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 1985-2002 period, the CVI preseason forecast has ranged from 0.50 to 1.67 times its postseason value (Table II-2). The 2002 CVI preseason forecast of 825,400 fish is 0.64 times its postseason estimate of 1,284,900 fish (Table II-2). The preseason forecast of 59% for the 2002 CVI harvest index is 1.74 times its postseason estimate of 34% (Table II-1).

2003 Stock Status

A total of 59,100 age-two chinook are estimated to have returned to the Central Valley in 2002, forecasting a 2003 CVI of 1,108,100 adult chinook (Figure II-1), which is 1.34 times the 2002 preseason forecast.

Evaluation of 2002 Regulations on 2003 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. The 2002 index of 34% reflects a record return to the Central Valley and a moderate level of ocean harvest south of Point Arena.

A repeat of 2002 regulations would be expected to result in a CVI harvest index similar to the average of the last five years (45%). Applying the complement of this fraction (1 - 0.45) to the 2003 CVI forecast of 1,108,100 fish and multiplying that quantity by the typical percentage of Central Valley chinook spawners that are fall run fish (approximately 90%), yields a 2003 adult escapement forecast of 548,500 Sacramento River fall chinook, which is well above the upper end of the escapement goal range (Figure II-2).

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	13.7	122.0	570.9	79
1991	254.6	62.1	316.7	112.3	15.4	127.7	444.4	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	10.3	141.8	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	16.3	288.3	1313.5	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	17.6	368.4	1,059.3	65
1998	221.8	114.5	336.3	253.0	39.1	292.1	628.4	54
1999	285.6	76.4	362.0	283.9	20.6	304.5	666.5	54
2000	446.3	146.5	592.8	456.1	25.2	481.3	1,074.1	55
2001	172.5	59.9	232.4	564.2	52.8	617.0	849.4	27
2002[d/]	308.6	132.3	440.9	809.8	34.2[e/]	844.0	1,284.9	34

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 run contributions not yet available; most recent 5-year average escapements used for these components.

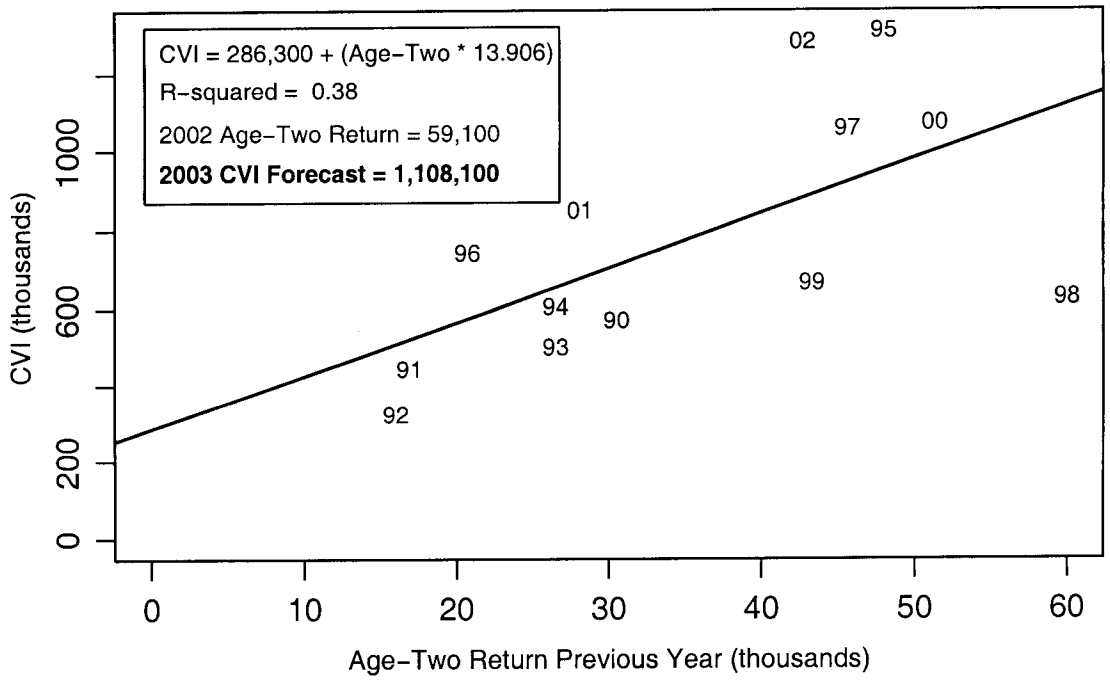

Figure II-1. Regression estimator for CVI based on previous year's river return of age-two Central Valley chinook, 1990-2002. Years shown are CVI year.

