2	216.3	Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. KRTAT.
Oregon Coast	-----Preseason Estimates Not Made -----								None.
North and South/Local Migrating									
Columbia River (Ocean Escapement)									
Upriver Spring	67.8	36.2	24.6	134.0	364.6	333.7	145.4	360.7	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Willamette Spring	27.4	32.8	46.0	59.9	61.0	73.8	109.8	109.4	Age-specific linear regressions of cohort returns in previous run years. ODFW staff.
Sandy Spring	3.8	3.9	4.3	3.8	4.0	4.3	4.8	5.2	Recent year average. ODFW staff.
Cowlitz Spring	1.4	1.5	2.1	2.0	1.0	3.1	4.9	15.9	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Kalama Spring	0.7	0.5	0.3	1.4	1.0	1.6	3.6	6.0	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Lewis Spring	2.4	0.9	1.5	2.6	2.8	2.0	3.1	5.4	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Upriver Summer	16.7	17.3	16.5	33.3	24.5	77.7	87.6	102.8	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
URB Fall	166.4	150.8	147.5	171.1	127.2	281.0	280.4	292.2	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
SCH Fall	21.9	14.2	65.8	21.9	56.6	144.4	96.9	138.0	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
LRW Fall	7.5	8.1	2.6	3.5	16.7	18.7	24.6	24.1	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
LRH Fall	54.2	19.2	34.8	23.7	32.2	137.6	115.9	77.1	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
MCB Fall	72.1	47.8	38.3	50.6	43.5	96.2	104.8	90.4	Age-specific average cohort ratios/cohort regressions. Columbia River TAC.
Washington Coast (Ocean Escapement)									
Willapa Bay Natural	-	-	4.2	4.2	4.3	3.7	2.4	4.1	Mean return per release by age class. WDFW staff. WDFW and tribes.
Hatchery	49.0	64.5	15.5	18.9	17.8	18.8	14.2	14.7	
Other Coastal Stocks	----- Not Available -----								

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

Production Source and Stock or Stock Group		Preseason Estimates of Adults								Methodology for 2004 Prediction and Source
		1997	1998	1999	2000	2001	2002	2003	2004	
Puget Sound^{a/}										WDFW and tribes.
Nooksack/Samish Hatchery		34.0	28.0	27.0	19.0	34.9	52.8	45.8	34.2	Brood release times average return-at-age/release.
East Sound Bay	Hatchery	1.2	0.5	2.3	5.0	1.6	1.6	1.6	0.8	1991-2000 average return rate of Nooksack/Samish fall chinook multiplied by 2000 Glenwood brood release.
Skagit	Natural	6.4	6.6	7.6	7.3	9.1	13.8	13.7 ^{b/}	20.4 ^{b/}	Age specific average cohort rates.
	Hatchery	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	Average return/smolt for BYs 1994-1998 broods multiplied by brood year 2000 release.
Stillaguamish	Natural	1.6	1.6	1.5	2.0 ^{c/}	1.7 ^{c/}	2.0 ^{c/}	2.0 ^{c/}	3.3 ^{c/}	Estimate based on spawner-recruit information.
Snohomish	Natural	5.2	5.6	5.6	6.0	5.8 ^{c/}	6.7 ^{c/}	5.5 ^{c/}	15.7 ^{c/}	Estimates based on spawner-recruit information.
	Hatchery	7.7	6.5	7.8	6.2	4.1	6.8 ^{c/}	9.4 ^{c/}	10.1 ^{c/}	Age specific forecast for fingerling and yearling for BYs 1999-2002 times estimated survival rates.
Tulalip	Hatchery	4.0	2.5	4.5	5.0	5.5	5.8 ^{c/}	6.0 ^{c/}	7.6 ^{c/}	CWT survival rates multiplied by release numbers for brood years 1999-2002.
South Puget Sound	Natural	18.2	21.8	19.6	17.5	16.2	16.9	19.6	17.5	Puyallup-predicted return at age calculated for return years 1992-2003. For Nisqually, 2000 escapement times 1998-2002 mean return/spawner.
	Hatchery	65.1 ^{d/}	67.8	59.4	77.5	73.7	90.8	86.6	86.5	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) 2000 return/pound released multiplied by 2000 brood pounds released.
Hood Canal	Natural and Hatchery	2.7	6.7	14.0	19.2	2.7	2.9 ^{b/}	3.6 ^{b/}	2.4 ^{b/}	Product of 2000 fingerling release times average postseason estimated terminal return rates
Strait of Juan de Fuca	Natural	0.8	0.9	0.9	1.1	3.5	3.6 ^{b/}	3.4 ^{b/}	3.6 ^{b/}	Four year average 2000-2003 of terminal run size. Elwha estimate is a combination of hatchery and wild fish.
	Hatchery	2.2	1.7	1.9	2.0	0.0	0.0	0.0	0.0	

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

b/ Terminal run forecast.

c/ Expected escapement without fishing.

d/ 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.

