
CHAPTER I

ABUNDANCE PROJECTIONS

ABUNDANCE PROJECTIONS

Abundance expectations in 2003 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 2003 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 Area, Type of Prediction and/or Stock or Stock Grouping	Preseason Estimates of Adults									Methodology for 2003 Prediction and Source
	2003	2002	2001	2000	1999	1998	1997	1996		
California Central Valley (Index) Sacramento and San Joaquin Basins, Fall, Late Fall, Spring, and Winter Run	1,108.1	825.4	649.4	790.4	847.7	1,051.0	849.0	533.0		Linear regression analysis of river age-2 jacks on CVI of the following year. CDFG.
Klamath River (Ocean Abundance) Fall Run	310.2	362.5	435.4	389.8	165.5	225.2	286.3	749.4		Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. KRTAT.
Oregon Coast North and South/Local Migrating									----- Preseason Estimates Not Made -----	None.
Columbia River (Ocean Escapement) Upriver Spring	145.4	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	109.8	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	4.8	4.3	4.0	3.8	4.3	3.9	3.8	3.3		Recent year average. ODFW staff.
Cowlitz Spring	4.9	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	3.6	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	3.1	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	87.6	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	280.4	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	96.9	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	24.6	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	115.9	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	104.8	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	2.4	3.7	4.3	4.2	4.2	-	-	-		
Hatchery	14.2	18.8	17.8	18.9	15.5	64.5	49.0	34.6		Mean return per release by age class. WDFW staff. WDFW and tribes.
Other Coastal Stocks									----- Not Available -----	
Puget Sound^{a/}										
Nooksack/Samish	45.8	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	1.6	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.

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 2003 Prediction and Source
	2003	2002	2001	2000	1999	1998	1997	1996			
Skagit	13.7 ^{b/}	13.8	9.1	7.3	7.6	6.6	6.4	7.1	Age specific average cohort rates.		Average return/release of 86-96 broods multiplied by brood year release.
Hatchery	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0			
Stillaguamish	2.0 ^{c/}	2.0 ^{c/}	1.7 ^{c/}	2.0 ^{c/}	1.5	1.6	1.6	1.3	Estimate based on spawner-recruit information		Estimates based on spawner-recruit information.
Snohomish	5.5 ^{c/}	6.7 ^{c/}	5.8 ^{c/}	6.0	5.6	5.6	5.2	4.2	Number of fish released multiplied by average return per release. Separate forecasts for fingerlings and yearling releases.		
Hatchery	9.4 ^{c/}	6.8 ^{c/}	4.1	6.2	7.8	6.5	7.7	6.7			
Tulalip	6.0 ^{c/}	5.8 ^{c/}	5.5	5.0	4.5	2.5	4.0	2.7	CWT survival rates multiplied by release numbers for brood years 1998-2001.		Mean value of 1998 and 1999 escapement for Puyallup. For Nisqually, 1998 escapement multiplied by 1996-2000 average return/spawner.
Natural	19.6	16.9	16.2	17.5	19.6	21.8	18.2	19.0			
Hatchery	86.6	90.8	73.7	77.5	59.4	67.8	65.1 ^{d/}	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	3.6 ^{b/}	2.9 ^{b/}	2.7	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.		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	30.2 ^{b/}	21.1 ^{b/}	22.6								
Strait of Juan de Fuca	3.4 ^{b/}	3.6 ^{b/}	3.5	1.1	0.9	0.9	0.8	0.9			
Hatchery	0.0	0.0	0.0	2.0	1.9	1.7	2.2	2.8	Brood release times 95-01 average return-at-age/release.		