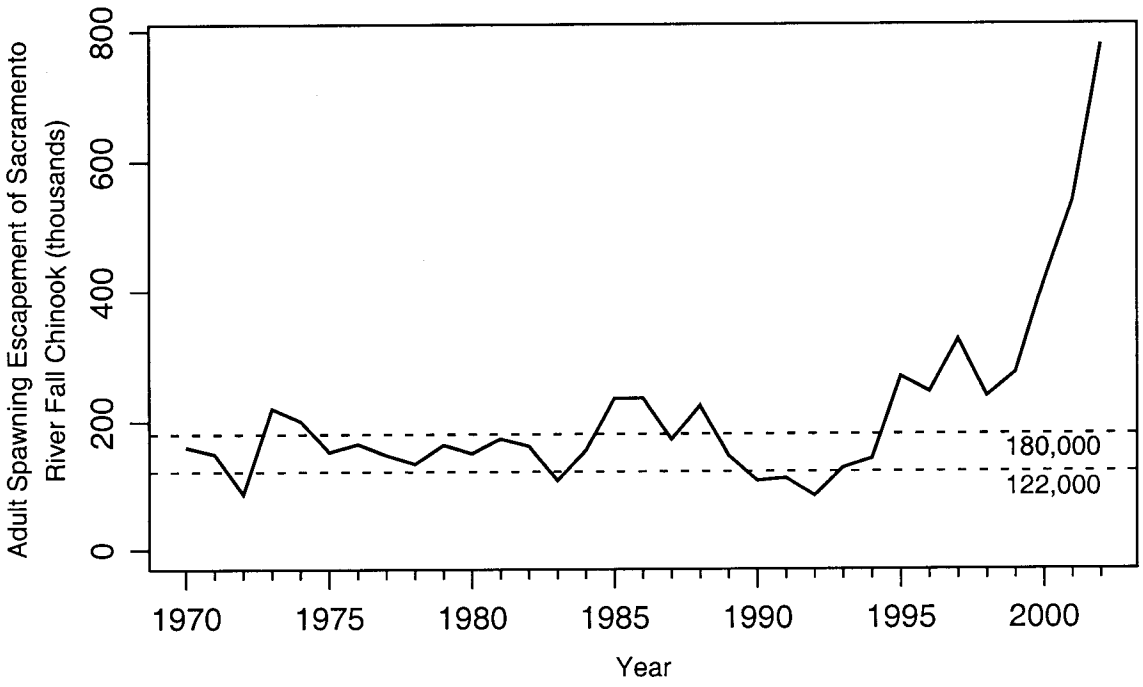

Figure II-2. Spawning escapements of adult Sacramento River fall chinook, 1970-2002 and the goal range for the stock of 122,000 to 180,000 adult fish.

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	Pre/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	444.4	1.05
1992	452.0	323.7	1.40
1993	501.0	500.8	1.00
1994	503.0	605.9	0.83
1995	654.0	1,313.5	0.50
1996	533.0	742.2	0.72
1997	849.0	1,059.3	0.80
1998	1,051.0	628.4	1.67
1999	847.7	666.5	1.26
2000	790.4	1074.1	0.74
2001	649.4	849.4	0.76
2002	825.4	1284.9	0.64
2003	1,108.1	-	-

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 a cohort analysis of coded-wire tag (CWT) information (brood years 1979-1998). 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 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 estimates; for age-four fish from 0.47 to 2.61 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, 2001 age-three forecast (209,000) was 0.41 times its postseason estimate (510,054); the age-four forecast (143,800) was 1.30 times its postseason estimate (110,574); and the total adults forecast (362,500) was 0.58 times its postseason estimate (627,597) (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. The regulations adopted in 2002 were expected to result in 35,000 natural spawning adults and an age-four ocean harvest rate of 12.9%. Based on postseason estimates, there were 65,646 natural spawning adults, and an age-4 ocean harvest rate of 15.6% (Table II-6).