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								Methodology for 2004 Prediction
		1997	1998	1999	2000	2001	2002	2003	2004	
OPI Area (Total Abundance) (California and Oregon Coasts and Columbia River)		463.8	165.8	620.6	727.9	1,758.7	434.1	984.6	777.9	Sum of stock component estimates.
OPI Public Hatchery		376.1	118.4	559.2	671.4	1,707.6	361.7	863.1	623.9	Multiple linear regression of OPI public hatchery jacks to adults adjusted for Columbia River delayed smolt release; 1970-2003 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		206.9	63.8	325.5	326.3	1,036.5	161.6	440.0	313.6	
Columbia River Late		86.5	24.9	140.9	278.0	491.8	143.5	377.9	274.7	
Coastal N. of Cape Blanco		60.4	21.6	59.4	48.5	127.3	36.6	29.3	16.6	
Coastal S. of Cape Blanco		22.3	8.1	33.4	18.6	52.0	20.0	15.9	19.0	
OCN		86.4	47.2	60.7	55.9	50.1	71.8	117.9	150.9	For river production, relates ocean recruits (SRS accounting) to upwelling, sea surface temperature; data base 1970-2003. Most recent three-year average abundance for lake production.
STEP		1.3	0.2	0.7	0.6	1.0	0.6	3.6	3.1	Smolt production from 2001 brood year with 2000 brood year observed smolt to adult survival rate.
Washington Coast										
Willapa	Natural	-	3.3	8.3	9.9	21.6	21.6	31.8	36.7	Avg. terminal 1998-2002 return year (RY) natural terminal runsize, expanded to ocean recruits by avg. pre-terminal exploitation rate.
	Hatchery	72.5	20.8	40.5	19.6	36.1	40.4	57.5	55.0	Avg. 1996-1999 brood year (BY) terminal hatchery recruits/release, applied to 2001 BY releases, expanded to ocean recruits by avg. pre-terminal exploitation rate.
Grays Harbor	Natural	26.1	30.1	57.7	47.8	51.3	55.4	58.0	118.9	Avg. terminal recruits/spawner for 1994-2002 RY, multiplied by 2001 escapement, expanded to ocean recruits by avg. pre-terminal exploitation rate,
	Hatchery	104.3	25.6	30.4	75.8	67.1	56.8	64.0	71.7	Avg. 1994-2002 RY terminal hatchery recruits/release, applied to 2001 BY releases, expanded to ocean recruits by avg. pre-terminal exploitation rate.
Quinault	Natural	2.0	6.5	7.3	4.4	8.7	29.4	47.7	92.8	Avg. 1993-1999 BY ocean recruits/spawner (4.3), multiplied by 2001 escapement.
	Hatchery	5.1	3.9	8.2	7.4	10.8	12.3	20.6	18.2	Avg. 1990-1999 BY hatchery recruits/release (3.0%), applied to 2001 BY releases.
Queets	Natural	4.3	4.2	4.3	2.7	12.0	12.5	24.0	18.5	Queets basin 2001 BY smolt production estimate, multiplied by most recent ten-year marine survival avg. (5.1% for untagged, 4.2% for tagged natural coho).
	Hatchery	16.9	4.6	13.8	11.8	10.0	16.0	24.9	17.1	Most recent ten-year hatchery marine survival avg. (2.0%) applied to 2001 BY releases.