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 pre-season **adult coho** salmon stock ocean abundance forecasts in thousands of fish. (Page 1 of 2)

Production Source and Stock or Group	Pre-season Estimates of Adults								Methodology for 2003 Prediction
	2003	2002	2001	2000	1999	1998	1997		
OPI Area (Total Abundance) (California and Oregon Coasts and Columbia River)	984.6	434.1	1,758.7	727.9	620.6	165.8	463.8	Sum of stock component estimates.	
OPI Public Hatchery	863.1	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; 1970-2000 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	440.0	161.6	1,036.5	326.3	325.5	63.8	206.9		
Columbia River Late	377.9	143.5	491.8	278.0	140.9	24.9	86.5		
Coastal N. of Cape Blanco	29.3	36.6	127.3	48.5	59.4	21.6	60.4		
Coastal S. of Cape Blanco	15.9	20.0	52.0	18.6	33.4	8.1	22.3		
OCN	117.9	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 1970-2000. Most recent 3-year average abundance for lake production.	
STEP	3.6	0.6	1.0	0.6	0.7	0.2	1.3	Smolt production from 2000 brood year with 1999 brood year smolt to adult survival rate.	
Washington Coast									
Willapa	31.8	21.6	21.6	9.9	8.3	3.3	-	1998-2000 average terminal run.	
Hatchery	57.5	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	58.0	55.4	51.3	47.8	57.7	30.1	26.1	2000 brood escapement multiplied by average return per spawner.	
Hatchery	64.0	56.8	67.1	75.8	30.4	25.6	104.3	Smolt releases multiplied by average ocean recruits per release.	
Natural	47.7	29.4	8.7	4.4	7.3	6.5	2.0	1993-1997 brood year average ocean recruits per spawner.	
Hatchery	20.6	12.3	10.8	7.4	8.2	3.9	5.1	1994-1998 average marine survival rate to ocean recruit applied to release.	
Queets	24.0	12.5	12.0	2.7	4.3	4.2	4.3	Smolt estimate multiplied by marine survival rate projection of 6.03%, based on 2002 Bingham Creek Jack return rates and 1997-2001 average recruits/smolt survival rate.	
Hatchery	24.9	16.0	10.0	11.8	13.8	4.6	16.9	1996-1999 brood year average survival rate to ocean recruit applied to smolt release.	
Supplemental	1.3	2.0	NA	0.8	3.0	0.7	1.0	1995-1997 brood year average survival rate multiplied by smolt release.	
(Flood)									
Hoh	12.5	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 7% projected marine survival rate estimated from Bingham Creek data.	
Natural	24.9	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 based on Bingham Creek data.	
Quillayute Fall Run	15.2	15.0	15.3	13.9	9.4	4.4	9.1	Mean ocean recruits per release for BY 80-93, multiplied by releases.	