2003 Stock Status

The forecast September 1, 2002 (preseason) ocean abundance of Klamath River fall chinook salmon is 171,300 age-three fish, 132,400 age-four fish, and 6,500 age-five fish (Figure II-3). This is comparable to last year's preseason forecast of 209,000 age-three, 143,800 age-four, and 9,700 age-five fish.

The assessment of 2002 fall fishery impacts on Klamath River fall chinook has not been completed at this time. These assessed impacts will be deducted from the ocean fishery's allocation in determining the 2003 allowable ocean harvest of Klamath River fall chinook.

Evaluation of 2002 Regulations on 2003 Stock Abundance

This evaluation cannot be undertaken at this time, as some of the necessary 2003 data inputs to the KOHM are currently unavailable.

TABLE II-3. **Klamath River fall chinook** ocean abundance (thousands), harvest rate, and river run size estimates (thousands) **by age**. (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	557.4	133.4	690.8	0.30	0.52	39.4	30.0	33.9	2.6	66.5
1983	318.0	113.9	431.9	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	56.9	432.1	0.11	0.25	69.4	32.9	25.6	5.8	64.4
1986	1308.8	141.3	1450.1	0.18	0.46	44.5	162.7	29.8	2.3	194.8
1987	786.4	343.4	1129.8	0.16	0.43	19.0	89.6	112.4	6.8	208.8
1988	750.4	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	179.6	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	767.6	27.6	795.2	0.04	0.13	22.8	193.8	17.5	2.4	213.7
1996	190.2	225.2	415.4	0.05	0.16	9.5	38.7	136.4	0.3	175.4
1997	140.2	62.8	203.1	0.01	0.06	8.0	35.0	44.1	4.6	83.7
1998	154.4	44.8	199.2	0.00	0.09	4.6	59.2	29.6	1.7	90.6
1999	129.1	30.2	159.3	0.01	0.09	19.2	29.1	20.5	1.3	50.9
2000	616.6	44.2	660.8	0.06	0.10	10.2	186.9	30.4	0.5	217.9
2001	376.2[a/]	133.9	510.1	0.02[a/]	0.09	11.3	99.0	88.0	0.2	187.2
2002	510.1[b/]	110.6[a/]	620.6	----[c/]	0.16[a/]	9.2	94.2	62.1	3.7	160.1

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).

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[a/] Sept. 1 (t-1)	Postseason Estimate Sept. 1 (t-1)	Pre/Postseason
	Age-Three		
1985	113,000	276,000	0.41
1986	426,000[b/]	1,308,763	0.33
1987	511,800	786,434	0.65
1988	370,800	750,425	0.49
1989	450,600	367,011	1.23
1990	479,000	177,605	2.70
1991	176,200	69,551	2.53
1992	50,000	39,401	1.27
1993	294,400	164,673	1.79
1994	138,000	116,115	1.19
1995	269,000	767,583	0.35
1996	479,800	190,218	2.52
1997	224,600	140,241	1.60
1998	176,000	154,429	1.14
1999	84,800	129,089	0.66
2000	349,600	616,610	0.57
2001	187,200	376,247[c/]	0.50[c/]
2002	209,000	510,054[c/]	0.41[c/]
2003	171,300	-	-
	Age-Four		
1985	56,875	57,500	0.99
1986	66,250	141,304	0.47
1987	206,125	343,365	0.60
1988	186,375	236,229	0.79
1989	215,500	176,267	1.22
1990	50,125	103,110	0.49
1991	44,625	37,260	1.20
1992	44,750	28,220	1.59
1993	39,125	14,969	2.61
1994	86,125	39,556	2.18
1995	47,000	27,588	1.70
1996	268,500	225,202	1.19
1997	53,875	62,819	0.86
1998	46,000	44,784	1.03
1999	78,750	30,162	2.61
2000	38,875	44,185	0.88
2001	247,000	133,899	1.84
2002	143,800	110,574[c/]	1.30[c/]
2003	132,400	-	-