	Supplemental	1.0	0.7	3.0	0.8	NA (Flood)	2.0	1.3	2.5	Most recent ten-year hatchery marine survival avg. (1.4%) applied to 2001 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								Methodology for 2004 Prediction
		1997	1998	1999	2000	2001	2002	2003	2004	
Washington Coast (continued)										
Hoh	Natural	2.8	3.4	3.2	3.5	8.5	8.5	12.5	8.1	Average Queets smolts per mi ² watershed area (531.5) multiplied by Hoh River watershed area (299 mi ²) and 5.1% marine survival rate prediction from Queets seas surface temp. survival model.
Quillayute Fall Run	Natural	8.9	8.0	14.5	8.7	23.0	22.3	24.9	21.2	
	Hatchery	9.1	4.4	9.4	13.9	15.3	15.0	15.2	20.9	Midrange value from recruits/release rates for 1980-1993 BY (3.5 %), applied to 2001 BY releases.
Quillayute Summer Run	Natural	1.6	1.3	1.2	1.6	0.6	1.2	1.8	1.1	
	Hatchery	3.6	1.8	3.5	5.4	5.3	4.9	5.4	6.1	Midrange value from recruits/release rates for 1980-1993 BY (3.5 %), applied to 2001 BY releases.
North Coast Independent Tributaries	Natural	3.8	3.0	3.4	5.1	8.1	6.4	14.8	12.7	
	Hatchery	NA	3.0	5.8	11.7	8.1	8.1	11.0	4.3	Avg. 1997-1999 BY hatchery recruits/release (1.9%), applied to 2001 BY releases.
WA Coast Total	Natural	49.5	59.8	99.9	83.7	133.8	157.3	215.5	309.9	
	Hatchery	212.5	64.8	114.6	146.4	152.7	155.5	199.9	195.9	
Puget Sound ^{a/}										
Strait of Juan de Fuca	Natural	6.5	16.8	14.7	13.5	21.4	21.2	20.1	35.7	A variety of methods were used for 2004, primarily based on smolt production and survival. See text in Chapter III and Joint WDFW and tribal annual reports on Puget Sound Coho Salmon Forecast Methodology for details.
	Hatchery	29.7	28.3	37.7	13.6	14.4	14.0 ^{b/}	24.0 ^{b/}	28.7 ^{b/}	
Nooksack-Samish	Natural	28.0	30.8	13.8	14.9	12.4	22.0	16.4	27.5	
	Hatchery	223.3	119.1	95.0	65.5	44.4	105.4	66.2	75.5	
Skagit	Natural	70.9	55.0	75.7	30.2	87.2	98.5	116.6	155.8	
	Hatchery	22.1	12.9	10.9	10.3	10.1	14.1	10.4	22.8	
Stillaguamish	Natural	36.0	47.8	35.7	17.7	24.4	19.7	37.8	38.0	
	Hatchery	-	-	-	-	-	-	1.3	0.5	
Snohomish	Natural	186.6	165.3	141.6	53.0	129.6	123.1	203.0	192.1	
	Hatchery	184.6	47.1	87.8	62.1	60.9	60.3	35.4	48.3	
South Sound	Natural	135.0	57.2	19.4	11.7	29.5	40.4	103.6	61.3	
	Hatchery	674.1	408.7	372.1	121.8	172.6	222.5	315.6	288.4	
Hood Canal	Natural	78.4	108.0	65.1	61.0	62.0	34.9	32.4	98.7	
	Hatchery	66.3	95.2	96.8	38.5	33.5	31.3 ^{b/}	48.0 ^{b/}	43.1 ^{b/}	
Puget Sound Total	Natural	541.4	480.9	366.0	202.0	366.5	359.8	529.9	609.2	
	Hatchery	1,200.1	711.3	700.3	311.8	335.9	447.6	501.0	507.3	