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

Production Source and Stock or Stock Group	Pre-season Estimates of Adults							Methodology for 2003 Prediction
	2003	2002	2001	2000	1999	1998	1997	
Quillayute Summer Run	1.8	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 based on Bingham Creek jack models.
	5.4	4.9	5.3	5.4	3.5	1.8	3.6	Average ocean recruits per release BY 1980-93, multiplied by the number of smolts released.
North Coast Independent Tributaries	14.8	6.4	8.1	5.1	3.4	3.0	3.8	Average of 500 smolts per square mile multiplied by 424 square miles of watershed and 7% projected marine survival rate estimated from Bingham Creek data.
	10.7	8.1	8.1	11.7	5.8	3.0	NA	average brood year 1988-1997 marine survival rate of 0.047 from the Makah National Fish Hatchery, multiplied by the 2000 brood year release of 304,300.
WA Coast Total	215.5	157.3	133.8	83.7	99.9	59.8	49.5	
	199.6	155.5	152.7	146.4	114.6	64.8	212.5	
Puget Sound^{a/}								
Straits of Juan de Fuca	25.6	21.2	21.4	13.5	14.7	16.8	6.5	A variety of methods were used for 2003, 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.
	18.6	14.0 ^{b/}	14.4	13.6	37.7	28.3	29.7	
Nooksack-Samish	16.4	22.0	12.4	14.9	13.8	30.8	28.0	
	66.2	105.4	44.4	65.5	95.0	119.1	223.3	
Skagit	116.6	98.5	87.2	30.2	75.7	55.0	70.9	
	10.4	14.1	10.1	10.3	10.9	12.9	22.1	
Stillaguamish	37.8	19.7	24.4	17.7	35.7	47.8	36.0	
	1.3	-	-	-	-	-	-	
Snohomish	203.0	123.1	129.6	53.0	141.6	165.3	186.6	
	35.4	60.3	60.9	62.1	87.8	47.1	184.6	
South Sound	103.6	40.4	29.5	11.7	19.4	57.2	135.0	
	315.6	222.5	172.6	121.8	372.1	408.7	674.1	
Hood Canal	33.4	34.9	62.0	61.0	65.1	108.0	78.4	
	47.0	31.3 ^{c/}	33.5	38.5	96.8	95.2	66.3	
Puget Sound Total	536.4	359.8	366.5	202.0	366.0	480.9	541.4	
	494.5	447.6	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/ Straits of Juan de Fuca 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	2002 ^{a/}	2003 ^{b/}	Alert ^{c/}	Concern ^{d/}	Exception ^{e/}			
CHINOOK														
Sacramento River Fall 122.0 - 180.0 adult spawners	244.4	323.9	237.5	273.3	413.6	537.1	778.6	>180.0	No	No	No	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	>35.0	No	No	No	No	No	
Southern, Central and Northern Oregon Coast Spring and Fall No less than 60 adult spawners/mile. ^{f/}	133.1	93.3	87.7	104.4	76.4	165.2	222.8	>60.0	No	No	No	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	>43.5	No	No	No	No	✓	
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	>80.0	Limited ^{e/}	Limited ^{e/}	Limited ^{e/}	Limited ^{e/}	✓	
Grays Harbor Fall - 14.6 adult spawners (MSP)	20.2	18.2	12.5	7.8	4.9	9.5	11.3	NA ^{g/}	Limited ^{e/}	Limited ^{e/}	Limited ^{e/}	Limited ^{e/}	✓	
Grays Harbor Spring - 1.4 adult spawners	4.5	4.5	2.3	2.9	2.9	2.9	2.6	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	✓	
Queets Fall - no less than 2.5 adult spawners (MSY)	3.4	2.5	4.0	1.9	3.6	2.9	2.3	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	✓	
Queets Spring/Summer - no less than 0.7 adult spawners	0.78	0.54	0.49	0.37	0.25	0.57	0.75	NA ^{g/}	Limited ^{e/}	Limited ^{e/}	Limited ^{e/}	Limited ^{e/}	✓	
Hoh Fall - no less than 1.2 adult spawners (MSY)	3.0	1.8	4.3	1.9	1.7	2.6	4.5	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	✓	
Hoh Spring/Summer - no less than 0.9 adult spawners	1.4	1.8	1.3	1.0	0.5	1.2	2.4	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	✓	
Quillayute Fall - no less than 3.0 adult spawners (MSY)	7.3	5.4	6.7	3.3	3.7	5.1	6.1	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	✓	
Quillayute Spring/Summer - 1.2 adult spawners (MSY)	1.2	0.9	1.6	0.7	1.0	1.2	1.0	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	NA ^{g/}	✓	

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	2002 ^{a/}	2003 ^{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	30.7	NA	>35.4	No	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	23.1	>5.8	No	No	No	
Hoh - 2.0 to 5.0 adult spawners (MSY range)	4.9	1.4	4.4	4.6	6.8	10.8	NA	>2.0	No	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	>6.3	No	No	No	
Western Strait of Juan de Fuca - 11.9 adult spawners	3.7	4.1	15.1	8.0	16.9	34.3	NA	>11.9	No	No	No	
Eastern Strait of Juan de Fuca - 0.95 adult spawners	1.89	1.30	1.94	1.36	2.11	2.6	NA	>0.95	No	No	No	
Hood Canal - 21.5 adult spawners (MSP)	37.1	95.8	101.1	16.6	27.3	94.7	NA	>21.5	No	No	No	
Skagit - 30.0 adult spawners (MSP)	8.3	32.6	73.6	28.6	63.7	92.0	NA	>30.0	No	No	No	
Stillaguamish - 17.0 adult spawners (MSP)	10.4	10.9	27.3	7.0	28.3	73.6	27.3	>17.0	No	No	No	
Snohomish - 70.0 adult spawners (MSP)	53.1	58.2	150.1	61.3	94.2	261.8	161.6	>70.0	No	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.

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.