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[a/] Sept. 1 (t-1)	Postseason Estimate Sept. 1 (t-1)	Pre/Postseason
	Age-Five		
1985	NA	11,275	NA
1986	NA	5,883	NA
1987	5,250	19,532	0.27
1988	13,250	14,724	0.90
1989	10,125	9,592	1.06
1990	7,625	7,708	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	8,864	0.89
1998	3,250	2,382	1.36
1999	2,000	2,093	0.96
2000	1,375	856	1.61
2001	1,250	258	4.84
2002	9,700	6,969[c/]	1.39[c/]
2003	6,500	-	-
	Total Adults		
1985	NA	344,776	NA
1986	NA	1,455,970	NA
1987	723,175	1,149,331	0.63
1988	570,425	1,001,378	0.57
1989	676,225	552,870	1.22
1990	536,750	288,423	1.86
1991	222,325	109,591	2.03
1992	96,000	69,066	1.39
1993	334,650	181,405	1.84
1994	224,625	157,092	1.43
1995	318,000	798,741	0.40
1996	749,425	416,206	1.80
1997	286,350	211,924	1.35
1998	225,250	201,595	1.12
1999	165,550	161,344	1.03
2000	389,850	661,651	0.59
2001	435,450	510,404	0.85
2002	362,500	627,597[c/]	0.58[c/]
2003	310,200	-	-

a/ Original preseason forecasts for years 1985-2001 were for May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the May 1 (t) number by the Sept. 1 (t-1) through May 1 (t) survival rate presumed by modelers in those years: 0.5 age-three, 0.8 age-four, 0.8 age-five.

b/ 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.

c/ Preliminary.

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

	Preseason Ocean Abundance Forecast[a/] Sept. 1 (t-1)		Postseason Ocean Abundance Estimate Sept. 1 (t-1)		Preseason Age-4 Harvest Rate Forecast[b/]		Postseason Age-4 Harvest Rate Estimate[c/]		Preseason Adult Harvest Forecast		Postseason Adult Harvest Estimate	
Year(t)	Age-3	Age-4	Age-3	Age-4	Ocean	River	Ocean	River	Ocean	River	Ocean	River
1986	426,000	66,250	1,308,783	141,304	0.28	0.50	0.46	0.67	72,000	37,700	305,522	46,154
1987	511,800	206,125	786,434	343,365	0.28	0.53	0.43	0.44	121,200	78,200	279,865	73,265
1988	370,800	186,375	750,425	236,229	0.31	0.53	0.39	0.52	114,100	65,400	252,956	73,854
1989	450,600	215,500	367,011	176,267	0.30	0.49	0.36	0.70	128,100	67,600	123,974	54,340
1990	479,000	50,125	177,605	103,110	0.30	0.49	0.55	0.36	85,100	31,200	114,995	11,459
1991	176,200	44,625	69,551	37,260	0.13	0.28	0.18	0.45	16,700	12,800	9,967	13,581
1992	50,000	44,750	39,401	28,220	0.06	0.15	0.07	0.27	4,200	4,200	3,159	6,787
1993	294,400	39,125	164,673	14,969	0.12	0.43	0.16	0.49	20,100	22,500	11,263	12,808
1994	138,000	86,125	116,115	39,556	0.07	0.20	0.09	0.30	10,400	14,300	8,524	13,524
1995	269,000	47,000	767,583	27,588	0.07	0.32	0.13	0.20	13,500	18,500	31,298	21,638
1996	479,800	268,500	190,218	225,202	0.17	0.66	0.16	0.39	88,400	129,100	44,915	69,242
1997	224,600	53,875	140,241	62,819	0.10	0.43	0.06	0.26	17,600	26,500	8,619	17,763
1998	176,000	46,000	154,429	44,784	0.07	0.29	0.09	0.30	10,200	14,800	4,915	17,897
1999	84,800	78,750	129,089	30,162	0.10	0.28	0.09	0.45	12,300	18,100	5,078	16,942
2000	349,600	38,875	616,610	44,185	0.11	0.53	0.10	0.25	24,000	32,400	41,918	35,065
2001	187,200	247,000	376,247	133,889	0.14	0.61	0.09	0.29	45,600	105,300	22,054	50,779
2002[d/]	209,000	143,800	510,054	110,574	0.13	0.57	0.16	0.25	30,000	70,900	42,038	34,528
2003	171,300	132,400	-	-	-	-	-	-	-	-	-	-

a/ Original preseason forecasts for years 1986-2001 were for May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the May 1 (t) number by the Sept. 1 (t-1) through May 1(t) survival rate presumed by modelers in those years: 0.5 age-three, 0.8 age-four, 0.8 age-five.

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

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

d/ Postseason estimates are preliminary.