a/ Run sizes scaled to FRAM base period (1979-1981) catch and escapement.

b/ Strait of Juan de Fuca, and Hood Canal Hatchery numbers in 2002-2004 include Natural coho from secondary (Hatchery) management zones.

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

Stock and Conservation Objective (thousands of spawners; spawners per mile; impact or replacement rate)	Observed or Projected Conservation Achievement (postseason estimates of thousands of spawners or spawners per mile; preseason or postseason impact or replacement rate)									Overfishing Criteria		
	1996	1997	1998	1999	2000	2001	2002	2003 ^{af}	2004 ^{bf}	Alert ^{cf}	Concern ^{df}	Exception ^{ef}
CHINOOK												
Sacramento River Fall 122.0 - 180.0 adult spawners	299.6	342.9	238.1	386.8	413.8	544.9	775.7	519.6	>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	77.8	65.6	87.4	>35.0	No	No	
Southern, Central and Northern Oregon Coast Spring and Fall No less than 60 adult spawners/mile. ^{fi}	133.1	93.3	87.7	104.4	76.4	165.2	222.4	234.8	>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	66.4	110.5	141.6	179.0	>43.5	No	No	T
Columbia River Summer Chinook 80.0 to 90.0 adults over Bonneville Dam. Council area base period impacts <2%. Long history of dam passage and habitat losses.	16.0	27.9	21.4	26.2	30.6	76.2	127.4	114.8	>80.0	No	No	T
Grays Harbor Fall - 14.6 adult spawners (MSP)	20.2	18.2	12.5	7.8	4.9	9.5	11.3	NA ^{gj}	NA ^{gj}	Limited ^{ej}	Limited ^{ej}	T
Grays Harbor Spring - 1.4 adult spawners	4.5	4.5	2.3	2.9	2.9	2.9	2.6	NA ^{gj}	NA ^{gj}	NA ^{gj}	No	T
Queets Fall - no less than 2.5 adult spawners (MSY)	3.4	2.5	4.0	1.9	3.6	2.9	2.3	5.0	NA ^{gj}	NA ^{gj}	No	T
Queets Spring/Summer - no less than 0.7 adult spawners	0.78	0.54	0.49	0.37	0.25	0.57	0.75	0.2	NA ^{gj}	Limited ^{ej}	No	T
Hoh Fall - no less than 1.2 adult spawners (MSY)	3.0	1.8	4.3	1.9	1.7	2.6	4.5	1.4	NA ^{gj}	NA ^{gj}	No	T
Hoh Spring/Summer - no less than 0.9 adult spawners	1.4	1.8	1.3	1.0	0.5	1.2	2.4	1.2	NA ^{gj}	NA ^{gj}	No	T
Quillayute Fall - no less than 3.0 adult spawners (MSY)	7.3	5.4	6.7	3.3	3.7	5.1	6.1	4.6	NA ^{gj}	NA ^{gj}	No	T
Quillayute Spring/Summer - 1.2 adult spawners (MSY)	1.2	0.9	1.6	0.7	1.0	1.2	1.0	1.1	NA ^{gj}	NA ^{gj}	No	T

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

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; preseason or postseason impact or replacement rate)									Overfishing Criteria		
	1996	1997	1998	1999	2000	2001	2002	2003 ^{a/}	2004 ^{b/}	Alert ^{c/}	Concern ^{d/}	Exception ^{e/}
COHO												
Grays Harbor - 35.4 adult spawners (MSP)	63.6	22.5	35.6	33.3	35.9	56.8	>35.4	>35.4	>35.4	No	No	
Queets - 5.8 to 14.5 adult spawners (MSY range)	12.6	1.9	5.5	5.3	8.6	22.4	23.1	16.0	>5.8	No	No	
Includes supplemental adults.												
Hoh - 2.0 to 5.0 adult spawners (MSY range)	4.9	1.4	4.4	4.6	6.8	10.8	9.0	5.1	>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	18.9	14.7	14.4	>6.3	No	No	
Western Strait of Juan de Fuca - 11.9 adult spawners	3.7	4.1	15.1	8.0	16.9	34.3	>11.9	NA	>11.9	NA	No	
Eastern Strait of Juan de Fuca - 0.95 adult spawners	1.89	1.30	1.94	1.36	2.11	2.6	>0.95	NA	>0.95	NA	No	
Hood Canal - 21.5 adult spawners (MSP)	37.1	95.8	101.1	16.6	27.3	94.7	39.3	>21.5	>21.5	No	No	
Skagit - 30.0 adult spawners (MSP)	8.3	32.6	73.6	28.6	63.7	92.0	46.7	>30.0	>30.0	No	No	
Stillaguamish - 17.0 adult spawners (MSP)	10.4	10.9	27.3	7.0	28.3	73.6	27.3	>17.0	>17.0	No	No	
Snohomish - 70.0 adult spawners (MSP)	53.1	58.2	150.1	61.3	94.2	261.8	161.6	>70.0	>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 HC 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 HC to confirm negligible impacts of proposed Council fisheries, identify factors which have led to the decline or low abundance (e.g., fishery impacts outside Council jurisdiction, or degradation or loss of essential fish habitat) and monitor abundance trends and total harvest impact levels. Council action will focus on advocating measures to improve stock productivity, such as reduced interceptions in non-Council managed fisheries, and improvements in spawning and rearing habitat, fish passage, flows, and other factors affecting overall stock survival.

f/ Based on the sum of south/local and north migrating spawners per mile weighted by the total number of miles surveyed for each of the two components (2.2 miles for south/local and 9.2 miles for northern stocks).

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

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