TABLE II-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	35,817	4,893	40,710	74,242	123,442	197,684	238,394	8,100	18,100	26,200
1987	17,588	5,167	22,755	43,531	57,452	100,983	123,738	11,400	11,400	22,800
1988	15,708	5,070	20,778	23,760	106,759	130,519	151,297	12,500	15,600	28,100
1989	6,311	11,77	18,086	15,277	23,460	38,737	56,823	2,700	900	3,600
1990	81	4,442	4,523	37,064	11,161	48,225	52,748	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	572	613	0	3,266	3,266	3,879	4,543	971	5,514
1995	0	984	984	11,854	14,475	26,329	27,313	11,840	5,536	17,376
1996	0	0	0	0	9,135	9,135	9,135	12,363	3,661	16,024
1997	0	232	232	610	1,211	1,821	2,053	2,166	2,736	4,902
1998	0	6	6	296	466	762	768	2,231	5,781	8,012
1999	61	174	235	1,251	435	1,686	1,921	4,981	1,748	6,729
2000	404	3,247	3,651	8,739	24,899	33,638	37,289	22,458	4,893	27,351
2001[a/]	121	110	231	2,864	6,285	9,149	9,380	17,885	7,294	25,179
2002[a/]	413	1,489	1,902	2,852	18,546	21,398	23,300	11,518	6,182	17,700
Age-Four										
1986	7,787	1,121	8,908	23,484	32,095	55,579	64,487	17,000	2,900	19,900
1987	21,800	4,442	26,242	71,370	49,013	120,383	146,625	41,000	8,500	49,500
1988	11,941	3,635	15,576	27,136	50,577	77,713	93,289	38,600	6,200	44,800
1989	5,935	9,625	15,560	31,974	16,296	48,270	63,830	41,000	7,700	48,700
1990	3,958	2,866	6,824	39,396	10,504	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	1,117	1,419	2,536	3,608	6,666	812	7,478
1995	0	224	224	1,759	1,703	3,462	3,686	2,957	481	3,438
1996	768	3,450	4,218	10,275	20,760	31,035	35,253	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	378	393	1,653	692	2,345	2,738	8,789	494	9,283
2000	116	892	1,008	2,453	1,052	3,505	4,513	6,733	756	7,489
2001	1,304	1,594	2,898	5,819	3,919	9,738	12,636	20,759	4,819	25,578
2002[a/]	2,070	878	2,948	4,431	9,901	14,332	17,280	11,698	4,054	15,752

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	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	0.02	0.02	0.02	0.18	0.07	0.25
2002[a/]	0.00	0.00	0.00	0.01	0.04	0.04	0.05	0.12	0.07	0.19
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	0.05	0.02	0.08	0.09	0.43	0.02	0.45
2000	0.00	0.02	0.02	0.06	0.02	0.08	0.10	0.22	0.02	0.25
2001	0.01	0.01	0.02	0.04	0.03	0.07	0.09	0.24	0.05	0.29
2002[a/]	0.02	0.01	0.03	0.04	0.09	0.13	0.16	0.19	0.07	0.25

a/ Preliminary data (incomplete cohort).

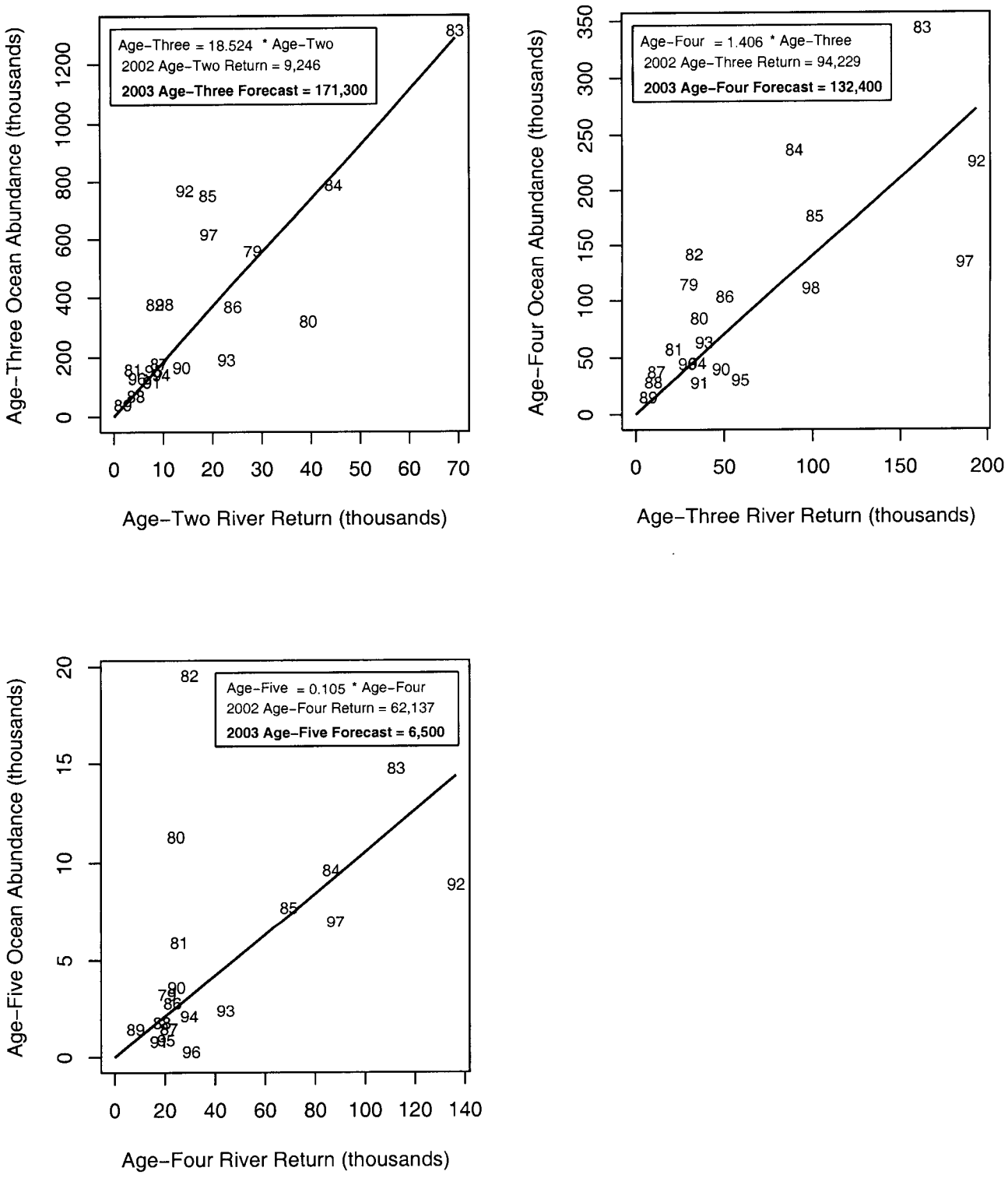

Figure II-3. Regression estimators for Klamath River fall chinook ocean abundance (Sept. 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

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.

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, Canada 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, Canada, Washington, and Oregon with minor contributions to California fisheries.

Predictor Description and 2003 Stock Status

Quantitative abundance predictions are not made 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 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 2002 Ocean Salmon Fisheries*, Chapter II, Table II-4 and Figure II-3). Natural fall chinook stocks from the Nehalem River on the NOC 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 CWT'd 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 2003 are the NOC stock will be above average abundance levels.

Mid-Oregon Coast

Since 1992, the Elk River Hatchery production has been CWT'd for use as an indicator stock for the MOC stock component. Age specific ocean abundance forecasts for 2003 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 2003 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 2002 Ocean Salmon Fisheries*, Appendix B, Table B-11).

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, Canada and southeast Alaska.

Predictor Description and 2003 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 2002 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 2003 is currently unavailable, but will likely be 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 2002 Regulations on 2003 Stock Abundance

Given the 2002 regulations and the projected 2003 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-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[e/]	0.9[e/]	0.6	14.5
2001	0.8	2.3	4.1	0.0	7.2	0.02[f/]	0.09	20.2	8.1	0.0	28.4[g/]
2002	0.9	NA	NA	NA	12.7	0.02	0.16	17.5	11.9	0.9	30.4
2003	-	-	-	-	-	-	-	NA	NA	NA	NA

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

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

c/ Based on cohort reconstruction methods. Index values for 2003 predicted from regression equations; postseason estimates are not available.

d/ Excludes age-six fish.

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

f/ 1997-2001 average age-three harvest rate/age-four harvest rate.

g/ Preseason forecast.

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 2003 return of each fall chinook stock group is estimated using relationships between successive age groups within a cohort. The database for these relationships was constructed by combining age-specific estimates of escapement and inriver fishery catches for years since 1964 (except for MCB which started in 1980). Typically, only the more recent broods are used in the current predictions. Fall chinook stock identification in the Columbia River mixed stock fisheries is determined by sampling catch and escapement for 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 2002 Ocean Salmon Fisheries* (Appendix B, Tables B-15 through B-20). The 2002 returns for the five fall chinook stocks listed in this report may differ somewhat from those provided in the *Review of 2002 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 1991-2002 average March preliminary preseason estimates as a percentage of the postseason estimates for the URB, LRW, LRH, SCH, and MCB stock estimates are 0.87, 0.85, 0.90, 0.94, and 1.01 respectively. The only March preliminary preseason estimate to show a consistent bias was LRH, which has been underpredicted the past nine years. The other four stocks 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.

2003 Stock Status

The preliminary forecast for 2003 URB fall chinook ocean escapement is 280,400 adults. If the forecast is realized, it would be similar to last year's return which was the largest return since 1988 and would be the fourth largest since 1964. The forecast is about 84% greater than the recent ten-year average of 150,400.

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
	2002	281.0	273.8	276.9	1.01	0.99
	2003	280.4	-	-	-	-
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
	2002	18.7	18.3	24.9	0.75	0.73
	2003	24.6	-	-	-	-
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
	2002	137.6	133.0	156.4	0.88	0.85
	2003	115.9	-	-	-	-

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
	2002	144.4	136.0	160.8	0.90	0.85
	2003	96.9	-	-	-	-
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
	2002	96.2	91.8	108.4	0.89	0.85
	2003	104.8	-	-	-	-

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.

No preseason forecast for 2003 ocean escapement of ESA-listed Snake River wild fall chinook is currently available. However, the Columbia River technical staffs are expected to develop a run size estimate for this stock prior to the April Council meeting.

Ocean escapement of LRW fall chinook in 2003 is forecast at 24,600 adults. The forecast indicates a return similar to last year, which was the second largest since 1989 and is almost double the recent ten-year average return of 13,500.

The preliminary forecast for 2003 ocean escapement of LRH fall chinook is for a return of 115,900 adults, which would be less than last year, but still the second largest return since 1989, and nearly double the recent ten-year average of 64,800.

Ocean escapement of SCH fall chinook in 2003 is projected to be 96,900 adults. Although it will be less that last year, it will still be the third largest return since 1982, and almost double the recent ten-year average of 50,600.

The preliminary forecast for the 2003 ocean escapement of MCB fall chinook is 104,800 adults. The forecast would represent the largest return on record, more than last year's return, and more than double the recent ten-year average of 49,100. 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 2002 Regulations on 2003 Stock Abundance

Applying 2002 regulations to the projected 2003 abundance of Columbia River fall chinook would result in ocean escapements of all five major stock units being greater than spawning escapement goals. Compared to 2002, ocean escapement is expected to be the same for URB and LRW, slightly greater for MCB, but slightly lower for LRH and SCH stocks.

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.

2003 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 14,200 adults, down approximately 24% from the 2002 preseason forecast. The natural fall chinook ocean escapement abundance forecast is 2,400 adults, down approximately 35% from the 2002 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.

TABLE II-9. Comparison of **preseason and postseason** forecasts **of Puget Sound** run size for **summer/fall chinook.**[a/] (Page 1 of 2)

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
	Nooksack-Samish - Hatchery and Natural			**East Sound Bay - Hatchery**			**Skagit - Hatchery**			**Skagit - Natural**		
1993	50.4	32.9	1.53	3.2	3.8	0.84	1.0	1.4	0.71	14.0	7.0	2.00
1994	46.6	28.1	1.66	3.2	0.8	4.00	1.3	4.3	0.30	8.4	6.6	1.27
1995	38.5	22.2	1.73	3.5	0.2	17.50	1.6	3.3	0.48	5.0	9.6	0.52
1996	27.0	29.4	0.92	1.7	0.7	2.43	1.0	1.2	0.83	7.1	12.2	0.58
1997	34.0	34.2	0.99	1.2	1.2	1.00	0.1	0.0	-	6.4	6.2	1.03
1998	28.0	29.5	0.97	0.5	0.3	1.67	0.0	0.1	-	6.6	14.9	0.43
1999	27.0	40.9	0.72	2.3	0.3	7.67	0.0	0.0	-	7.6	5.2	1.46
2000	19.0	33.5[b/]	0.57	5.0	0.1[b/]	50.00	0.0	0.2[b/]	-	7.3	17.2[b/]	0.60
2001	34.9	63.9[b/]	0.55	1.6	0.1[b/]	16.00	0.0	0.1[b/]	-	9.1	14.0[b/]	0.65
2002	52.8	-	-	1.6	-	-	0.0	-	-	13.8	-	-
	Stillaguamish - Natural			**Snohomish - Hatchery**			**Snohomish - Natural**			**Tulalip - Hatchery**		
1993	NA	1.3	NA	1.6	2.7	0.59	4.9	5.7	0.86	2.8	1.4	2.00
1994	NA	1.3	NA	1.8	5.4	0.33	4.5	5.0	0.90	2.8	1.9	1.47
1995	1.8	1.4	1.29	2.2	6.0	0.37	4.3	5.9	0.73	2.3	4.1	0.56
1996	1.3	2.3	0.57	6.7	9.2	0.73	4.2	8.0	0.53	2.7	4.0	0.68
1997	1.6	1.2	1.33	7.7	2.7	2.85	5.2	4.4	1.18	4.0	8.6	0.47
1998	1.6	1.5	1.07	6.5	1.1	5.91	5.6	6.4	0.88	2.5	7.2	0.35
1999	1.5	1.1	1.36	7.8	1.6	4.88	5.6	4.8	1.17	4.5	15.2	0.30
2000	2.0	1.7[b/]	0.88	6.2	1.5[b/]	4.13	6.0	6.1[b/]	0.98	5.0	8.4[b/]	0.60
2001	1.7	1.4[b/]	1.21	4.1	0.7[b/]	5.86	5.8	8.4[b/]	0.69	5.5	5.1[b/]	1.08
2002	2.0	-	-	6.8	-	-	6.7	-	-	5.8	-	-
	South Puget Sound - Hatchery			**South Puget Sound - Natural**			**Hood Canal - Hatchery and Natural**					
1993	61.8	36.8	1.68	26.5	19.8	1.34	11.7	4.8	2.44			
1994	52.7	48.9	1.08	18.0	29.9	0.60	11.5	3.8	3.03			
1995	49.6	74.5	0.67	21.7	34.5	0.63	3.9	9.4	0.41			
1996	51.9	58.3	0.89	19.0	35.8	0.53	9.0	8.2	1.10			
1997	65.1	46.5	1.40	18.2	20.6	0.88	2.7	7.9	0.34			
1998	67.8	54.5	1.24	21.8	27.7	0.79	6.7	16.3	0.41			
1999	59.4	83.6	0.71	19.6	17.0	1.15	14.0	29.6	0.47			
2000	77.5	55.8[b/]	1.39	17.5	13.9[b/]	1.26	19.2	21.3[b/]	0.90			
2001	73.7	96.4[b/]	0.76	16.2	20.2[b/]	0.80	25.3	19.3[b/]	1.31			
2002	90.8	-	-	16.9	-	-	24.0	-	-			

TABLE II-9. Comparison of **preseason and postseason** forecasts **of Puget Sound** run size for **summer/fall chinook.**[a/] (Page 2 of 2)

Year	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason	Preseason Forecast	Postseason Return	Pre/Postseason
	Strait of Juan de Fuca - Hatchery			**Strait of Juan de Fuca - Natural**								
1993	0.7	0.2	3.50	3.1	2.4	1.29						
1994	3.9	1.6	2.44	1.0	0.5	2.00						
1995	3.0	0.1	30.00	0.9	2.7	0.33						
1996	2.8	0.2	14.00	0.9	3.1	0.29						
1997	2.2	0.3	7.33	0.8	3.5	0.23						
1998	1.7	1.7	1.00	0.9	1.9	0.47						
1999	1.9	0.7	2.71	0.9	2.7	0.33						
2000	2.0	1.2[b/]	1.83	1.1	1.7[b/]	0.82						
2001	0.0	1.7[b/]	0.00	3.5	2.0[b/]	1.75						
2002	0.0	-	-	3.6	-	-						

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.

2003 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.

Summer/Fall Chinook

Preliminary information for Puget Sound summer/fall stocks indicates the total 2003 return is expected to be similar to the 2002 preseason forecast for both hatchery and natural stocks. Changes in the abundance of individual stocks from various production areas are detailed in Table I-1.

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 2002 Regulations on 2003 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 2002 Council area regulations on projected 2003 abundance would not provide a useful comparison of ocean escapement.